

ERODE SENGUNTHAR ENGINEERING COLLEGE



(An Autonomous Institution, Affiliated to Anna University) PERUNDURAI, ERODE - 638 057

UG Curriculum and Syllabus

(1 to 8 Semesters)

B.E – ELECTRONICS AND COMMUNICATION ENGINEERING

Choice Based Credit System (CBCS)

REGULATION 2019



ERODE SENGUNTHAR ENGINEERING COLLEGE, ERODE DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATIONS - 2019

(Students admitted from 2020-21 onwards)

CHOICE BASED CREDIT SYSTEM

I TO VIII SEMESTERS CURRICULUM

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	n Program for the st right at the start of t			ed	•	Cr Ur Lit Pr Le	eative niversa erary oficien cture sits to	al Huma ncy Moo by Emii local A	an Valu dules nent pe reas	ople	ch & Inno	ovations
FIRST SE	MESTER		bjective						Max	Imum	Marks	
Code No	Course	PEO	Outcome	s PSO	L	Т	Р	С			-	Catego
		s	POs	s		2			CA	ES	Total	ry
19BS101	Calculus and its Applications	1,11	1,2,3, 4,12	-	3	1	0	4	40	60	100	BS
19BS102	Engineering Physics	1,11	1,2,4, 5,6,8,9	1,2	2	0	2	3	40	60	100	BS
19BS103	Engineering Chemistry	1,11	1,2,3,4 5,7,12	1,2	3	0	0	3	40	60	100	BS
19ES101	Python Programming	1,11,111	1,2,3, 4,12	-	3	0	0	3	40	60	100	ES
19HS101	Communicative English	III	2,3,6, 9,10, 12	-	3	0	0	3	40	60	100	HS
19TPS01	Soft Skills - I	Ш	8,9, 10,12	-	1	0	1	1.5	40	60	100	EEC
			P	RACTI	CAL	5						
19BS105	Chemistry Laboratory	1,11	1,2,3,4 ,5,12	-	0	0	4	2	60	40	100	BS
19ES104	Python Programming Laboratory	1,11,111	1,2,3,4 ,5, 12	- 1	0	0	2	1	60	40	100	ES
19ES106	Engineering Graphics	1,11	1,2,3,5 10,12	1	0	0	4	2	60	40	100	ES

TOTAL

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Code No	Course		Objective Outcome		$\gamma \lambda$	т	Р	с	Max	imum	Marks	Categ
Code No	Course	PE Os	POs	PSO s	L	13	P		CA	ES	Total	ory
19BS201	Vector Calculus and Complex Variables	1,11	1,2,3, 4,12	-	3	1	0	4	40	60	100	BS
19ES202	Advanced C Programming	1,11,1 11	1,2,3, 4,12	-	3	0	0	3	40	60	100	ES
19ES205	Electrical Engineering	1,11,1 	1,2,3,4 ,5,6, 11,12	1,2	3	0	0	3	40	60	100	ES
19ES208	Analog Electronics-l	1,11,1 11	1,2,3,4 ,5,6, 11,12	1,2	3	0	0	3	40	60	100	PC
	Language Elective	I,IV	2,3,6,9,10,12	-	3	0	0	3	40	60	100	HS
19MC201	Environmental Science and Engineering	I,IV	1,2,3,4 ,5,6,7, 8,12	-	3	0	0	0	40	60	100	MC
19TPS02	Soft Skills - II	Ш	8,9,10, 12	-	1	0	1	1.5	40	60	100	EEC
			F	PRACTI	CAL	5						
19ES214	Advanced C Programming Laboratory	I,II,I II	1,2,3,4 ,12	-	0	0	4	2	60	40	100	ES
19ES219	Devices Laboratory	1,11,1 11	1,2,3,4 ,5, 11,12	1,2	0	0	2	1 •	60	40	100	PC
				Total	19	1	7	20.5	400	500	900	a 24

Code No	Course		ojective &			Т	Р	С	Max	imum	Marks	Categ
Code No	Course	PEOs	POs	PSO s	L	6	P (U	CA	ES	Total	ory
19BS301	Applied Linear Algebra	1,11	1,2,3,4		3	1	0	4	40	60	100	BS
19EC301	Analog Electronics-II	1,11,111	1,2,3,4 ,5,6, 11,12	1,2	3	0	0	3	40	60	100	PC
19EC302	Digital Electronics	1,11,111	1,2,3,4 ,5,6, 11,12	1,2	3	0	0	3	40	60	100	PC
19EC303	Signals and Systems	1,11,111	1,2,3,4 ,5,6, 11,12	1,2	3	1	0	4	40	60	100	PC
19EC304	Network Theory	1,11,111	1,2,3,4 ,5,6,12	1,2	3	1	0	4	40	, 60	100	ES

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19MC301	Indian Constitution	I,IV	6,8,10, 11,12	3	2	0	0	0	40	60	100	MC
19TPS03	Quantitative Aptitude and Logical Reasoning - I	I,IV	1,2,9, 10,12	-	2	0	0	0	40	60	100	EEC
			PR	ACTICA	۹LS							
19EC305	Analog Electronics Laboratory	1,11,111	1,2,3, 4,5,6, 11,12	1,2	0	0	2	1	60	40	100	PC
19EC306	Digital Electronics Laboratory	1,11,111	1,2,3, 4,5,6, 11,12	1,2	0	0	2	1	60	40	100	PC
				Total	19	3	4	20	400	500	900	-

		Object	ive & Ou	tcomes					Max	imum	Marks	Cate
Code No	Course	PEOs	POs	PSOs		Т	P	С	CA	ES	Total	gory
19 BS 404	Probability and Stochastic Process	1,11	1,2,3, 4,12	-	3	1	0	4	40	60	100	BS
19BS407	Electromagnetics and Waveguides	1,11,111	1,2,3, 4,5,6, 11,12	1,2	3	0	0	3	40	60	100	BS
19EC401	Linear Integrated Circuits	1,11,111	1,2,3, 4,5,6, 11,12	1,2	3	0	0	3	40	60	100	PC
19EC402	Digital Signal Processing	1,11,111	1,2,3, 4,5,6, 11,12	1,2	3	1	0	4	40	60	100	PC
19EC403	Analog Communication	1,11,111	1,2,3, 4,5,6, 11,12	1,2	3	0	0	3	40	60	100	PC
19ES401	Control System Engineering	1,11,111	1,2,3, 4,5,6, 11,12	1,2	3	1	0	4	40	60	100	ES
19TPS04	Quantitative Aptitude and Logical Reasoning - II	I,IV	1,2,9, 10,12	-	2	0	0	0	40	60	100	EEC
71,0,2-		and star	PR	ACTICA	LS		1					301
19HS401	Language Skills	I,IV	5,,9, 10,12		0	0	2	0	100	0	100	EEC
19EC404	Linear Integrated Circuits Laboratory	1,11,111	1,2,3, 4,5,6, 11,12	1,2	0	0	2	1	60	40	100	PC

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19EC405	Digital Signal Processing Laboratory	1,11,111	1,2,3, 4,5,6, 11,12	1,2	0	0	2	1	60	40	100	PC
	in the second			Total	20	3	4	23	500	500	1000	

Code No	Course	Object	tive & Out	comes		Т	Р	с	Max	imum	Marks	Categ
oute No	Course	PEOs	POs	PSOs				Ŭ	CA	ES	Total	ory
19EC501	Antennas and Wave Propagation	1,11,111	1,2,3,4 ,5,6, 11,12,	1,2	3	0	0	3	40	60	100	PC
19EC502	Digital Communication	1,11,111	1,2,3,4 ,5,6, 11,12	1,2	3	0	0	3	40	60	100	PC
19EC503	Microprocessor, Microcontroller and Interfacing	1,11,111	1,2,3,4 ,5,6, 11,12,	1,2	3	0	0	3	40	60	100	PC
	Professional Elective – I	-		-	3	0	0	3	40	60	100	PE
	Open Elective -I	-	-	- 3	3	0	0	3	40	60	100	OE
19HS402	Universal Human Values 2 : Understanding Harmony	IV	1,2,4,7 , 8,11, 12		3	0	0	3	40	60	100	HS
19TPS05	Quantitative Aptitude and Logical Reasoning - III	I,IV	1,2,9, 10,12		2	0	0	0	40	60	100	EEC
			PR	ACTICA	LS						150.5	
19EC504	Microprocessor Microcontroller and Interfacing Laboratory	1,11,111	1,2,3,4 ,5,6, 11,12	1,2	0	0	2	1	60	40	100	PC
19EC505	Communication Systems Laboratory	1,11,111	1,2,3,4 ,5,6, 11,12	1,2	0	0	2	1	60	40	100	PC
19EC506	Mini Project	I,II,III.I V	1,2,3,4 ,5,6,7, 8,9,10, 11,12		0	0	2	1	100	0	100	EEC
19EC507	Internship /Industrial Training	1,11,111.1 V	1,2,3,4 ,5,6,7, 8,9,10, 11,12		0	0	2	1	100	0	100	EEC
				Total	20	0	8	22	600	500	1100	-

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Cada Na	Courses	Object	tive & Ou	tcomes		-	Р		Max	kimum	Marks	Categ
Code No	Course	PEOs	POs	PSOs	L	T	P	С	CA	ES	Total	ory
19CS403	Computer Networks	1,11,111	1,2,3, 4,8, 10,12	1,2	3	0	0	3	40	60	100	PC
19EC601	Mobile Communication	1,11,111	1,2,3,4 ,5,6, 11,12	1,2	3	0	0	3	40	60	100	PC
19EC602	CMOS VLSI Design	1,11,111	1,2,3,4 ,5,6, 11,12	1,2	3	0	0	3	40	60	100	PC
	Professional Elective – II			-	3	0	0	3	40	60	100	PE
	Open Elective-II	-		-	3	0	0	3	40	60	100	OE
19TPS06	Quantitative Aptitude and Logical Reasoning - IV	I,IV	1,2,9, 10,12	-	2	0	0	0	40	60	100	EEC
			PR	ACTICA	LS							
19HS601	Professional Skills	I,IV	1,5,7,8 ,9,12	-	0	0	2	0	60	40	100	EEC
19EC603	VLSI Design Laboratory	1,11,111	1,2,3,4 ,5,6, 11,12,	1,2	0	0	2	1	60	40	100	PC
19CS406	Networking Laboratory	1,11,111	1,2,3,4 ,5,12	1,2	0	0	4	2	60	40	100	PC
19EC604	Comprehension Review	I,II,III.I V	1,2,3,4 ,5,6,7, 8,9,10, 11,12	-	0	0	2	0	100	0	100	EEC
				Total	17	0	10	18	520	480	1000	

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Code No	Course		bjective Outcome			Т	Р	C	Max	imum l	Marks	Categ
ooue no	2 Roll Amaria	PEOs	POs	PSOs	-			Ŭ	CA	ES	Total	ory
19EC701	Microwave Engineering	1,11,111	1,2,3, 4,5,6, 11,12	1,2	3	1	0	4	40	60	100	PC
19EC702	Optical Fiber Communication	1,11,111	1,2,3, 4,5,6, 11,12	1,2	3	0	0	3	40	60	100	PC
19EC703	Embedded and Real time Systems			-	3	0	0	3	40	60	100	PC

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	Professional Elective – III	-		-	3	0	0	3	40	60	100	PE
	Professional Elective –IV				3	0	0	3	40	60	100	PE
	Professional Elective – V				3	0	0	3	40	60	100	PE
	1		P	RACTIC	ALS							1.
19EC704	Optical and Microwave Laboratory	1,11,111	1,2,3, 4,5,6, 11,12	1,2	0	0	2	1	60	40	100	PC
19EC705	Embedded and Real time Systems Laboratory	1,11,111	1,2,3, 4,5,6, 11,12	1,2	0	0	2	1	60	40	100	PC
19EC706	Project work Phase-I	I,II,III,I V	1,2,3, 4,5,6, 7,8,9, 10,11, 12	1,2,3	0	0	2	1	60	40	100	EEC
				Total	18	1	6	22	420	480	900	-

Code No	Course		bjective utcome		L	т	Р	с	Max	imum	Marks	Catego
oodo no	Course	PEOs	POs	PSOs		e.			CA	ES	Total	ry
	Professional Elective – VI	-		-	3	0	0	3	40	60	100	PE
	Professional Elective – VII				3	0	0	3	40	60	100	PE
		-	Р	RACTIC	ALS							
19EC801	Project Work	I,II,III,I V	1,2,3, 4,5,6, 7,8,9, 10,11 12	1,2,3	0	0	12	6	60	40	100	EEC
				Total	6	0	12	12	140	160	300	10.55

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ELECTIVES

		LANGUA	GE ELECTIVES					
		Ob	jective & Outcon	nes			1.114	
Code No	Course	PEOs	POs	PSOs	L	Т	Р	C
19HX201	English for Engineers	I,IV	2,3,6,9,10,12		3	0	0	3
19HX202	Hindi	I,IV	2,3,6,9,10,12		3	0	0	3
19HX203	Japanese	I,IV	2,3,6,9,10,12	-	3	0	0	3
19HS204	French	I,IV	2,3,6,9,10,12	-	3	0	0	3

		Ohi	ective & Outcom	es				T	
Code No	Course	PEOs	POs	L	Т	Р	C		
	1			PSOs					
		ELEC	CTIVES-I		1 I.				
19ECX01	Medical Electronics	1,11,111	1,2,3,4,11, 12	1,2	3	0	0	3	
19ECX02	Wavelets and Multi- resolution Processing	1,11, <mark>1</mark> 11	1,2,3,4,11,12	1,2	3	0	0	3	
19ECX03	Electrical and Electronics	1,11,111	1,2,3,4,11,12	1,2	3	0	0	3	
19ECX04	Electromagnetic Interference and Compatibility	1,11,111	1,2,3,4,11,12	1,2	3	0	0	3	
19ECX05	Speech Processing	1,11,111	1,2,3,4,11,12	1,2	3	0	0	3	
		ELEC	TIVES-II						
19ECX06	Wireless Adhoc and Sensor networks.	1,11,111	1,2,12	1,2	3	0	0	3	
19ECX07	High speed networks	1,11,111	1,2,12	1,2	3	0	0	3	
19ECX08	Machine Learning	1,11,111	1,2,12	1,2	3	0	0	3	
19ECX09	Artificial intelligence	1,11,111	1,2,12	1,2	3	0	0	3	
19ECX10	Wireless Networks	I,II,III	1,2,12	1,2	3	0	0	3	
		ELEC	TIVES-III						
19ECX11	Data Compression Techniques	1,11,111	1,2,3,4,11, 12,13,14	1,2	3	0	0	3	
19ECX12	Video Analytics	1,11,111	1,2,3,4,11, 12,13,14	1,2	3	0	0	3	
19ECX13	Digital Image Processing	1,11,111	1,2,3,4,11, 12	1,2	3	0	0	3	
19ECX14	Biomedical Image Processing	1,11,111	1,2,3,4,11, 12,13,14	1,2	3	0	0	3	
19ECX15	Statistical Signal processing	1,11,111	1,2,3,4,11, 12	1,2	3	0	0	3	

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19ECY03	PCB Design	1,11, <mark>1</mark> 11	1,2,9,12	1,2	3	0	0	3
19ECY02	Communication Engineering	1,11,111	1,2,9,12	1,2	3	0	0	3
19ECY01	VLSI Design	1,11,111	1,2,9,12	1,2	3	0	0	3
	OPEN ELECTIVES OFF	ERED TO	OTHER DEPART	MENT S	TUDEN	TS	fr Kar	
19MC301	Indian Constitution	I,IV	6,8,9	3	2	0	0	0
19MC201	Environmental Science and Engineering	I,IV	1,2,3,4,5,6,7, 8,12	-	3	0	0	0
		MANDATO	ORY COURSE					-
19ECX35	Soft Computing	1,11,111	1,2,3,4,5,12	1,2	3	0	0	3
19ECX34	security Cognitive Radio	1,11,111	1,2,3,4,5,12	1,2	3	0	0	3
19ECX33	Electromagnetics Cryptography and Network	1,11,111	1,2,3,4,5,12	1,2	3	0	0	3
19ECX32	Computational	1,11,111	1,2,3,4,5,12	1,2	3	0	0	3
19ECX31	Network On Chip	1,11,111	1,2,3,4,5,12	1,2	3	0	0	3
	standardo	ELEC	TIVES-VII	75.2				
19ECX30	Wireless system and standards	1,11,111	1,12	1,2	3	0	0	3
19ECX29	Remote Sensing	1,11,111	1,2,12	1,2	3	0	0	3
19ECX28	Radar and Navigational Aids	1,11,111	1,2,12	1,2	3	0	0	3
19ECX27	Global Positioning Systems	1,11,111	1,2,12	1,2	3	0	0	3
19ECX26	Satellite Communication	1,11,111	1,2,12	1,2	3	0	0	3
		ELEC	TIVES-VI					
19ECX25	Embedded Internet of Things	1,11,111	1,2,3,4,5, 12	1,2	3	0	0	3
19ECX24	Computer Architecture and Interfacing	1,11,111	1,2,12	1,2	3	0	0	3
19ECX23	Modern Electronic Instrumentation	1,11,111	1,2,3,4,12	1,2	3	0	0	3
19ECX22	Nano Electronics	1,11,111	1,2,5,12	1,2	3	0	0	3
19ECX21	RF MEMS	1,11,111	1,2,5,12	1,2	3	0	0	3
			CTIVES-V					
19ECX20	Testing of VLSI Circuits	1,11,111	1,2,3,4,5,12	1,2	3	0	0	
19ECX19	Digital integrated Circuits Low power VLSI	1,11,111	1,2,3,4,5,12	1,2	3	0	0	3
19ECX18	Design and Analysis of	1,11,111	1,2,3,4,5,12	1,2	3	0	0	
19ECX17	System on Chip	1,11,111	1,2,3,4,5,12	1,2	3	0	0	:

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19ECY04	Automotive Electronics	1,11,111	1,2,9,12	1,2	3	0	0	3
19ECY05	Electronic Material	1,11,111	1,2,9,12	1,2	3	0	0	3
19ECY06	Bio medical Instrumentation	1,11,111	1,2,9,12	1,2	3	0	0	3
19ECY07	Sensors for Engineering Applications	1,11,111	1,2,9,12	1,2	3	0	0	3
19ECY08	Principles of Digital Image Processing	1,11,111	1,2,9,12	1,2	3	0	0	3
19ECY09	Discrete time Signal Processing	1,11,111	1,2,9,12	1,2	3	0	0	3
19ECY10	Information and Coding Theory	1,11,111	1,2,9,12	1,2	3	0	0	3
-	ADDI	FIONAL ON	E CREDIT COUR	RSE				
19ECZ01	Simulation Technologies for Real Time Communication Networks	1,11,111	1,3,6,9, 10,11		1	0	0	1
19ECZ02	Hands on Course in Embedded Systems	1,11,111	1,2,3,4,5, 9,11,12	-	1	0	0	1
19ECZ03	Internet of Things (IoT) using CC3200	1,11,111	1,2,3,4,5, 9,11,12	-	1	0	0	1
19ECZ04	Advanced Motor Control Applications Using 32 Bit Real time Controllers	1,11,111	1,2,3,4,5, 9,11,12	-	1	0	0	1
19ECZ05	Advanced System Design Using 16 Bit Ultra Low power Microcontrollers	1,11,111	1,2,3,4,5, 9,11,12	- 1	1	0	0	1
19ECZ06	Advanced Analog System Design	1,11,111	1,2,3,4,5, 9,11,12	-	1	0	0	1
19ECZ07	Hands on Course in PCB Designing using Protel (Altium Designer), PADS tool	1,11,111	1,2,3,4,5, 9,11,12	-	1	0	0	1
19ECZ08	Foundation Course in Community Radio Technology	1,11,111	1,2,3,4,5, 9,11,12		1	0	0	1
19ECZ09	LTE and the Evolution to 4G Wireless Communication	1,11,111	1,6,7,9, 10,11,12		1	0	0	1
19ECZ10	Millimeter wave Communication Networks	I,II,III	1,6,7,9, 10,11,12	-	1	0	0	1
19ECZ11	Fiber Optic Cable Installation and OTDR Testing	1,11,111	1,2,3,4,5, 9,11,12	-	1	0	0	1
19ECZ12	RTOS and its Application	1,11,111	1,6,8,9, 11,12	-	1	0	0	1
19ECZ13	Telematics	1,11,111	1,6,8,9, 11,12	-	1	0	0	1
19ECZ14	Advanced Verification Methodologies	1,11,111	1,6,7,10, 11,12	-	1	0	0	1
19ECZ15	E-Commerce Security	1,11,111	1,2,3,4, 9,11,12	-	1	0	0	1

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19ECZ16	Routing Architecture and Design	1,11,111	1,6,7,9, 10,11,12		1	0	0	1
19ECZ17	Embedded Protocols	1,11,111	1,6,7,9, 10,11,12	-	1	0	0	1

S.No.	S.No. Category			Credi	ts Pe	r Sem	Total Credit	Credit s in %	Range of Total Credits				
		1			IV	V	VI	VII	VIII	Credit	sin %	Min	Max
1	BS	12	4	4	7					27	17	10%	20%
2	ES	6	8	4	4	-22				22	14	10%	20%
3	HS	3	3			3			-	9	6	5%	10%
4	PC		4	12	12	11	12	12	<u></u> s	63	39	30%	40%
5	PE				1	3	3	9	6	21	13	10%	15%
6	OE				·	3	3	1.5	-	6	3	5%	10%
7	EEC	1.5	1.5		-	2	8-	1	6	12	8	10%	15%
	Total	22.5	20.5	20	23	22	18	22	12	160	100	(

BS- Basic Science

PE- Professional Elective

ES-Engineering Science OE- Open Elective

CA – Continuous Assessment

HS-Humanities and Social Science PC- Professional Core

MC – Mandatory Course

ES- End Semester Examination

EEC-Employability Enhancement Course

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SEMESTER-I

Department	ELECTRONICS AND COMMUNIC	ATION		IGINEE	RING	R 2019	Semester- I	BS
Course Code	Course Name		-	Week	Credit	Total	Maximum	Marke
		L	Т	Р	C	Hours	Maximum	Marks
19BS101	CALCULUS AND ITS APPLICATIONS	3	1	0	4	60	100	1
Course Object	tive (s): The purpose of learning this	cours	e is	to				
Interpre	t the introductory concepts of Limit an	d cont	inui	ty		2		
 Find Eig arising in Summarvariables Develop Course Outco Apply dirdifferent Identify a solve the Analyze Characte Integrate Unit I LIM Representation of one variable 	enough confidence to identify surface omes: At the end of this course, learn fferentiation to solve maxima and min iation to differentiate functions and model the real time problems usin higher order ordinary differential equ the characteristics of a linear system erize the functions of several variables the functions for evaluating the surface the functions for evaluating the surface ITS AND CONTINUITY	ariable is on volved e and a ers wil ima pr ng first uations with E s and g ice are tinuity	es e of i in area l be oble ord s. iiger iiger iiger a a	the po solving a there l able to ems use ler linea h values the solu nd volue	owerful to problem by solvin : e both the ar differen s and Eig tions of to me.	ools to ha ns related <u>g using int</u> e limit defin ntial equation he same.	ndle practical to functions c egration nition and rules ions. Recogniz s.	problems of several s of e and 12
of higher orde	tial equations of second and higher o er with variable coefficients: Cauch	y's lin	near	differe	ential equ	uation - M	ar differential e Method of var	quations iation of
parameters for	second order differential equations-V EN VALUES AND EIGEN VECTORS	<i>ibratin</i>	ig si	tring-Ele	ectrical c	ircuits		12
Eigen Values	and Eigen Vectors of a real matrix - atrix- Diagonalisation-Quadratic form:	Prope	ertie	s of Eig n of a g	gen Valu uadratic	es - Cayle	ey - Hamilton [*]	Theorem
Unit IV MUL	TIVARIABLE CALCULUS							12
Functions of T	wo Variables and their solutions- To maxima and minima.	tal Diff	ere	ntial - D	Derivative	e of implic	it functions-Jac	
Unit V MUL	TIPLE INTEGRALS			/				12
Double integra Area as double	tion with constant and variable limits integral in cartesian coordinates. Trip	s-Regio	on o egra	of integ I in Car	ration -C tesian co	hange the	e order of inte	gration -
Text Books(S)								
1. Thomas (Calculus, 14th Edition by Pearson				/			
The second s	yszig, Advanced Engineering Mathem	natics,	Ter	nth Editi	ion, Wile	India Pri	vate Limited, N	lew Delhi
Limited, 2								
" Publishing	vlie and C Louis Barrett, Advanced Er Company Ltd, 2003.			-				w-Hill
5. Glyn Jame	es, Advanced Engineering Mathemati	cs, Fo	urth	Edition	, Wiley I	ndia, 2015	i.	
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Department	ELECTRONICS AND COMMUN	IICATIO	N ENG	GINEE	RING	R 2019	Semester-I E
Course Code	Course Name	Но	urs / V		Credit	Total	Maximum Mar
4000400		L	Т	P	C	Hours	
19BS102	ENGINEERING PHYSICS (s): The purpose of learning this cou	2	0	2	3	60	100
Engineering a Get the basic Acquire know Enhance the Understand b Course Outcomes Gain knowled Acquire know Have adequa Get knowled microscopes.		of mate will be a atter and s and t ber & Las s of qu	erials able to d its ap heir ap ser an antum	: oplicati oplicati d their theor	ons ons application y and its	ons s applica	tions in tunnelir
expansion of	knowledge on the concepts of the joints and heat exchangers OPERTIES OF MATTER	ermal p	roperti	es of	materials	s and the	
and the second	strain diagram and its uses - torsio	nol et-		ما ما م 1		hadette	
pendulum: theory a uniform and non-un	nd experiment - bending of beams - iform bending: theory and experime RASONICS	- bendin	g mon	nent –	cantileve		
and the second	fication of Sound- Ultrasonics Pro	duction	Ma				
generator-cavitatior and reflection mode	ns-ultrasonic cleaning-Non Destruct es- A, B and C – scan displays- Engi	tive Tes	sting- I	Pulse	echo sys	stem thro	ugh transmissio and drilling.
	SER AND FIBRE OPTICS						
nomojunction and h and acceptance ang and displacement.	of energy levels, Einstein's A an neterojunction – Industrial application gle - types of optical fibres (material	ons of la	aser. F	Fiber c	ptics: pri	nciple, n	umerical apertur sensors: pressur
	ANTUM PHYSICS	Constr	n effe	ot. 11			e et el superificación
wave particle dual Schrödinger's wave dimensional rigid bo		ept of v	vave f	unctio	n and it	s physic	al significance - article in a one
	RMAL PHYSICS						
conduction, convect heory and experin	ergy – thermal expansion of solids a tion and radiation – heat conduction nent - conduction through compo- and solar water heaters.	ns in so	lids –	therma	al conduc	tivity - Le	ee's disc method
	Sale					P.le	Bos

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TEXT BOOK(S):

- 1. Bhattacharya, D.K. & Poonam, T. —Engineering Physics . Oxford University Press, 2015
- 2. Gaur, R.K. & Gupta, S.L. —Engineering Physics□. Dhanpat Rai Publishers, 2012
- 3 Pandey, B.K. & Chaturvedi, S. —Engineering Physics ... Cengage Learning India, 2012

REFERENCE(S):

- 1. Halliday, D., Resnick, R. & Walker, J. Principles of Physics. Wiley, 2020
- 2. Serway, R.A. & Jewett, J.W. Physics for Scientists and Engineers. Cengage Learning, 2019
- 3. Tipler, P.A. & Mosca, G. Physics for Scientists and Engineers with Modern Physics'. W.H.Freeman, 2007

Total: 30 hours

Exp No.	Name of Experiments (Any Five)
1	Determination of Rigidity Modulus – Torsion Pendulum
	Determination of Young's Modulus by Non-Uniform Bending Method
3	(a) Determination of Wavelength, and Particle Size using Laser(b) Determination of Acceptance Angle in an Optical Fiber.
	Determination of Thermal Conductivity of a Bad Conductor – Lee's Disc Method.
	Determination of Velocity of Sound and Compressibility of Liquid – Ultrasonic Interferometer
6	Determination of Wavelength of Mercury Spectrum – Spectrometer Grating
7	Determination of Band gap of a Semiconductor
	Determination of Thickness of a thin wire – Air Wedge Method

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Department	ELECTRONICS AND COMMUN				ERING	R 2019	Semester-I	BS
Course Code	Course Name	Hour			Credit	Total	Maximun	Marks
		L	Τ	Ρ	С	Hours		
19BS103	ENGINEERING CHEMISTRY	3	0	0	3	45	10	0
 Know the Understation Gain know Know the 	and the basic concepts of water ch e fundamental concepts of Electro and the principles and generation of owledge on polymers e types of fuels and the manufactu mes: At the end of this course, lea	chemistr of energy re of soli	y and / in Ba id, liq	l corro atterie uid ar	osion. es, Solar o nd gaseou	cells & Nu		
 Know the Impart kr energy s Aware th Impart kr 	e students conversant with water tr e reaction involved in corrosion and nowledge on renewable energy so torage devices. e synthesis & industrial application nowledge on different types of fu- tion process.	d corrosi urces like n of poly:	on pr e nuc mers	otecti lear,	on metho solar and	wind and		
and the second	TER CHEMISTRY		-					9
Reverse Osmo Unit II ELE Electrochemica Chemical serie corrosion (galv	es (scales,sludge,priming,foam osphate, sodium aluminate and osis. CTROCHEMISTRY AND CORRO al cell - redox reaction, electrode es-Standard hydrogen electrode- anic, differential aeration) - types- ressed current cathodic protection	calgon) SION potential Calomel factors in	.Exte	nst e	quation (e. Corros	derivation ion: chem	and problem	9 s). Electro ochemica
	RGY SOURCES	method	•					9
Introduction- n breeder reacto	uclear energy- nuclear fission- n r. Batteries and fuel cells:Types c ll :H2 -O2 fuel cell.							r reactor
Unit IV POL	YMER CHEMISTRY						•	9
based on sour Preparation, pr vinyl chloride, njection, extrus		olymeriz	ation (epo	add xy re	ition, con sin and b	densation bakelite) a	and copolyn Ind thermopla	nerization stics (poly moulding
and the second se	LS AND COMBUSTION							9
netallurgical contractions of the second s	ion- classification of fuels- solid oke (Otto Hoffmann method) – L Bergius processes- knocking- oc es(LPG)- water gas- bio diesel. Co	iquid fue	els: F umbe	Refiniı r- cet	ng of pet tane num	roleum- s nber – G	ynthetic petro aseous fuels:	I Fischer
EXT BOOK(S),							
	C. and Monica Jain, Engineering	Chemist	try, D	hanpa	at Rai Pu	blishing C	company (P) L	td., New
2. Ravikr	ishnan A., Engineering Chemistry,	Sri Kris	hna H	li-tec	h Publish	ing Comp	any Pvt. Ltd.	Chennai.

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M.OR

1.	Dara S.S. Umare S.S. Engineering Chemistry, S. Chand & Company Ltd., New Delhi 2016
2.	Sivasankar B., Engineering Chemistry, Tata McGraw-Hill Publishing Company, Ltd., New Delhi, 2017.
3.	GowarikerV.R,Viswanatha.N.V,Jayadev Sreedhar-Polymer Science, Publishing company New Age International Publishers, New Delhi,2015.
4.	Ozin G. A. and Arsenault A. C., Nano chemistry: A Chemical Approach to Nano materials, RSC Publishing, 2017.
5.	Ashima Srivastava and Janhavi N N., Concepts of Engineering Chemistry, ACME Learning Private Limited., New Delhi. 2015.

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Course Code	ELECTRONICS AND COMM		Street in some state		R 2019	Semester- I	ES
	Course Name	Hours		Credit	Total	Maximum	Marks
19ES101	PYTHON PROGRAMMING	L 3	TP	C	Hours		
	re (s): The purpose of learning	22		3	45	100	
	problem solving concepts.	g this cours	50 15 10				
		ting longue	an for d	ovolonoro o	nd to rea	ما معما بيسافم ما	
programs.	why Python is a useful script	ung langua	ige for a	evelopers a	nd to rea	d and write sim	pie Pytr
	thon programs with conditiona	ale and loor	20				
	data structures lists, tuples, d	Sources and the second second second					
	tput with files in Python	inclionaries.	•				
	es: At the end of this course, I	learners wi	ill be abl	e to			
	ems solving techniques to real			610			
	and construct common progra	•		ables loop	branch (and input/output	
	e, and test Python programs u				branch, a		
	using dictionaries and function	-	i upies e	ind Strings			
	rite data from/to files in Pythor		c				
the second s	PUTATIONAL THINKING	in rogram.	3.				9
	Computational Thinking -Fro	om abacus	s to ma	chine – T	he first S	Software _First	1.004
omputer-Inform	ation and data - Convertin	ng informa	ation i	nto data -l	Data Ca	pacity Problem	Solvin
echniques: Gen	eral problem Solving concept	s-: Algorith	m, Pseu	ido-code an	d Flowch	art Problem Sol	ving wit
equential Logic	Structure - Problem Solving w	vith Decisio	ons - Pro	blem Solvir	ng with Lo	ops Case Stud	y: Rapto
nd Scratch Tool	A CONTRACT OF A						
	DDUCTION TO PYTHON				_		9
1920	tures - Setting up path - Wor	and the second	A transmission and		c Syntax	- Variable a	nd Dat
	- Conditional Statements - Lo			atements			
and the second se	G MANIPULATION, LIST AN	2002-1-7-7-7-7-100 V.20					9
reating Sing -	Accessing Strings - Bas	ic Operation					
							thods
reating List -	Accessing list - Operation	s on List -					thods
reating List - Iple - Tuple Ope	erations – Functions and Meth	is on List - nods					ethods Creatin
reating List - Iple - Tuple Ope nit IV DICTI	erations – Functions and Meth ONARIES AND FUNCTIONS	is on List - nods	Working	y with lists -	Function	and Methods –	ethods Creatin 9
reating List - uple - Tuple Ope nit IV DICTI reating Dictiona	erations – Functions and Meth ONARIES AND FUNCTIONS ries - Accessing values in dict	is on List - nods tionaries -	Working	with lists -	Function	and Methods – Properties – Fu	ethods Creatin 9 nctions
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Department	ELECTRONICS AND COMMU	NICATIC	N E	NGIN	IEERING	R 2019	Semester-I	HS	
Course Code	Course Name	Hours	/We	ek	Credit	Total	Maximum	Marke	
Course code	Course Name	L	T	Ρ	С	Hours	Maximum	marko	
19HS101	COMMUNICATIVE ENGLISH	3	0	0	3	45	100)	
Course Objective	e (s): The purpose of learning this	s course	is to						
 Acquire basi 	c English grammar.								
 Develop liste 	ening skills to listen lectures and b	basic vide	eos.						
 Enhance the 	e reading skill to comprehend tech	nnical wri	tings.						
 Improve writ 	ing skills to express thoughts free	ely.							
 Develop spe 	aking skills to speak fluently in re	al contex	kts.						
Course Outcome	es: At the end of this course, learn	ners will l	be ab	le to					
Mark Allow Design and the state of the second second	guage usage in LSRW skills.								
 Develop liste 	ening skills to comprehend genera	al / techn	ical ta	alks.					
- Acquire the a	ability to understand different write	ten texts							
	writing skills to express the ideas	s of the le		rs.					
Enhance theCommunication	e fluently in real time context.	s of the le		rs.					
Enhance the Communicat Unit I LAN	e fluently in real time context. GUAGE FOCUS		earne					9	
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Enhance the Communicat Jnit I LAN Parts of speech Tense forms - Su Jnit II LIST istening for spec Telephone etique	te fluently in real time context. GUAGE FOCUS - Word formation - Sentence type bject - Verb agreement ENING cific information: Short conversation tte - Note-taking - Listening for g	oes (dec	larativ	ve, ir gues	- Gap filli	ng - Telej	phone convers	ative) 9 ations	
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TEXT	BOOK(S)
1.	Communicative English by KN Shoba ,Lourdes Joavani Rayen Publised by Cambridge university
REFE	RENCE(S)
1.	Murphy, Raymond. English Grammar in Use – A Self-Study Reference and Practice Book For Intermedia
2.	Seely, John. Oxford Guide to Effective Writing and Speaking. Indian ed. New Delhi: Oxford University Press. 2005.
3.	Anderson, Kenneth et al. Study Speaking: A Course in Spoken English for Academic Purposes. United Kingdom: Cambridge University Press 1992.
4	Wren and Martin, High school English Grammar and Composition, Publisher: S.Chand. 2019.

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Chairman - BoS Dept. of English - ESEC

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Department	ELECTRONICS AND COMMUNICA		and the state of the second		ERING	R 2019	Semester I	EEC
Course Code	Course Name		Hour Wee T		Credit C	Total Hours	Maximum	Marks
19TPS01	SOFT SKILLS - I	1	0	1	1.5	30	100	
Course Object	ive (s): The purpose of learning this of	course	is				1. A.	
 To enha To impro To devel To devel Course Outcor Have con Speak flu Have go 	op basic grammar knowledge in Engli nce Speaking Skills in English ove Verbal and Non-verbal Communica op Confidence and Emotional Intellige op Inter Personal Skills. nes: At the end of this course, learner mpetent knowledge of grammar uent English by enriching Vocabulary I od Presentation Skills through verbal a any Situation with confidence by being	ation S ence rs will Knowl and no	be ab edge on ve	rbal (communi	cation.		
Work in a	a team by having team coherence and			-		- Margar		
	ctive English – Written English					1000	And See	6
	ammar - Parts of Speech – Tenses – \					ction.Dialo	gues and	
	Writing. Exercises to practice and impl	rove t	nese	skills	8.	5 hr 6 h		6
CONTRACTOR	ctive English – Spoken English oms & Phrases – Synonyms – Antony	vme F	ialog	1105	and Cor	voreation	e_Writing Ex	125511
	ove these skills.	ynis.L	nalog	ues	and Col	Iver Sation	s –vvinung. Ex	ercises
	of Communication & The Hidden Da	ata In	volve	d			1	6
on Verbal Com	ication - Effective Communication - A munication - Body Language of self a lings in communication - dealing with d of Teams – Part -01	and ot	hers.				edback.	6
	a of reams – Part -01 it - importance of developing assertive	- ekille	- dev	elon	ing self c	onfidence		
telligence.	t - importance of developing assertive	5 SKIIIC		reiop	ing sen c	onnuence	- developing	emotion
	d of Teams – Part -02		dill's					6
	am work – Team vs. Group - Attribut		a su	cces	sful team	– Barrier	s involved Wo	rking w
	with People- Group Decision Making.					_		
EFERENCES:		1						
	Habits of Highly Effective People -			Cov	/ey.			
	oks in the "Chicken Soup for the Soul"	series	S .					
	rch for meaning – Viktor Frankl							
	est miracle in the world – Og Mandino yahu Goldratt.							
	ith Emotional Intelligence - David Gold	eman.						
	nglish – Sundra Samuel, Samuel Publ							
8. Developing	g Communication Skills by Krishna Mo				120,000			elhi
	of Effective Communication, Ludlow a						And the install	
		AC RO	ok) b	y Ste		el		
10. Effective F	Presentation Skills (A Fifty-Minute Serie interviewing" by Richaurd Camp, Mar				and Jack	L. Simone	etti – Publishec	l by Wil

Chairman - BoS Dept.of ECE - F

Department	ELECTRONICS AND COMMUNI	CATIC	N EN	IGIN	EERING	R 2019	Semester-I	BS
Course Code	Course Name	Hour	s/W	eek	Credit	Total	Maxim	
19 BS 105	CHEMISTRY LABORATORY	L	Т	P	С	Hours	Maximum I	viarks
1963105	CHEWISTRY LABORATORY	0	0	4	2	60	100	-

Course Objective (s): The purpose of learning this course is to

- Determination of total, temporary & permanent hardness of water by EDTA method.
- Determination of chloride content of water sample by argentometric method.
- Estimation of iron content of the given solution using potentiometer.
- Determination of strength of given hydrochloric acid using pH meter.
- Conductometric titration of strong acid vs strong base.

Course Outcomes: At the end of this course, learners will be able to:

- Make the student to acquire practical skills in the determination of water quality parameters through Volumetric analysis.
- Acquire the knowledge about chloride content in water sample.
- Make the student to acquire practical skills about strength of iron using potentiometric titrations.
- Understand the how to estimate hydrochloric acid in water sample using pH meter.
- Gain the knowledge about conductance of ions

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Exp No.	Name of Experiments (Any Ten)
1	Determination of Total, Temporary & Permanent hardness of water by EDTA method.
2	Determination of chloride content of water sample by Argentometric method.
3	Determination of Dissolved oxygen content in water sample using Winklers Method
4	Determination of Alkalinity in Water Sample
5	Determination of strength of given hydrochloric acid using pH meter.
6	Determination of strength of acids in a mixture of acids using conductivity meter.
7	Conductometric titration of Weak acid vs Weak base.
8	Estimation of iron content of the given solution using potentiometer.
9	Conductometric titration of strong acid vs strong base.
10	Determination of Molecular weight of polyvinyl alcohol using Ostwald viscometer
11	Estimation of iron content of the water sample using spectrophotometer
12	Estimation of Copper in Brass

LIST OF EQUIPMENTS

S.No	Description of Equipment	Quantity required	Quantity available
01	Potentiometer	10 Nos.	10 Nos.
02	pH meter	10 Nos.	10 Nos.
03	Conductivity meter	10 Nos.	10 Nos.
04	Spectrophotometer	2 Nos.	2 Nos.
05	Oswald viscometer	30 Nos.	30 Nos.

Chairman - Bo^e Dept. of Chemistry - L. ...

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Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUN		22-33 March		Sector States	R 2019	Semester-I ES
Course Code	Course Name		rs / W	1	Credit	Total	Maximum Marks
		L	Т	P	С	Hours	
19ES104	PYTHON PROGRAMMING LABORATORY	0	0	2	1	30	100
Course Objective	(s): The purpose of learning this c	ourse is	s to				
Implement PUse function	and debug simple Python programs Python programs with conditionals a is for structuring Python programs.	and loop					
	ompound data using Python lists, tr rite data from/to files in Python.	uples a	nd dic	ctiona	ries.		
	s: At the end of this course, learner		e able	e to			
	nd debug simple Python programs						
	ython programs with conditionals a			مما محا			
	hon programs step-wise by defining				-	1.	
	lists, tuples, dictionaries for represe ite data from/to files in Python.	enting c	ompo		iala.		
_ist of Experimen							
	atest among three numbers withou	tueina	third	variat	ale		
	Digits of a Number	it using	uniu	valla	JIE		
	of Prime Numbers						
	sequential search						
12	culator program						
6. Explore string							
7. Implement S							
8. Implement S							
9. Read and wr							
	usage of basic regular expression						
	use of advanced regular expression		data v	alida	tion.		
12. Demonstrate							
	use of Dictionaries						
	na Separate Files (CSV), Load CS	V files i	nto in	ternal	Data Str	ucture	
					1		
List of Equipme	nt:	100			No. of Contraction		
Software : Linux/	Windows Python 2.7 and above Ve	ersion,	Hard	ware:	30 PCs		
TEXT BOOK(S)				5		1.0	2
1. David Riley Hall/CRC, 2	y and Kenny Hunt, Computationa 2014.	al Think	king f	for the	e Moderi	n Problen	n Solver, Chapman
	wson,Python Programming for the	Absolu	te Be	ginne	r, 3rd Ed	lition, 201	О.
REFERENCE(S)			140		. Deal	1.1.18	
2011.	e, Problem Solving and Programmi					S. Sale	a ser de la company
	old, Introduction to Programming U			Concernance and the second	the second s		
3. Allen Down Massachus	ey, Green Tea Press Needham, Th etts.	nink Pyt	thon,	How t	to Think I	ike a Con	nputer Scientist,
4. Cunninghar	m, sams teach yourself python in 2	4 hours	s, Sec	ond e	dition Pe	arson, 20	14
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T		OSTITU:				CV.	e
Chairma	IN - BOS SE - ESEC					CKI	irman - BoS of ECE - ESEC

Department	ELECTRONICS AND COMM						R 2019	Semes	ter-I	ES
Course Code	Course Name		rs / V		(Credit	Total	Maxim	ım M	ark
19ES106	ENGINEERING GRAPHICS	L 0	Т 0	P 4	1	C 2	Hours 60	-	00	
 Learn convention Draw orthograp Draw the project Draw the section Draw the isome Course Outcomes: Recognize the orthograp Draw the orthograp Draw the project 	s): The purpose of learning this ons and use of drawing tools in m hic projection of points and lines ation of planes and simple solids. In of solids and obtain the develo tric projection of the given solids At the end of this course, learne conventions and apply dimension praphic projection of points and li tion of planes and simple solids. In of solid drawings and developm	course naking ers will ning co nes.	e is to r engin t of su be al	neerin urface ble to: its wh	s of ile di	awings. given so rafting si	lids. mple object			
 Draw the isome 	tric projection of the given object	S.						100		
and the second se	ONVENTIONS (Not for Examin		· ·						1	
specifications – Size Jnit I PLAI Basic Geometrical	hics in engineering applications e, layout and folding of drawing s NE CURVES constructions, Curves used in pola by eccentricity method – Co	heets	- Let	tering	and	dimensi	oning. s – Constr	uction of	1: ellips	2
Company and the second of the		insu uc			oid	- constru	iction of inv	oluces of	anding	se, le,
square and circle – I Jnit II PRO	Drawing of tangents and normal JECTION OF POINTS AND LIN	to the ES	abov	e curv	/es.				1	le,
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Square and circle – IJnit IIPROOrthographic projectStraight lines (only Fand true inclinationsJnit IIIPROProjection of planessolids like prisms, pprincipal planes by r	Drawing of tangents and normal JECTION OF POINTS AND LIN tion- principles-Principal planes irst angle projections) inclined to by rotating line method. JECTION OF PLANES & SOLID (polygonal and circular surfaces byramids, cylinder, cone and tr otating object method.	to the ES -First o both OS) inclin runcate	above angle the p ned to ed so	e curv e projo princip o both olids v	ves. ectio bal pl the vher	n-projec lanes - E principal the ax	tion of poir Determination planes. Pro is is incline	ots. Proje on of true ojection o ed to one	12 ection lengt 12 f simp e of t	le, of hs 2
quare and circle – I Jnit II PRO Drthographic projector traight lines (only Find true inclinations Jnit III PRO Projection of planes olids like prisms, principal planes by re Init IV PRO Sectioning of above rincipal planes and	Drawing of tangents and normal JECTION OF POINTS AND LIN tion- principles-Principal planes irst angle projections) inclined to by rotating line method. JECTION OF PLANES & SOLIE (polygonal and circular surfaces byramids, cylinder, cone and tr	to the ES -First o both OS) inclin uncate IDS At on wh obtain	above angle the p ned to ed so ND D nen th ing tr	e curv e proje princip both blids v EVEL ne cut rue sh	ves. ectio bal pl the vher OPN ting	n-projec lanes - E principal the ax /ENT OI plane is of sect	tion of poir Determination planes. Pro- is is incline F SURFAC	on of true opjection o ed to one ES o the one	12 cction lengt f simp of t	le, of hs 2 ble he
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SEMESTER-II

	ELECTRONICS AND COMMUN	ICATI	ON E	NGIN	EERING	R 2019	Semester-II	BS
Course Code	Course Name	Hou	rs / V	Veek	Credit	Total	Maximum	Mark
course coue	Course Name	L	Т	P	С	Hours	Maximum	viai K
19BS201	VECTOR CALCULUS AND COMPLEX VARIABLES	3	1 :	0	4	60	100	
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Calculus viz: Implement the electrostatics Develop enou appropriate se Understand th Defining a con Course Outcomes Characterize Apply the the Identify the con-	ugh confidence to identify and mode olutions, using the skills learned in the complex functions. <u>mplex function and solving through</u> the end of this course, learners the calculus of vectors. oretical aspects of vector integral ca e differentiation properties of complex pomplex functions and their mapping epts of integration to complex funct	Vector li thod in el math their int comple will be alculus ex func in cert	ntegra the s emati eracti able in the tions	ation. tudy c cal pa ive an egratic to: bir core	of heat flo atterns in i id support on e areas. x planes.	w, fluid dy real world	namics and and and offer	
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ields –Scalar poten		1		1			-	10
	ATION OF VECTORS	oorom	in o	nlana	Ctokolo 1	Theorem	Causa diver	12
	tegral - Surface integral- Green's th ns involving cubes and parallelepip		in a	plane	- Stokes	i neorem-	Gauss diverg	gence
	IC FUNCTIONS	eu.	-	-	100	No.		12
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		L	Т	Ρ	С	Hours	Maximum	Warks
19ES202	ADVANCED C PROGRAMMING b): The purpose of learning this course	3	0	0	3	45	100	
 Develop C prog Develop applic Do input/outpu Use Interrupts 	grams using basic programming cor grams using arrays and strings ations in C using functions , pointers t and file handling in C in C Programming At the end of this course, learners wi	s and str		es				
Develop C app Develop applic Design a C app Develop progra Unit I C	lications using Arrays and Strings. lications using Function and Pointers ation using structure and union. plication using Sequential and Rando am using Interrupts& bit level operation CONSTRUCTS OF C	om-acce ons	<u>.</u>					9
decision making and	Dperators - data types – I/O statem looping RRAYS & FUNCTIONS	ients – 1	forma	t spe	ecificatio	ons – cor	itrol statem	ents –
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Department	ELECTRONICS AND COMMUN	Source and the second second	operations at called	Constraint and the second			Semester-II MC
Course Code	Course Name	Hou	rs/We	ek P	Credit C	Total Hours	Maximum Marks
19MC201	ENVIRONMENTAL SCIENCE AND ENGINEERING	3	0	0	0	45	100
 Study the nature Finding and imp Know the types Apply the knowl Study the intermanagement. 	The purpose of learning this course e and facts about environment. olementing scientific, technological a of natural resources and the individ ledge to various social issues by un- egrated themes and biodiversity at the end of this course, learners wi	and ec lual rol dersta r, natu	onomic le in co nding tl ural re	nserv he en	ing the re vironmer	esources. ntal legisla	ation laws.
 preservation of Outline the role generations. Explain the cornatural resource Find the role of harvesting technic Develop their av 	of human being in maintaining a cle nstituents of environment, precious es. of government and Non-Governme	ean er s reso ent org Family	nvironm urces i ganizat planni	ent a n the ion a ng pr	nd usefu e enviror and expla	Il environr nment and ain the v	nent for the future d conservation of arious rain water
Unit I E	COSYSTEMS AND BIODIVERSITY	(1	10
ecosystem - structu biodiversity - consun Threats to biodiversit - In-situ and Ex-situ c		stem - ethic	and riv	ver e esthe	cosysten tic value:	n – Biod s - Hotsp	iversity - value of ots of biodiversity ation of biodiversit
Unit II	ENVIRONMENTAL POLLUTION	11 4		1-1		O all as	8
pollution - Solid waste	effects and control measures of Air e management - Causes - effects -c evention of pollution - Disaster mana NATURAL RESOURCES	control	measu	ires o	f urban a	and indust	rial wastes - Role
Forest resource - Us ground water - confli and using mineral res modern agriculture - energy - wind energy of natural resources.	e-over exploitation -deforestation - icts over water - Mineral resource source - Food resources - world foo fertilizer- pesticide problems - Er . Land resources - land degradatio	- use- d prob nergy n - soi	exploit lems cl resourc l erosic	ation- hange ce - F	environn es cause Renewab	nental eff d by agric ble energy	on of surface and ects of extracting culture - Effects of / sources - solar al in conservation
Man more and the local sectors and the sectors	SOCIAL ISSUES AND THE ENVIR		Contraction of the second s				9
climate change-globa (Prevention and control 12 Principles of Green	stainable development-Water cons al warming - acid rain - ozone rol of pollution) Act - Water (preven n chemistry – Application of Green of HUMAN POPULATION AND THE	layer ition ai chemis	depleti nd cont stry.	on - rol of	Environ	ment pro	tection act - Air
welfare programmes	ariation among nations - Population - Human rights - HIV/AIDS - Hu ment and human health.						
Bog - non Sola - non Sola - sola	nten - Nangso	M.(2			Chairr Dept.of	nan - BoS ECE - ESEC

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TEXT BOOK(S):

- 1. Anubha Kaushik and C.P. Kaushik, Environmental Science and Engineering, New Age International Publishers, New Delhi (2015)
- 2. Dr. A.Ravikrishan, Envrionmental Science and Engineering., Sri Krishna Hitech Publishing co. Pvt. Ltd., Chennai,12th Edition (2016)

REFERENCE(S):

- 1. Masters, Gilbert M, Introduction to Environmental Engineering and Science, Second Edition, Pearson Education, New Delhi (2012).
- 2. Santosh Kumar Garg, Rajeshwari garg, smf Ranjni Garg Ecological and Environmental Studies Khanna Publishers, Nai Sarak, Delhi (2014).
- 3. R.K. Trivedi, Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standard, Vol. I and II, Enviro Media.
- Dharmendra S. Sengar, Environmental law, Prentice Hall of India PVT LTD, New Delhi, 2007. Rajagopalan, R, Environmental Studies-From Crisis to Cure, Oxford University Press 2005
- 5. Cunningham, W.P. Cooper, T.H. Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2015.

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Chairman - BoS Dept. of Chemistry - ESEC

Department	ELECTRONICS AND COMMUNIC	ATION	ENG	INE	ERING	R 2019	Semester I	EEC
Course Code	Course Name	Hours/ Week L T P C		Credit C	Total Hours	Maximum	Marks	
19TPS02	SOFT SKILLS - II	1	0	1	1.5	30	100	
	(s): The purpose of learning this cours							
 To coach th To develop To develop To teach im 	Students on Group Discussion Do's ar e students on Interview Skills. Presentation Skills. Business Etiquette. portance of Ethics and Values. at the end of this course, learners wi	*	-					
 Attend the ir Present ther Behave very Have good 	Group Discussion with Confidence by k interview with positive attitude by having in very well by enhancing their Present well in official gathering and Meeting I ethics and values in their Personal and	g Mock I tation Sk by know	nterv ills. ing E	view Etiqu	s. iette.	5.		
	ROUP DISCUSSION	0.0	~					6
Don'ts – Understa	nding the objective and skills tested in	a GD –	Gen	erai	types of C	JDS - RO	ies in a GD –	Do's
								6
	kills – Self preparation checklist – Groo	omina tin	e. de	n's &	don'ts -	mock inte	rview & feedb	
	ESENTATION SKILLS	oning up	5. ut	000	uonito	mook inte	I VIEW & IEEU	6
Presentation Skills -	Stages involved in an effective presen management – Mock Presentations &	ntation – Feedba	sele ck.	ctior	n of topic,	content, a	iids – Engagii	ng
UNIT 4 Bu	siness Etiquette							6
Brooming etiquette – npress.	- Telephone & E-mail etiquette – Dinin	ng etique	ette -	- do'	s & Don'i	ts in a form	nal setting – I	now to
	nics						-1	6
and the second	of Ethics and Values – Choices and Dil	lommas	fac	od	Discussi	one from	nows boadling	20
EFERENCES:		lemmas	lace	eu –	Discussi		news neadlin	55.
 Man's search The greatest i Goal - Eliyahi Working with Excel in Engli Developing Control Delhi. Essentials of I Effective Pression 	in the "Chicken Soup for the Soul" serie for meaning – Viktor Frankl miracle in the world – Og Mandino u Goldratt. Emotional Intelligence - David Golema sh – Sundra Samuel, Samuel Publicati ommunication Skills by Krishna Mohan Effective Communication, Ludlow and I entation Skills (A Fifty-Minute Series B rviewing" by Richaurd Camp, Mary E	an. ions n and Me Panthon Book) by	; Pre Stev	entic /e M	e Hall of andel	India.		v Wiley

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Department	ELECTRONICS AND COMMUNICA	Charles and the second s					Semester-II	ES
Course Code	Course Name	Hours / Week Credi					Maximum I	Marks
		L	Т	Ρ	С	Hours	maximum	harno
19ES214	ADVANCED C PROGRAMMING LABORATORY	0	0	4	2	60	100	
 Develop C Pro Develop C pro Develop applio Do input/output 	a): The purpose of learning this course ograms using basic programming const ograms using arrays and strings cations in C using functions, pointers a ut and file handling in C s and Process and access peripherals	ructs	ture	es				
 Write a C Prog Develop C app Develop applic Design a C app 	At the end of this course, learners will gram using basic programming construc- plications using Function and Pointers. cation using structure and union. plication using Sequential and Random rogram to interact with device	cts.						
st of Experiments	ogram to interact with device					_		
2. Programs to s 3. Programs bas 4. Programs usin 5. Programs usin 6. Programs usin 7. Programs usin 8. Programs bas 9. Programs bas 10. Programs usin 11. Program usin 12. Programs usin 13. Programs usin 14. Programs usin 15. Program to sub 16. Program to hat 17. Program to dis 17. Program to dist of Equipment:	ng array of structures end and receive signals andle process isplay device details							
	sktops with C++ Compiler - 30 Nos.							
	+ compiler supporting 30 terminals or r	nore.						
EXT BOOK(S)	· · · · · · · · · · · · · · · · · · ·							
and the state of the second se	ighan, The C programming language,	eocond .	odit	ion	aarear	Educatio	on Asia 2005	1
the second se	amy, C Programming, Second Edition,		the local division in which the local division in the local divisi			Educatio	on Asia, 2005	Ut under
	itkar, Let Us C, 16th Edition, BPB Public		-		n, 2009			
the second se					015			
the second se	itkar, Understanding Pointers in C, BP	B Public	atio	on, 2	015			£
EFERENCE(S)		•	1					
	nd Harvey Deitel, —C How to Program				and the second second second second		and the second se	~ (
University Pre						.		
3. Byron S. Go Education, 19	ttfried, Schaum's Outline of Theory a 996.	ind Prob	olen	ns o	f Progra	amming	with C,McGra	w -Hil

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Chairman - BoS Dept.of ECE - ESEC

Department	EECTRONICS AND COMMUN	ICATIO	N ENG	GINE	ERING	R 2019	Semester-II PC	
Course Code	Course Name Hours/Week Credit				Total	N/		
4050040		L	Т	P	С	Hours	Maximum Marks	
19ES219	DEVICES LABORATORY	0	0	2	1	30		
Understand theGain hand on	aracteristics of basic electronic devi ne working of BJT,FET, SCR experience in simulation using PS At the end of this course, learners	PICE						
Interpret the o	haracteristics of basic electronic de characteristics of various electronic lation using PSPICE		6					

Exp No.	Name of Experiments
1	Characteristics of PN Junction Diode
2	Zener diode Characteristics & Regulator using Zener diode
3	Common Emitter input-output Characteristics
4	Common Base input-output Characteristics
5	Characteristics of FET
6	Characteristics of SCR
7	Characteristics of UJT
8	Characteristics of MOSFET
9	Characteristics of TRIAC
10	Simulation of Characteristics of PN Junction Diode and Zener diode using SPICE
11	Simulation of Characteristics of BJT (common emitter configuration) and determination of h parameters using SPICE
12	Simulation of Characteristics of JFET and MOSFET using SPICE
13	Simulation of Characteristics of SCR and UJT using SPICE

List of Equipment:

- BC 107, BC 148,2N2646,BFW10 25 each
- 1N4007, Zener diodes 25 each
- Resistors, Capacitors, Inductors sufficient quantities
- Bread Boards 15 Nos
- CRO (30MHz) 10 Nos.
- Function Generators (3MHz) 10 Nos.
- Dual Regulated Power Supplies (0 30V) 10 Nos.

R. 0 Chairman - BoS Dept.of ECE - ESEÇ

Department	ELECTRONICS AND COMMUNI	ICATION	ENG	INE	ERING	R 2019	Semester-I	II PC
Course Code	Course Name	Hours	1	T	Credit	Total	Maximum	Marks
		L	Т	P	C	Hours		
19EC301	ANALOG ELECTRONICS-II ive (s): The purpose of learning thi	3	0	0	3	45	100	
signal circui Understand Study the p Understand Study abour Course Outcor Analyze par Design and	indamental concepts behind transis it models the different Transistor configuration erformance metrics of Multistage and the working of signal generating and toscillators and Multivibrator circuin nes: At the end of this course, lear rametric values for different biasing model different Transistor configuration using low frequency analysis.	ons for BJ nd Power nd wave s ts. ners will b methods	IT, FE ampl shapir be abl of BJ	T. ifiers ng cin e to: T an	cuits d FET.			
 Analyze the conditions. Design mult Transistors. Design Osc 	illator and Multivibrator circuits usin ALL SIGNAL LOW FREQUENCY	iits using l ng Bipolar	Bipola Junc	ar Ju	nction T	ransistors		
	of transistor amplifier CE,CC&CB C CC configurations, Comparison of							
	Small Signal Equivalent Circuit mod							r. FEI
/oltage Gain, S Jnit II HIG	Small Signal Equivalent Circuit mod	el, Transo	condu	ctan	ce, T Eq	uivalent C	Circuit Model.	9
/oltage Gain, S Jnit II HIG BJT: Behavior Emitter Transis he CE Amplifie Frequency Res	Small Signal Equivalent Circuit mod H FREQUENCY MODELS of Transistor at High Frequency, tor Model, - CB & CE Short Circu r. FET: The Gate Capacitive effect, ponse of CS Amplifier.	el, Transo The High it Current , High Fre	n Free Free equen	ctan quen	ce, T Eq icy T Ma cy respo	uivalent C odel, The onse, Frec	Circuit Model. Hybrid pi Co quency Respo	9 ommor onse o quency
/oltage Gain, S Jnit II HIG 3JT: Behavior Emitter Transis he CE Amplifie Frequency Res Jnit III	Small Signal Equivalent Circuit mod H FREQUENCY MODELS of Transistor at High Frequency, tor Model, - CB & CE Short Circu r. FET: The Gate Capacitive effect, ponse of CS Amplifier. LTI STAGE AND FEEDBACK AMI	el, Transo The High it Current , High Fre PLIFIERS	r Free Free quen	quen quen quen cy M	ce, T Ēq icy T Mi cy respo iOSFET	uivalent C odel, The onse, Frec Model, Ur	Circuit Model. Hybrid pi Co quency Respo nity Gain Free	9 ommor onse o quency 9
/oltage Gain, S Jnit II HIG BJT: Behavior Emitter Transis he CE Amplifie Frequency Res Jnit III MU BJT: CE-CC A Amplifiers.FET: Shunt and Volta	Small Signal Equivalent Circuit mod H FREQUENCY MODELS of Transistor at High Frequency, tor Model, - CB & CE Short Circu r. FET: The Gate Capacitive effect, ponse of CS Amplifier. LTI STAGE AND FEEDBACK AMI mplifier, Cascade Amplifier, RC co uits, Difference Amplifier. Step MOS Difference Amplifier, Feedb ge Series.	The High The High it Current High Fre PLIFIERS oupled an respons pack amp	n Free Free quen mplifie e an	er, M duen cy M er, M d F - C	ce, T Eq acy T Ma cy respo OSFET illers Th Frequence urrent S	uivalent C odel, The onse, Frec Model, Ur eorem, H	Hybrid pi Co quency Responity Gain Fred ligh input res	9 ommor onse o quency 9 istance ltistage Curren
/oltage Gain, S Jnit II HIG BJT: Behavior Emitter Transis he CE Amplifie Frequency Res Init III MU BJT: CE-CC A ransistor circu Amplifiers.FET: shunt and Volta Init IV SIG	Small Signal Equivalent Circuit mod H FREQUENCY MODELS of Transistor at High Frequency, tor Model, - CB & CE Short Circu r. FET: The Gate Capacitive effect ponse of CS Amplifier. LTI STAGE AND FEEDBACK AMI mplifier, Cascade Amplifier, RC co uits, Difference Amplifier. Step MOS Difference Amplifier, Feedb age Series. NAL GENERATORS AND WAVE	The High it Current High Fre PLIFIERS oupled an respons back amp	n Free t Free quen mplifie e an lifiers	ctan quen cy M er, M er, M d F - C	ce, T Eq icy T Ma cy respo OSFET illers Th Frequence urrent So	uivalent C odel, The onse, Frec Model, Ur eorem, H cy Respo eries, Vol	Circuit Model. Hybrid pi Co quency Respond hity Gain Fred ligh input res onse of Mu tage Shunt, (9 ommor onse o quency 9 istance ltistage Curren 9
/oltage Gain, S Jnit II HIG BJT: Behavior Emitter Transis he CE Amplifie Frequency Res Init III MU BJT: CE-CC A Amplifiers.FET: Shunt and Volta Init IV SIG Basic Principles Wien Bridge , Monostable, As	Small Signal Equivalent Circuit mod H FREQUENCY MODELS of Transistor at High Frequency, tor Model, - CB & CE Short Circu r. FET: The Gate Capacitive effect, ponse of CS Amplifier. LTI STAGE AND FEEDBACK AMI mplifier, Cascade Amplifier, RC co uits, Difference Amplifier, Step MOS Difference Amplifier, Feedback ge Series. NAL GENERATORS AND WAVE s of Sinusoidal Oscillators, Classific General Form of LC- Hartley, C table and Bistable Multivibrators, R	The High The High it Current High Fre PLIFIERS oupled an respons back amp SHAPINC cation of C Colpitts, C L and RC	n Free quen mplifie e an lifiers G CIR Dscilla	er, M er, M er, M er, C d CUI tor- Tun	ce, T Eq acy T Ma cy respo OSFET illers Th Frequenc urrent S Barkhau ed Colle	uivalent C odel, The onse, Frec Model, Ur eorem, H cy Respo eries, Vol sen Criter ector and	Circuit Model. Hybrid pi Co quency Respondent hity Gain Free ligh input res onse of Mu tage Shunt, of rion- RC Phas Crystal Osc	9 ommor onse o quency istance ltistage Curren 9 se Shif
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1. Robert L. Boylestad and Louis Nasheresky, Electronic Devices and Circuit Theory, 10th Edition, Pearson

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SEMESTER-III

Department	ELECTRONICS AND COMMUNIC	ATIC	N EN	GINE	ERING	R 2019	Semester-III	BS
Course Code	Course Name	Hou	urs / W	/Week Crec	Credit	Total	Maximum	Marka
Course Code	Course Name	L	Т	Р	С	Hours	Maximum	Warks
19BS301	APPLIED LINEAR ALGEBRA	3	1	0	4	60	100	dia an
Course Obje	ctive (s): The purpose of learning this	s cour	se is t	0				
 Introduce 	ce the system of linear equations and	solve	e nume	rically				
- Underst	tand the concepts of vector space							
Underst	tand linear transformations and Diago	naliza	ation.	_				
- Apply th	ne concept of inner product spaces in	Ortho	ogonal	izatior	ı.			
Apply E	igen values and Eigen vectors in real	life						
Course Outco	omes: At the end of this course, learn	ners w	vill be a	able to	e interior	the second second		
- Explain	the fundamental concepts of system	of line	ear eq	uation	s and the	eir solution	S	
- Explain	advanced algebra and their role in m	oderr	Math	ematio	s and ap	plied cont	exts.	
	strate accurate and efficient use of ad							
	strate their mastery by solving non - tr				and the first of the state		s and by provir	ng simple
	ns about the statements proven by the							• .
	and the applications of Eigen values			ectors	e-bi fi			
Unit I SY	STEM OF LINEAR EQUATIONS		-					12
Direct method	d: Gauss elimination method – Gauss	s-Jorc	lan me	thod -	- Iterative	e methods	: Gauss-Seidel	method
- LU decompo	osition method – Cholesky decompos	ition I	metho	d - Re	axation I	Method.		
Unit II VE	CTOR SPACES							12
Vector spaces	s and subspaces – Linear independer	nce a	nd dep	bende	nce – Ba	sis and Di	mension - Null	spaces,
column space	s – Dimension Theorem.							
Unit III LIN	EAR TRANSFORMATION							12
Similarity tran	sformation - Diagonalization - Ortho	ogona	al spac	ce- ma	atrix of li	near trans	formation-Geo	metry of
linear transfor	mation-kernal-range- Nullity.							
Unit IV INN	NER PRODUCT SPACE							12
Inner product	- Length and orthogonality - Orthogo	onal s	ets – (Orthog	onal proj	jections –	Inner product s	spaces -
The Cauchy S	Schwarz Inequality - The Gram Schmi	dt Orl	thogor	alizati	on proce	ss - Applic	cations of inner	product
spaces.								
Unit V AP	PLICATION OF EIGENVALUES AND	D EIG	ENVE	CTOF	RS		all of support	12
Generalised e	igen vectors-Power method – Jacobi	meth	nod for	symm	netric ma	trix – Qua	dric surface.	the second
		18 18 18	1 100		Mainter -		A CARLES AND A CARLES	
Reference Bo	ok(S):		10 miles	Alexandra and			and the second second	
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Friedberg, A.H., Insel, A.J. and Spence, L., Linear Algebra, Prentice - Hall of India, New Delhi, 2004.
Bernard Kolman, David R. Hill, Introductory Linear Algebra, Pearson Education, New Delhi, First Reprint 2009.
Howard Anton, Elementary Linear Algebra Applications , Wiley India Pvt. Ltd., Bangalore, 9th Edition, 2008

5. Steven Chapra, Numerical Methods for Engineers, Tata McGraw Hill seventh Edition, 2015.

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3. Millman J. and Taub H., Pulse Digital and Switching Waveforms, TMH, 2011.

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OSILI- BORNING

	ELECTRONICS AND COM	NUNICATI	ON E	ENG	INEERING	R 2019	Semester-II	I PC
Course Code	Course Name	Hours /		-3/6	Credit	Total Hours	Maximum	Marks
19EC302	DIGITAL ELECTRONICS	221	T 0	P 0	C 3	45	100	
	s): The purpose of learning this			0	3	45	100	
 Understand th Understand th Study about sl Analyze and E 	e concepts of Boolean express e concepts of combinational lo nift registers, Modulo-N asynch Design of state machines erent logic families.	sions, Karr gic circuits	augh for v	ario	us applicati	ons	ethod for simp	lificatio
 Apply Boolean Design combir Design shift re Design and an Discuss difference 	: At the end of this course, lea algebra, Karnaugh map and T national logic circuits for various gisters, Modulo-N asynchronou alyze state machines for the gi ent logic families	abulation s applicatio us and syn ven specif	meth ons chroi	od fo nous	or simplifica	tion of Bo	oolean expres	
Unit I NUME	BER SYSTEMS AND LOGIC G	BATES						9
winimization fec	hniques: Boolean postulates	and laws	- D	e-Mo	organ's the	orem - I	Principle of D	9 Juality
Boolean expressio Product of Sums (F	hniques: Boolean postulates n - Minimization of Boolean ex POS) – Karnaugh map minimiz BINATIONAL CIRCUITS	pressions	– Mi	nterr	n – Maxter	m - Sum	of Products (uality
Boolean expressio Product of Sums (F Unit III COME Combinational Ci binary adder and s	n - Minimization of Boolean ex POS) – Karnaugh map minimiz BINATIONAL CIRCUITS rcuits: Design procedure – Ha subtractor – Carry look ahead a	pressions ation- Qui If adder ar adder – B0	– Mi ne Mo nd su CD a	nterr c Clu btrac dder	m – Maxter iskey metho ctor – Full a - Multiplex	m - Sum od of min dder and er/ Demu	of Products (imization	SOP) - 9 Paralle
Boolean expressio Product of Sums (F Unit III COME Combinational Ci binary adder and s Encoder – Parity c	n - Minimization of Boolean ex POS) – Karnaugh map minimiz BINATIONAL CIRCUITS rcuits: Design procedure – Ha	pressions ation- Qui If adder ar adder – B0	– Mi ne Mo nd su CD a	nterr c Clu btrac dder	m – Maxter iskey metho ctor – Full a - Multiplex	m - Sum od of min dder and er/ Demu	of Products (imization	SOP) - 9 Paralle
Boolean expressio Product of Sums (F Unit III COME Combinational Ci binary adder and s Encoder – Parity cl Unit IV SEQU Sequential Circui one flip flop using excitation tables a Design of synchror shift register	n - Minimization of Boolean ex POS) – Karnaugh map minimiz BINATIONAL CIRCUITS rcuits: Design procedure – Ha subtractor – Carry look ahead a necker & generator – Code cor	pressions ation- Quin If adder an adder – Bo nverters - N R, JK, D a alysis of s n, State ta	- Mi ne Mo D au Magn and T ynch able,	nterr c Clu btrac dder itude itude rono	m – Maxter iskey metho ctor – Full a - Multiplex comparato evel and Ec us sequent te minimiza	m - Sum od of min dder and er/ Demu or. lge trigge ial circuit ttion and	of Products (imization I subtractor – I Iltiplexer – De ering - Realiza s: Characteris State assign	Puality SOP) - Paralle coder 9 ation o stic and ment
Boolean expressionProduct of Sums (For Sums (For Sums))Unit IIICOMECombinational CircuitDinary adder and semicoder – Parity closeUnit IVSEQUSequential CircuitDene flip flop usingExcitation tables aDesign of synchrorishift register	n - Minimization of Boolean ex POS) – Karnaugh map minimiz BINATIONAL CIRCUITS rcuits: Design procedure – Ha subtractor – Carry look ahead a necker & generator – Code cor ENTIAL CIRCUITS ts: Introduction, Flip flops –SF other flip flops- Design and an nd equations – State diagram	pressions ation- Quin If adder and adder – Bo overters - N R, JK, D a alysis of s n, State ta nd sequer	- Mi ne Mi D au CD au Magn ind T ynch able, ice di	nterr c Clu btrac dder itude itude rono Stat etect	m – Maxteri iskey metho ctor – Full a - Multiplex comparato evel and Ec us sequent te minimiza tor – Regist	m - Sum od of min dder and er/ Demu or. lge trigge ial circuit ttion and	of Products (imization I subtractor – I Iltiplexer – De ering - Realiza s: Characteris State assign	Puality SOP) - Paralle coder 9 ation o stic and
Boolean expressio Product of Sums (F Unit III COME Combinational Ci binary adder and s Encoder – Parity cl Unit IV SEQU Sequential Circui one flip flop using excitation tables a Design of synchror shift register Jnit V ASYN Asynchronous Se low table – Minim	n - Minimization of Boolean ex POS) – Karnaugh map minimiz BINATIONAL CIRCUITS reuits: Design procedure – Ha subtractor – Carry look ahead a necker & generator – Code cor ENTIAL CIRCUITS ts: Introduction, Flip flops –SF other flip flops- Design and an nd equations – State diagram nous counters, ring counters and CHRONOUS SEQUENTIAL C equential Circuits: Analysis of ization of primitive state table Dynamic –Essential –Hazards	pressions ation- Quin If adder and adder – Bo nverters - N R, JK, D a alysis of s n, State ta nd sequer IRCUITS of asynchr –State at	- Mi ne Mi D av Magn Ind T ynch able, ice d AND onous	nterr c Clu btrac dder itude rono Stat etect PLD s se men	m – Maxteri iskey metho ctor – Full a - Multiplex e comparato evel and Ec us sequent te minimiza tor – Regist 9S quential cir t – Excitati	m - Sum od of min dder and er/ Demu or. Ige trigge ial circuit tion and ters: Shif cuits – F on table	of Products (imization I subtractor – I Itiplexer – De ering - Realiza s: Characteris State assign t registers- Ur Primitive state - Cycles – R	Paralle SOP) - Paralle coder 9 ation o stic and ment niversa 9 table aces -
Boolean expressio Product of Sums (F Unit III COME Combinational Ci binary adder and s Encoder – Parity cl Unit IV SEQU Sequential Circui one flip flop using excitation tables a Design of synchron shift register Jnit V ASYN Asynchronous Set low table – Minim Hazards: Static –E using PLDs: PROM	n - Minimization of Boolean ex POS) – Karnaugh map minimiz BINATIONAL CIRCUITS reuits: Design procedure – Ha subtractor – Carry look ahead a necker & generator – Code cor ENTIAL CIRCUITS ts: Introduction, Flip flops –SF other flip flops- Design and an nd equations – State diagram nous counters, ring counters and CHRONOUS SEQUENTIAL C equential Circuits: Analysis of ization of primitive state table Dynamic –Essential –Hazards	pressions ation- Quin If adder and adder – Bo nverters - N R, JK, D a alysis of s n, State ta nd sequer IRCUITS of asynchr –State at	- Mi ne Mi D av Magn Ind T ynch able, ice d AND onous	nterr c Clu btrac dder itude rono Stat etect PLD s se men	m – Maxteri iskey metho ctor – Full a - Multiplex e comparato evel and Ec us sequent te minimiza tor – Regist 9S quential cir t – Excitati	m - Sum od of min dder and er/ Demu or. Ige trigge ial circuit tion and ters: Shif cuits – F on table	of Products (imization I subtractor – I Itiplexer – De ering - Realiza s: Characteris State assign t registers- Ur Primitive state - Cycles – R	Paralle SOP) - Paralle coder 9 ation o stic and ment niversa 9 table aces -
Boolean expressio Product of Sums (F Unit III COME Combinational Ci binary adder and s Encoder – Parity ch Unit IV SEQU Sequential Circui one flip flop using excitation tables a Design of synchror shift register Jnit V ASYN Asynchronous Second low table – Minim Hazards: Static – E using PLDs: PROM EXT BOOK(S):	n - Minimization of Boolean ex POS) – Karnaugh map minimiz BINATIONAL CIRCUITS reuits: Design procedure – Ha subtractor – Carry look ahead a necker & generator – Code cor ENTIAL CIRCUITS ts: Introduction, Flip flops –SF other flip flops- Design and an nd equations – State diagram nous counters, ring counters and CHRONOUS SEQUENTIAL C equential Circuits: Analysis of ization of primitive state table Dynamic –Essential –Hazards	pressions ation- Quin If adder and adder – Bo overters - I R, JK, D a alysis of s n, State ta nd sequer IRCUITS of asynchro- State and eliminatio	- Mi ne Mi D av CD av Magn Ind T ynch able, ice d able, ice d ssign n. Im	nterr c Clu btrac dder itude rono Stat etect PLD s see men plen	m – Maxtern iskey metho ctor – Full a - Multiplex comparato evel and Ec us sequent te minimiza tor – Regist S quential cir t – Excitati mentation o	m - Sum od of min dder and er/ Demu or. lge trigge ial circuit tion and ters: Shif cuits – F on table f combin	of Products (imization I subtractor – I Itiplexer – De ering - Realiza s: Characteris State assign t registers- Ur Primitive state - Cycles – R national logic	Paralle SOP) - Paralle coder 9 ation o stic and ment niversa 9 table aces -

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4.	Arivazhagan S Salivahanan, Digital Circuits And Design Vikas Publishing House Pvt Ltd, 4th Edition,
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Department	ELECTRONICS AND COMMUNIC	CATIO	I ENG	SINE	ERING	R 2019	Semester-III	PC
	Course Name	Hou	rs / W	eek	Credit	Total		
Course Code	Course Name	L	Т	Ρ	С	Hours	Maximum	Marks
19EC303	SIGNALS AND SYSTEMS	3	1	0	4	60	100	
Course Objectiv	ve (s): The purpose of learning this	course	is to					
 Understand 	the concepts of. different types of si	gnals a	nd Sy	sterr	IS			
Comprehen	d the concepts of Fourier series, Fou	urier Tra	ansfor	m ar	nd Lapla	ce Transfo	orm	
 Know about 	the Continuous Time systems							
 Study the co 	oncepts of DTFT and Z Transform							
 Understand 	Discrete Time systems with DTFT	and Z	ransf	orm				
Course Outcom	es: At the end of this course, learne	ers will b	be able	e to:				1
Categorize S	Signals &Systems							
 Analyze con 	tinuous time signals with Fourier se	ries, Fo	ourier [·]	Tran	sform ar	nd Laplace	e Transform	
 Analyze con 	tinuous time systems with Fourier T	ransfor	m and	Lap	blace Tr	ansform		
Analyze Dise	crete Time signals with DTFT and Z	Transfe	orm					
Analyze Disc	crete Time systems with DTFT and	Z Trans	sform					
Jnit I CL	ASSIFICATION OF SIGNALS AND	SYSTE	MS					12
	of continuous and discrete time s gnals. Systems : CT and DT systems							- Basic
	IALYSIS OF CONTINUOUS TIME S		125					12
	r periodic signals - Fourier Transforr	100	all and the second			ansforms	and properties	
	NEAR TIME INVARIANT CONTINU					2. N. 2014	Same and	12
mpulse respons	 e - convolution integrals- Differentia stems connected in series / parallel. 		ion- F	ourie	er and La	aplace trai	nsforms in Ana	lysis o
							-	
CT systems - Sy Jnit IV AN	ALYSIS OF DISCRETE TIME SIGN						5	12
CT systems - Sy Jnit IV AN ow Pass Samp Transform & Pro	ling Theorem – Fourier Transform o perties	of discr				TFT) – P	roperties of DT	FT - Z
CT systems - Sy Jnit IV AN ow Pass Samp ransform & Pro Jnit V LIN	ling Theorem – Fourier Transform of	of discr	SYST	EMS	5			FT - Z 12

1.	Oppenheim, Alanv., Willsky, Alan S, and Hamid Nawab S, Signals & Systems, 2nd Edition, Pearson
	Education, New Delhi, 2014, ISBN :9781292025902
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2.	Schaum's Outline of Signals and Systems, 3rd Edition ,2013

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Department	ELECTRONICS AND COMMUN						Semester-III	ES
Course Code	Course Name	Hours	s/Weel	۲ ۲	Credit C	Total Hours	Maximum	Marks
19EC304	NETWORK THEORY	3	1	0	4	60	100	
 Introduct Introduct Introduct Study the 	ctive (s): The purpose of learning the the basic concepts of DC and A the different methods of circuit ana the the phenomenon of resonance the transient and steady state resp the the various analysis parameter	AC circuits lysis using and coupl oonse of the	behav Netwo ed circ e circu	ork uits its.	theorem s.		y and topology	
Ourse Outco Develop Develop Develop Design :	omes: At the end of this course, le the capacity to analyze of DC ar the capacity to apply the various and understand the phenomenon the transient and steady state re	earners wi nd AC circu network th of resonal	ll be al uits bel heoren hce an	ole nav ns t d c	to: rior and a to AC ar oupled o	d DC circuits.		lal
	various parameter of two port ne							12
circuits - Netw Cutsets - Fur voltages and (Unit II N	Kirchhoff's laws – Mesh curren work terminology - Graph of a net indamental cutsets - Cutset matr Cutset schedules, Duality and dua ETWORK THEOREMS FOR DC	twork - Inc ix – Tie s al networks AND AC (idence ets - l s. CIRCU	an _ink	nd reduc < curren	ed incide ts and T	ence matrices – ïe set schedul	Trees es -Twi 12
Villman's the eduction: volt	rems -Superposition theorem, Theorem, and Maximum power training age and current division, source tesonance AND COUPLED CI	nsfer theo transforma	rem ,a	app	lication	of Netwo	ork theorems-	
Resonance - S current throug inductance - I circuits - Serie Unit IV TI Natural respor	Series resonance - Parallel resonance - Parallel resonance - Parallel resonance - Dot rule - Construction of coupled RANSIENT ANALYSIS Inse-Forced response - Transient as Signal and exponential source	nance - Va with freq Coefficient inductors response	uency of co Single	upli e tu	Bandwi ing - Ar uned and L and R	dth - Q alysis of double LC circu	factor -Selective f multi winding tuned coupled of its to excitation	riation i vity. Se couple circuits. 12 by Ste
sinusoidal exc								12
Two port ne	tworks, Z parameters, Y para terconnection of two port network							P. D. BANKART
Science E Joseph Ec	Hayt, Jr. Jack E. Kemmerly and ngineering, Eighth Edition, 11th F Iminister and Mahmood Nahvi, El	Reprint 201 lectric Circ	6. uits, S					
the second s	Company, New Delhi, Fifth Editi	on Reprint	2016.					
EFERENCES	51:							
the second s	Alexander, Mathew N.O. Sadiku	, Fundame	entals o	of E	Electric C	Circuits, F	Fifth Edition, Mo	Graw H
9th Reprin 2. A.Bruce C Learning, I	Alexander, Mathew N.O. Sadiku	cepts and A 2009.	Analysi	is o	of Linear	Electric	Circuits, Cenga	ge

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Department	ELECTRONICS AND COMMUN					R 2019	Semester-III	MC
Course Code	Course Name			Veek P	Credit	Total	Maximum M	larks
19MC301	INDIAN CONSTITUTION	L 2	T	0	C 0	Hours 30	100	
	ve (s): The purpose of learning th				0	50	100	
 perspective Address the entitlement Indian national indian national its imperse outcom Discuss the Gandhi in I Discuss the Discuss the Gandhi in I 	ne growth of Indian opinion rega t to civil and economic rights as v	rding m vell as the cor dian Co rners wi rights ir	node the e nstitu ill be n Ind	rn Incemerg ncem ution. able t ia for	lian intell ence of r ent of the to: the bulk	ectuals' on nationhood e Bolshev of Indian	constitutional ro d in the early y rik Revolution i s before the ar	ole an ears o n 191 rival o
the leaders adult suffra	e circumstances surrounding the ship of Jawaharlal Nehru and the oge in the Indian Constitution. e passage of the Hindu Code Bill o	eventua	al fail					
	story of making of Indian Consti				9.00		the second second	5
	Constitution - Drafting Committee		posi	tion &	Working)	1.1.1	1.2
Jnit II Phi	losophy of the Indian Constitut	ion	1		10.01	1.12		5
Preamble - Salie	ent Features							
Unit III CO	NTOURS OF CONSTITUTIONAL	. RIGH	TS &	DUT	IES			5
Religion - Cultur Policy - Fundam	ghts - Right to Equality - Right to F al and Educational Rights - Right ental Duties. GANS OF GOVERNANCE							
	omposition - Qualifications and	Diegus	alifica	tions	Dowo	e and E	unctions Exec	
	ernor - Council of Ministers - Judio							
	nctions.			numen				cation
- Powers and Fu	Inctions.			numer				5 s
Powers and Fu Unit V LO District's Admin Elected Represe Elected officials Hierarchy (Differ grass root demo	CAL ADMINISTRATION istration head: Role and Importa entative, CEO of Municipal Corpo and their roles, CEO Zila Par rent departments) -Village level: cracy.	oration chayat:	- Mu - Pa Po:	nicipa chaya sition	lities: Int ti raj: Int and role	troduction roduction e- Block	, Mayor and , PRI: ZilaPach level: Organiz	5 role o nayat ationa nce o
Powers and Fu Jnit V LO District's Admin Elected Represe Elected officials Hierarchy (Differ grass root demo Jnit VI ELE	CAL ADMINISTRATION istration head: Role and Importa entative, CEO of Municipal Corpo and their roles, CEO Zila Par rent departments) -Village level: cracy. ECTION COMMISSION	oration chayat: Role of	- Mu - Pa Pos f Ele	nicipa chaya sition cted a	lities: Int iti raj: Int and role and Appo	troduction roduction e- Block pinted off	, Mayor and , PRI: ZilaPach level: Organiz icials - Importa	5 role o nayat ationa nce o
Powers and Fu Jnit V LO District's Admin Elected Represe Elected officials Hierarchy (Differ grass root demo Jnit VI ELE Election Commis State Election C	CAL ADMINISTRATION istration head: Role and Importa entative, CEO of Municipal Corpo and their roles, CEO Zila Par rent departments) -Village level: cracy.	oration chayat: Role of ef Elec	- Mu - Pa Pos f Ele	nicipa chaya sition cted a Comr	lities: Int and role and Appo nissioner	troduction roduction e- Block pinted off	, Mayor and , PRI: ZilaPach level: Organiz icials - Importa	5 role o nayat ationa nce o 5 oners
Powers and Fu Jnit V LOC District's Admin Elected Represe Elected officials Hierarchy (Differ grass root demo Jnit VI ELE Election Commis State Election C vomen	CAL ADMINISTRATION istration head: Role and Importa entative, CEO of Municipal Corpo and their roles, CEO Zila Par rent departments) -Village level: cracy. ECTION COMMISSION ssion: Role and Functioning, Chi ommission: Role and Functioning	oration chayat: Role of ef Elec	- Mu - Pa Pos f Ele	nicipa chaya sition cted a Comr	lities: Int and role and Appo nissioner	troduction roduction e- Block pinted off	, Mayor and , PRI: ZilaPach level: Organiz icials - Importa	5 role o nayat ationa nce o 5 oners
Powers and Fu Unit V LO District's Admin Elected Represe Elected officials Hierarchy (Differ grass root demo Unit VI ELE Election Commis State Election C women REFERENCE(S)	CAL ADMINISTRATION istration head: Role and Importa entative, CEO of Municipal Corpo and their roles, CEO Zila Par rent departments) -Village level: cracy. ECTION COMMISSION ssion: Role and Functioning, Chi ommission: Role and Functioning	oration chayat: Role of ef Elec I, Institu	- Mu - Pa f Ele	nicipa chaya sition cted a Comr nd Bo	lities: Int and role and Appo missioner dies for t	troduction roduction e- Block pinted off and Elect the welfar	, Mayor and , PRI: ZilaPach level: Organiz icials - Importa	5 role o nayat ationa nce o 5 oners
Powers and Fu Jnit V LO District's Admin Elected Represe Elected officials Hierarchy (Differ grass root demo Jnit VI ELE Election Commis State Election C vomen REFERENCE(S) 1. "The Con	CAL ADMINISTRATION istration head: Role and Importa entative, CEO of Municipal Corpo and their roles, CEO Zila Pa- rent departments) -Village level: cracy. ECTION COMMISSION ssion: Role and Functioning, Chi ommission: Role and Functioning	oration chayat: Role of ef Elec , Institu	- Mu - Pa f Ele tion ute a	nicipa chaya sition cted a Comr nd Bo	lities: Int and role and Appo missioner odies for t	troduction roduction e- Block binted off and Elect the welfar	, Mayor and , PRI: ZilaPach level: Organiz icials - Importa ction Commissi re of SC/ST/OB	5 role o nayat ationa nce o 5 oners
Powers and Fu Jnit V LO District's Admin Elected Represe Elected officials Hierarchy (Differ grass root demo Jnit VI Jnit VI ELE Election Commis State Election Vomen Commis 1. "The Con 2. Dr. S. N. E Publishers	CAL ADMINISTRATION istration head: Role and Importa entative, CEO of Municipal Corpo and their roles, CEO Zila Par rent departments) -Village level: cracy. ECTION COMMISSION ssion: Role and Functioning, Chi ommission: Role and Functioning : stitution of India", 1950 (Bare Act)	oration chayat: Role of ef Elec J, Institu J, Gover g of Ind	- Mu - Pa f Ele tion ute a	nicipa chaya sition cted a Comr nd Bo ent Pu Consti	lities: Int and role and Appo missioner dies for t blication. tution", 1	troduction roduction e- Block binted off and Elect the welfar	, Mayor and , PRI: ZilaPach level: Organiz icials - Importa ction Commissi re of SC/ST/OB	5 role of nayat ationa nce of 5 oners

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			Hour		ERING	R 2019	Semester
Course Code	Course Name	1	Wee		Credit C	Total Hours	Maximum Marks
19TPS03	QUANTITATIVE APTITUDE AND LOGICAL REASONING - I	L 2	Т 0	0	0	30	100
Course Obje	ctive (s): The purpose of learning this c	ourse	e is t	0			and the second second
	ude assessment by using speed math c						
IT MILL	lems using fast track method by learning			ation	and nun	obers	ng naterio f
	pasic of ratio and proportion and mixture						
	different ways of solving problems on ave		•		e la		
	ogical skills by analyzing the objects.	aye	and	aye			
	omes: At the end of this course, learners		haa	blo t			2 1 m
		S WIII	be a	blet	0.		
1	question with speed and accuracy.						
	quantitative aptitude questions by using						
	t of the aptitude topics by knowing ratio	223 (A					on.
Solve the	problems on average and ages by using	logic	al w	ay of	f approac	h.	
	eir logical thinking.						
and the second se	ED MATHS AND NUMBER SYSTEMS				01		
PEED WATHS	Solution and solution roots – Solution for	num	ners	tron	1 11 10 51		
	S: Square and square roots – Square for	nun		non	101 10 50	. Finding s	squares of
umbers betwe	en 81 to 100. Cubes and cubes roots.						
umbers betwee UMBER SYS1	en 81 to 100. Cubes and cubes roots. FEMS: Numbers and types of Numbers	– Pro	oper	ties o	of Numbe		
umbers betwee UMBER SYST alue - Divisibili	en 81 to 100. Cubes and cubes roots. FEMS: Numbers and types of Numbers ty rules – Concept on unit digit and rem	– Pro aind	operi er th	ties o	of Numbe		value and place
UMBER SYST UMBER SYST Ilue - Divisibili JNIT 2 SIM	en 81 to 100. Cubes and cubes roots. FEMS: Numbers and types of Numbers ty rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM	– Pro aind /IBEI	operi er th RS	ties o eore	of Numbe m.	ers –Face v	value and place
UMBER SYST UMBER SYST alue - Divisibili JNIT 2 SIM MPLIFICATIC	en 81 to 100. Cubes and cubes roots. FEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge	– Pro aind /IBEI	opert er th RS c forr	ties d eore nula	of Numbe m. e –Simpli	ers –Face v	value and place
umbers betwee UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction	en 81 to 100. Cubes and cubes roots. FEMS: Numbers and types of Numbers ty rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge a – Continued fraction and its simplification	– Pro aind /IBEI braic on –	opert er th RS c forr Recu	ties (eore nula urrinç	of Numbe m. e –Simpli g decimal	fication of o	value and place
umbers betwee UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction	en 81 to 100. Cubes and cubes roots. FEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge	– Pro aind /IBEI braic on –	opert er th RS c forr Recu	ties (eore nula urrinç	of Numbe m. e –Simpli g decimal	fication of o	value and place
UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction ROBLEMS ON	en 81 to 100. Cubes and cubes roots. TEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge a – Continued fraction and its simplification NUMBERS: Set of numbers – Assume TIO & PROPORTION ,ALLIGATIONS &	– Pro aind //BEI braid on – the MIX	oper er th RS c forr Recu unkr	ties o eore mula urring nown	of Numbe m. e –Simpli g decimal numbers	fication of o s.	value and place
UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction ROBLEMS ON	en 81 to 100. Cubes and cubes roots. TEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge a – Continued fraction and its simplification NUMBERS: Set of numbers – Assume	– Pro aind //BEI braid on – the MIX	oper er th RS c forr Recu unkr	ties o eore mula urring nown	of Numbe m. e –Simpli g decimal numbers	fication of o s.	value and place
umbers betwee UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction ROBLEMS ON UNIT 3 RAT ATIO AND PE	en 81 to 100. Cubes and cubes roots. TEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge a – Continued fraction and its simplification NUMBERS: Set of numbers – Assume TIO & PROPORTION ,ALLIGATIONS & ROPORTION: Ratio between two or mor ANS MIXTURES: Definition – Allegation	– Pro aind MBEI braic on – the the MIX e pe	er th RS c forr Recu unkr TUR rson	ties of eore mula urring nown E S – N	of Numbe m. e –Simpli g decimal numbers /liscellane value (or	fication of o s. and form eous proble cost price)	value and place decimal fraction equations ems.
umbers betwee UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction ROBLEMS ON UNIT 3 RAT ATIO AND PE	en 81 to 100. Cubes and cubes roots. TEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge a – Continued fraction and its simplification NUMBERS: Set of numbers – Assume TIO & PROPORTION ,ALLIGATIONS & ROPORTION: Ratio between two or mor	– Pro aind MBEI braic on – the the MIX e pe	er th RS c forr Recu unkr TUR rson	ties of eore mula urring nown E S – N	of Numbe m. e –Simpli g decimal numbers /liscellane value (or	fication of o s. and form eous proble cost price)	value and place decimal fraction equations ems.
UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction ROBLEMS ON UNIT 3 RAT ATIO AND PH LLIGATIONS x golden rules	en 81 to 100. Cubes and cubes roots. TEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge a – Continued fraction and its simplification NUMBERS: Set of numbers – Assume TIO & PROPORTION ,ALLIGATIONS & ROPORTION: Ratio between two or more ANS MIXTURES: Definition – Allegation to solve problems on mixture – Remova RAGES & PROBLEM ON AGES	– Pro aind /IBEI braic on – the the MIX e pe rule al am	opert er th RS forr Recu unkr TUR rson: – M ong	ties of eore mula urring nown E s – N ean the c	of Number m. e –Simpli g decimal numbers /liscellane value (or quantities	fication of o s. and form eous proble cost price) more than	value and place decimal fraction equations ems.
UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction ROBLEMS ON UNIT 3 RAT RATIO AND PH LLIGATIONS ix golden rules	en 81 to 100. Cubes and cubes roots. TEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge a – Continued fraction and its simplification NUMBERS: Set of numbers – Assume TO & PROPORTION ,ALLIGATIONS & ROPORTION: Ratio between two or more ANS MIXTURES: Definition – Allegation to solve problems on mixture – Removal	– Pro aind /IBEI braic on – the the MIX e pe rule al am	opert er th RS forr Recu unkr TUR rson: – M ong	ties of eore mula urring nown E s – N ean the c	of Number m. e –Simpli g decimal numbers /liscellane value (or quantities	fication of o s. and form eous proble cost price) more than	value and place decimal fraction equations ems. of the mixture two.
umbers betwee UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction ROBLEMS ON UNIT 3 RAT ATIO AND PR LLIGATIONS ix golden rules UNIT 4 AVE VERAGES: A	en 81 to 100. Cubes and cubes roots. TEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge a – Continued fraction and its simplification NUMBERS: Set of numbers – Assume TO & PROPORTION ,ALLIGATIONS & ROPORTION: Ratio between two or more ANS MIXTURES: Definition – Allegation to solve problems on mixture – Remova ERAGES & PROBLEM ON AGES Average from total –Total from the average	– Pro aind /IBEI braic on – the the MIX e pe rule al am	operit er th RS forr Recu unkr TUR rson ong Misc	ties of eore mula urring nown E s - N ean the c	of Number m. e –Simpli g decimal numbers Aiscellane value (or quantities	fication of o s. s and form eous proble cost price) more than oblems.	value and place decimal fraction equations of the mixture two.
umbers betwee UMBER SYST alue - Divisibili UNIT 2 SIM IMPLIFICATIO mixed fraction ROBLEMS ON UNIT 3 RAT ATIO AND PR LLIGATIONS ix golden rules UNIT 4 AVE VERAGES: A	en 81 to 100. Cubes and cubes roots. TEMS: Numbers and types of Numbers ity rules – Concept on unit digit and rem PLIFICATIONS & PROBLEMS ON NUM DNS: BODMAS rule – Application of alge a – Continued fraction and its simplification NUMBERS: Set of numbers – Assume TIO & PROPORTION ,ALLIGATIONS & ROPORTION: Ratio between two or more ANS MIXTURES: Definition – Allegation to solve problems on mixture – Remova RAGES & PROBLEM ON AGES	– Pro aind /IBEI braic on – the the MIX e pe rule al am	operit er th RS forr Recu unkr TUR rson ong Misc	ties of eore mula urring nown E s - N ean the c	of Number m. e –Simpli g decimal numbers Aiscellane value (or quantities	fication of o s. s and form eous proble cost price) more than oblems.	value and place decimal fraction equations of the mixture two.

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UNIT 5 ANALOGY & MIRROR & WATER IMAGES

ANALOGY: Study and topic relationship – Worker and tool relationship – Tool and action relationship – Work and working place – Worker and product – Product and raw materials – Instrument and measurement – Quantity and unit – Animals and young ones – Male and female.

MIRROR IMAGES AND WATER IMAGES: Letter inverted – Object inverted.

TOTAL: 30 HOURS

6

REFERENCES:

- Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Fourth Edition, Tata McGraw-Hill Publishing Company Ltd, 2012
- 2. Arun Sharma, How to prepare for Data Interpretation for the CAT, First Edition, Tata McGraw-Hill Publishing Company Ltd, 2012.
- 3. R.V.Praveen,"Quantitative Aptitude and Reasoning"Third Edition, PHI Learning ,2016.
- 4. Dr.R S Aggarwal, Quantitative Aptitude, Revised and Enlarged Edition, S.Chand Publishing Company Ltd, 2017.
- 5. Arun Sharma "How to Prepare for Quantitative Aptitude" Eight Edition, McGraw Hill Education, 2018.
- 6. "Reasoning and Aptitude" for GATE and ESE Prelims, Made Easy Publication, 2020.

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Department	ELECTRONICS AND COMMU	JNICAT	ION E	NGIN	IEERING	R 2019	Semester-III	PC																
Course Code	Course Name	Hours /Week Credit				Total	Movimum M	aulea																
1050205	ANALOG ELECTRONICS	L	T	P	P	P	P	P	P	Ρ	Ρ	Ρ	Ρ	Ρ	P	P	P	-	-		С	Hours	Maximum Marks	
19EC305	LABORATORY	0	0	2	1	30	100																	
Course Objective	e (s): The purpose of learning th	is cours	e is to			1.1																		
- Study the cha	aracteristic of CE,CB and CC Am	plifier																						
- Learn the free	quency response of CS Amplifier	s																						
• Study the Tra	nsfer characteristic of differentia	l amplif	ier																					
• Perform expe	riment to obtain the bandwidth o	of single	stage	and	nultistage	e amplifie	rs																	
Perform SPIC	E simulation of Electronic Circu	its	1050																					
Course Outcome	s: At the end of this course, lear	ners wi	ll be at	ole to																				
Analyze the li	mitation in bandwidth of single s	tage an	d multi	stag	e amplifie	ər																		
Simulate amp	lifiers using Spice																							
• Measure CM	RR in differential amplifier.																							
Analyze vario	us types of feedback amplifiers																							
 Design oscilla 	tors, tuned amplifiers, wave-sha	ping cir	cuits a	nd m	ultivibrato	ors.																		

Exp No.	Name of Experiments
1	Frequency Response of CE and CS amplifiers
2	Darlington Amplifier
3	Differential Amplifiers - Transfer characteristics, CMRR Measurement
4	Cascode and Cascade amplifiers
5	Series and Shunt feedback amplifiers
6	RC Phase shift oscillator and Wien Bridge Oscillator
7	Single Tuned Amplifier
8	Astable and Monostable multivibrators using Spice
9	Schmitt Trigger circuit Using Spice
10	Analysis of Frequency Response of BJT and FET using Spice
11	Bistable Multivibrator using Spice

List of Equipment :

- CRO/DSO (30MHz) 15 Nos.
- Signal Generator /Function Generators (3 MHz) 15 Nos
- Dual Regulated Power Supplies (0 30V) 15 Nos.
- Digital LCR Meter 2 Nos
- Digital Multimeter 15 Nos
- Standalone desktop PCs with SPICE software 15 Nos.
- Transistor/FET (BJT-NPN-PNP and NMOS/PMOS) 50 Nos
- SPICE Circuit Simulation Software: (any public domain or commercial software)
- Components and Accessories: Transistors, Resistors, Capacitors, Inductors, diodes, Zener Diodes, Bread Boards, Transformers. SPICE Circuit Simulation Software: (any public domain or commercial software)

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING						Semester-III	PC
Course Code	Course Name	Hours / Week Credit Tota		Total	Maximum Ma			
1050206	DIGITAL ELECTRONICS	L	Т	P	С	Hours	waximum wa	arks
19EC306	LABORATORY	0	0	2	1	30	100	

Course Objective (s): The purpose of learning this course is to

- Understand the fundamentals of logic gate and its use in implementing basics Boolean function.
- Gain knowledge on various types of combinational, sequential and digital logic circuits.
- Analyze sequential digital circuits like flip-flops, registers, counters.
- Understand the importance and need for verification, testing of digital logic and design for testability
 Remember various synchronous and asynchronous sequential circuits.

Course Outcomes: At the end of this course, learners will be able to:

- · Learn the basics of gates.
- Construct basic combinational circuits and verify their functionalities
- Apply the design procedures to design a basic sequential circuits
- Learn about counters and shift registers
- Understand basic digital circuits and to verify their operation.

Exp No.	Name of Experiments
1.	Verification of Boolean theorems using digital logic gates.
2.	Design and implementation adder and Subtractor using logic gates
3.	Design and implementation of 4 bit binary Adder/ Subtractor using MSI devices.
4.	Design and implementation of code converters using logic gates (i) BCD to excess-3 code and vice versa (ii) Binary to gray and vice-versa
5.	Design and implementation of multiplexers and demultiplexers using basic gates and MSI devices
6.	Design and implementation of decoders and encoders using basic gates and MSI devices
7.	Implementation of Boolean Functions using MUX
8.	Design and implementation of simple ALU using basic gates and MSI devices
9.	Design and implementation of parity generator/checker using basic gates and MSI devices
10.	Design and implementation of magnitude comparator using basic gates and MSI devices
11.	Design of BCD to seven-segment display using 7447 IC
12.	Construction and verification of 4 bit ripple counter and Mod-10 / Mod-12 Ripple counters
13.	Design and implementation of shift registers in SISO, SIPO PISO, PIPO modes using ICs.
14.	Simulation of Experiments 1,2,3,4 using Modelsim

List of Equipment :

- Dual power supply/ single mode power supply 15 Nos
- IC Trainer Kit 15 Nos
- Bread Boards 15 Nos
- Seven segment display -15 Nos
- Multimeter 15 Nos
- ICs each 50 Nos 7400/ 7402 / 7404 / 7486 / 7408 / 7432 / 7483 / 74150 / 74151 / 74147 / 7445 / 7476/7491/ 555 / 7494 / 7447 / 74180 / 7485 / 7473 / 74138 / 7411 / 7474

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Department	ELECTRONICS AND COMM	UNICAT	FION I	ENGI	NEERING	R 2019	Semester-IV	BS
Course Code	Course Name	Hou	rs / We	eek	Credit	Total	Maximum	Maules
Course Code	Course Name	L	Т	P	С	Hours	waximum	warks
19BS404	PROBABILITY AND STOCHASTIC PROCESS	3	1	0	4	60	100	
	/e (s): The purpose of learning t							
	d the basic concepts of probabil				ons with c	haracteri	stics.	
	concepts of two dimensional ra						20.000	
	d the basic concepts of random				e widely u	sed in IT	fields.	
	d the concept of correlation and						*	
	d the significance of linear syste						3.0	
	es: At the end of this course, le							
	ate and apply the basic probabili							е
	of probability distributions in an a							
	he relationship of two dimension				s using co	relation	techniques ar	ia to
	properties of two dimensional ran concept random processes in er							4
	d and apply the concept of corre		-					
	its will have an exposure of vari					holn in a	cauirina ekille	in
	tuations involving more than on							
	invariant systems.	c varias	10.7101		analyze the	respond	se of random	nputs
and the second se	BABILITY AND RANDOM VAR		-				- and little	12
	ioms of probability - Condition			- Bay	e's theore	m - Dis	crete and co	A second s
	s – Moments – Moment gene						orete una oo	innaoa
		rating t	unctior	1S - 1	Binomial.	Poisson.	Geometric.	Uniform
		rating t	unctior	ns –	Binomial,	Poisson,	Geometric,	Uniforn
Exponential and	Normal distributions.	-		ns –	Binomial,	Poisson,	Geometric,	Uniform
Exponential and Jnit II TWO	Normal distributions.		ES	-	2.			12
Exponential and Jnit II TWO oint distribution - Transformation	Normal distributions. - DIMENSIONAL RANDOM VA s – Marginal and conditional dis n of random variables – Centra		ES ns – C	ovaria	ance – Co	rrelation	and linear re	12 gressio
Exponential and Jnit II TWO loint distribution: Transformation - Transformation andom variables	Normal distributions. - DIMENSIONAL RANDOM VA s – Marginal and conditional dist of random variables – Centra s).		ES ns – C	ovaria	ance – Co	rrelation	and linear re	12 gressio stribute
Exponential and Jnit II TWO oint distribution Transformation Transformation Transformation andom variables Jnit III	Normal distributions. - DIMENSIONAL RANDOM VA s – Marginal and conditional dis n of random variables – Centra s). DOM PROCESSES	ARIABL stribution al limit t	ES ns – C heorer	ovaria n (for	ance – Co independ	rrelation ent and	and linear reative identically dis	12 gressio stribute
Exponential and Jnit II TWO Joint distribution Transformation Transformation Transformation andom variables Init III RANI RANI Classification – S S	Normal distributions. - DIMENSIONAL RANDOM VA s – Marginal and conditional dist n of random variables – Centra s). DOM PROCESSES Stationary process – Markov pro-	ARIABL stribution al limit t	ES ns – C heorer	ovaria n (for	ance – Co independ	rrelation ent and	and linear reative identically dis	12 gressio stribute
Exponential and Init II TWO oint distribution Transformation andom variables Init III RANI Classification – S	Normal distributions. - DIMENSIONAL RANDOM VA s – Marginal and conditional dist n of random variables – Centra s). DOM PROCESSES Stationary process – Markov pro-	ARIABL stribution al limit t	ES ns – C heorer	ovaria n (for	ance – Co independ	rrelation ent and	and linear reative identically dis	12 gressio stribute
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Chairman - BoS Dept. of Maths - ESEC



Department	ELECTRONICS AND COMMUNI	CATIO	ON EN	IGINE	EERING	R 2019	Semester-IV	BS
Course Code	Course Name		rs / W		Contraction of the second second	Total	Maximum Mar	rks
19BS407	ELECTROMAGNETICS AND	L 3	Т 0	P 0	C 3	Hours 45	100	
a de la companya de La companya de la comp	WAVEGUIDES			U	J		100	_
	(s): The purpose of learning this con	urse is	s to					
	cs of electrostatic e various laws associated with mag	noto c	tation					
	axwell's equation and electromagne							
	e various types of guided wave	uc wa	100					
	ctangular waveguides and resonato	r						
	: At the end of this course, learners		e able	to:				
	ndamental concepts of electrostatics					a		
	ndamental law of magneto statics							
	well equations and wave equation							
	haracteristic s of guided waves					a.		
	haracteristic s of Rectangular wave	guides						
Jnit I ELECT	ROSTATICS		-		final de la	1 - 10 - M - 1	42.75	9
ntroduction to Co	ordinate system - Rectangular, cyli	ndrica	l and	sphe	rical coc	ordinate s	ystem - Coulom	b's
	ntensity - Electric field intensity of lin							
	of Gauss law - Electric potential - Po	tentia	due t	o dip	ole - Poi	sson's an	d Laplace equati	or
	ons for electric field.			11 - K				
	ETOSTATICS		1015					9
	Applications - Ampere's circuital law							etic
lux and Magnetic f	lux density - Nature of magnetic ma	terials	- Bou	ndary	/ conditio	ons for Ma	agnetic field.	
Init III MAXW	ELL'S EQUATIONS AND ELECTR	OMAG	GNET	C W	AVES			9
araday's law - Di	splacement current - Maxwell's equ	uation	in poi	int fo	rm and i	integral fo	orm for steady a	nd
	- Poynting vector and Poynting	theore	m -W	ave	Equatior	n - Unifor	m Plane Waves	3 -
	raction - Wave Polarization.	15.5	1.8P					
	D WAVES							9
	parallel planes of perfect conductor							
	E and TM waves – TEM Waves –	Veloci	ties of	prop	agation	 Attenua 	ation of TE and T	M
	ane guides – Wave impedances.		0.00		TANOU			-
	IGULAR WAVEGUIDES AND RES							9
	TM waves – TE waves – Characte							
	Impossibility of TEM waves- Don					All a state of the second s		
avity resonator for	ation of mode – Microwave cavity res	sonald	or - Re	clang	jular cav	nty resona		d
avity resonator for	TE TO T Mode.			-	-			-
EXT BOOK(S):			12		1.1			
	Jr and John A.Buck, Engineering 011, ISBN : 9780070612235, 00706			gneti	cs, 7th	Edition,	Tata McGraw-H	ill
E.C. Jordan & K Edition 2011.	.G. Balmain, Electromagnetic Wave	s and	Radia	ting S	Systems	, Prentice	Hall of India, 2n	d
David K Cheng,	Field and Wave Electromagnetics, F	earso	n Edu	catio	n Inc, De	elhi, 2004		
EFERENCE(S):								
Ramo, Whinnery	and Van Duzer, Fields and Wave 003, ISBN : 8129702606	es in C	Comm	unica	tions Ele	ectronics,	3rd Edition, Joh	n
	diku: Elements of Engineering Ele	ctrom	agneti	cs,4t	h Editior	n, Oxford	University Pres	S,
2007	20.			-				
	SHALPS				C	R.V		
	X					4 "		

Chairman - BoS Dept. of Physics - ESEC

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Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNICA			1		R 2019	Semester-IV	PC
Course Code	Course Name	Hou	urs/\ T	Week P	Credit C	Total Hours	Maximum	Marks
19EC401	LINEAR INTEGRATED CIRCUITS	3	0	0	3	45	100	1
 Understand Know about Understand Study the o Understand Course Outcom Describe the Develop and Describe the 	ve (s): The purpose of learning this could the characteristics and applications of the special function Operational Amplifier the operation of 555 families of ICs and peration of D/A and A/D converter type the operation of voltage regulator. mes: At the end of this course, learners a fundamentals and areas of application of analyze special function Operational / e operation of 555 families of ICs and coperation of D/A and A/D converter type operation of 555 families of ICs and coperation of D/A and A/D converter type operation op	oper and i d cha s and will b ms for Ampl harad	ation ts ap aracte d its o be ab r the ifier a cteris	plicati eristics charac le to: integra and its stics of	on s of PLL cteristic: ated cirr applica	s cuits. ation		
	operation of voltage regulator.			, on an				2004
Jnit I Introd	luction to Operational Amplifier				n u i s 2		er I nord og h	9
Operational am	ational amplifier - Ideal and practica plifier - Differential amplifier – Transfer ters – Circuits for improving CMRR: (char	acter	ristics	- Low	frequency	/ small signal	analysis
and the second se	cteristics of Operational Amplifiers							9
DC Characteris	tics: Input bias current- Input offset Frequency response- Stability and slew							t – AC
The second se	cations of Operational Amplifier							9
Signal generato	tor- Instrumentation amplifier – Differen rs: Astable and monostable multivibrat nd Wien bridge oscillator- Triangular wa	or -	Schn	nitt trig				
	tional Amplifier in Signal Conditioni							9
Active Filter: I a Converter: Flas	and II order low pass and high pass h type, Integrating type and success or type, R-2R ladder type and inverted F	filter	s – appro	Switch ximati	on type			
Jnit V Specia	al ICs							9
controlled oscilla demodulators a Switching regula FEXT BOOK(S):		565) e re	- Fui gulat	nction or IC	al block Serie	diagram s op-amp	, Application: / o regulator (7	4M, FN 8XX) -
Delhi, 2003			1					New
2. Roy Choud	hury and Shail Jain Linear Integrated C	ircuit	ts, W	iley Ea	astern,	New Delh	ii, 2014	
REFERENCE(S):		2.11.1	-			<u></u>	
	5, Introduction to System Design using ew Delhi, 1994.	Integ	rated	l Circu	iits, Seo	cond Editi	on, Wiley East	ern
the second s	cob .J,Analog Integrated Circuits and A	Applio	catior	ns, Fir	st editio	on, Prenti	ce Hall of India	a, New
3. Robert F C	Coughlin and Fedrick F Driscoll Opera entice Hall of India, New Delhi, 2001.	tiona	al am	plifiers	s and li	near Inte	grated Circuits	s, Fifth

Chairman - BoS Dept.of ECE - ESEC

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Department	ELECTRONICS AND COMMUNI	CATION E	NGINE	ERING	R 2019	Semester-IV	PC
Course Code	Course Name	Hours / V	Week	Credit	Total	Maximum I	Acales
Course Coue	Course Name	LT	P	С	Hours	waximumi	VIAIKS
19EC402	DIGITAL SIGNAL PROCESSING	3 1	0	4	60	100	1.
 Study the Study ab understa Understa Program Course Outcool Apply DF Design or Realize d Discuss f Utilize DS Jnit I 	ive (s): The purpose of learning this e principles of discrete-fourier transfo out discrete time systems and to lear and the finite word length effects in sig and the effects of finite register length using DSP processors mes: At the end of this course, lear T algorithm for signal analysis f digital filter for the given specification igital filter for the given specification inite word length effects SP processor for real time application CRETE FOURIER TRANSFORM DFT and FFT: Review of DTFT, DF	orm gnal proces ners will be on	T algo sing able to):			12
FT algorithms							
Overlap add a Jnit II DES Characteristics Butterworth filt Approximation	 Decimation in time – Decimation in time – Decimation in time – Decimation is and save method. GIGN OF DIGITAL IIR FILTERS of practical frequency selective filters, Chebyshev filters. Design of I of derivatives, Impulse invariance methods. 	n frequenc ers. Chara IR filters fi ethod, Bilin	y algor octeristi rom ar ear tra	ithms – L cs of cor nalog filte nsformati	inear and mmonly u rs (LPF, on. Frequ	circular convo sed analog fi HPF, BPF, B ency transform	lution 12 Iters -
Overlap add a Jnit II DES Characteristics Butterworth filt Approximation n the analog de	 Decimation in time – Decimation in time save method. Dign of Digital IIR FILTERS of practical frequency selective filters, Chebyshev filters. Design of I of derivatives, Impulse invariance methods. 	n frequenc ers. Chara IR filters fi ethod, Bilin	y algor octeristi rom ar ear tra	ithms – L cs of cor nalog filte nsformati	inear and mmonly u rs (LPF, on. Frequ	circular convo sed analog fi HPF, BPF, B ency transform	Iters - RF) - nation
Overlap add a Jnit II DES Characteristics Butterworth filt Approximation n the analog de Jnit III DES Design of FIR Fourier series Frequency same	 Decimation in time – Decimation in time – Decimation in time – Decimation in time – Decimation is and save method. SIGN OF DIGITAL IIR FILTERS of practical frequency selective filters, Chebyshev filters. Design of I of derivatives, Impulse invariance method and the second secon	n frequenc ers. Chara IR filters fi ethod, Bilin orm I, direc ric FIR filte indows (Re inear phase	y algor acteristi rom ar ear tra t form ers - de ectangu e struct	ithms – L cs of cor halog filte nsformati II, Cascad esign of I ular, Ham	inear and mmonly u rs (LPF, on. Frequ le, paralle inear pha ming and	circular convo sed analog fi HPF, BPF, B ency transform el realizations se FIR filters d Hanning win	lters - RF) - nation using dow),
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Overlap add aJnit IIDESCharacteristicsButterworth filtApproximationIn the analog doJnit IIIDESDesign of FIRFrequency sameInit IVQuantizationQuantizationOverflow error-	 Decimation in time – Decimation in and save method. SIGN OF DIGITAL IIR FILTERS of practical frequency selective filters, Chebyshev filters. Design of I of derivatives, Impulse invariance method and the second structure of IIR filter - direct for an anti-symmetric and Anti-symmetric and Anti-symmetric and Anti-symmetric and Anti-symmetric proceeding method. FIR filter structures - lie EFFECTS OF FINITE WORD LEN poise – Derivation for quantization error-Figure Signal scaling. 	n frequence ers. Chara IR filters fil ethod, Bilin orm I, direct ric FIR filte indows (Re inear phase GTH REGI noise pow Product qu	y algor acteristi rom ar ear tra t form ers - de ectangu estruct STER ver –Tr antizat	ithms – L cs of cor halog filte nsformati II, Cascad esign of I ular, Ham ure, direc	inear and mmonly u rs (LPF, on. Frequ de, paralle inear pha ming and t form rea	circular convo sed analog fi HPF, BPF, B ency transform realizations se FIR filters Hanning win alizations	Iters RF) nation using dow) 12 Input
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 John G Proakis and Manolakis, Digital Signal Processing Principles, Algorithms and Applications, Pearson, Fourth Edition, 2014.
 Lonnie C Ludeman, Fundamentals of Digital Signal Processing, Wiley India, New Delhi, 2010
 Avtar Singh and Srinivasan S, Digital Signal Processing, Implementation using DSP Microprocessors with examples from TMS320C67XX, Thomson/Brooks/Cole, California, United States, 2010.

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2	Sanjith K Misra, Digital Signal Processing: A Computer based Approach, 4th edition, India, 2013, Tata
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P.b-Chairman - BoS Dept.of ECE - ESEG

Department	ELECTRONICS AND COMMUN	VICAT	ION E	ING	NEERING	R 2019	Semester-I	V PC
Course Code	Course Name	Hou	rs/We	ek	Credit	Total	Maximum	Mark
Course coue	Course Name	L	Т	Ρ	С	Hours	Maximum	Wark
19EC403	ANALOG COMMUNICATION	3	0	0	3	45	100	1
	(s): The purpose of learning this c	ourse	is to					
	de Modulation Systems							
	lodulation Systems .							
	edge about random process and N							
	e influence of noise on the perform	ance o	of ana	log d	communica	tion syste	ems.	
	ion theory and coding techniques.							
	s: At the end of this course, learned	ers will	be ab	ole to	•			
•	ude Modulation Systems							
	Modulation Systems.							
· · · · · · · · · · · · · · · · · · ·	m process and Calculate noise in o							
	erformance of the communication				esence of n	oise.		
 Determine Chr 	annol Conceity and Analyze coding							
	annel Capacity and Analyze coding		iques		hand days	1		1
Unit I AMPI	ITUDE MODULATION SYSTEMS	6						9
Unit I AMPI Need for modulati	ITUDE MODULATION SYSTEMS on – Classifications of modulatio	3 on tech	nnique	es-G				SBSC
Unit I AMPI Need for modulati SSB-SC, VSB-C	_ITUDE MODULATION SYSTEMS on – Classifications of modulatio omparison of Amplitude mod	3 on tech	nnique	es-G				SBSC
Unit I AMPI Need for modulati SSB-SC, VSB-C Superheterodyne F	ITUDE MODULATION SYSTEMS on – Classifications of modulatio omparison of Amplitude mod Receivers	3 on tech	nnique	es-G				SBSC
Unit I AMPI Need for modulati SSB-SC, VSB-C Superheterodyne F Unit II ANGI	_ITUDE MODULATION SYSTEMS on – Classifications of modulatio omparison of Amplitude mod Receivers _E MODULATION SYSTEMS	3 on tech Iulatior	nnique n sy	es-Ge sterr	ns- AM	transmitte	ers-AM reco	SBSC eivers
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Unit I AMPI Need for modulati SSB-SC, VSB-C Superheterodyne F Unit II ANGI Frequency modulation FM, indirect FM- D Unit III NOIS Random variable-	_ITUDE MODULATION SYSTEMS on – Classifications of modulatio omparison of Amplitude mod Receivers _E MODULATION SYSTEMS tion: Narrowband and wideband F emodulation of FM signals -FM stee ES IN COMMUNICATION SYSTE Random process- strict sense	M- Phereo m	nnique n sy nase M ultiple nary-v	es-Ge sterr Modu exing	Ilation- Ger - FM transr sense st	transmitten neration co mitters- FI ationary-	of FM signal, M receivers.	SBSC eivers 9 Direc 9 ccess
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TEXT BOOK(S):

- 1. J.G.Proakis, M.Salehi, Fundamentals of Communication Systems, Pearson Education 2014.
- 2. Simon Haykin, Communication Systems, 4th Edition, Wiley, 2014.

REFERENCE(S):

- 1. B.P.Lathi, Modern Digital and Analog Communication Systems, 3rd Edition, Oxford University Press, 2007.
- 2. D.Roody, J.Coolen, Electronic Communications, 4th edition PHI 2006
- 3. A.Papoulis, Probability, Random variables and Stochastic Processes, McGraw Hill, 3rd edition, 1991.
- 4. B.Sklar, Digital Communications Fundamentals and Applications, 2nd Edition Pearson Education 2007.
- 5. H P Hsu, Schaum Outline Series Analog and Digital Communications TMH 2006.

man - BoS Dept.of ECE - ESEC

-	ELECTRONICS AND COMMUNICA	Contraction of the second second	and the second	A MARTINE		R 2019	Semester-IV	ES
Course Code	Course Name	Hours			Credit C	Total Hours	Maximum	Marks
4050404			T	P			100	
19ES401	CONTROL SYSTEM ENGINEERING ve (s): The purpose of learning this con	3	1	0	4	60	100	_
Gain knowlUnderstandStudy aboutStudy the fr	edge on system representation and tim I the time response of various control t stability of systems requency response through Nyquist, Pe out state variable analysis	e respo lers	onse					
Course Outcon	nes: At the end of this course, learners	will be	able	e to:				
Determine	the transfer function of systems							
Determine	he time response of the systems							
• Check the	stability of the system							
	he frequency response of the systems							
	space analysis to continuous and discr	ete time	e sys	stem				
Open loop and	YSTEM REPRESENTATION closed loop systems-Terminology and n concept- Modeling of mechanical s						a non-sector sector s	
Open loop and Transfer functio flow graphs - Ma							a non-sector sector s	tems ·
Open loop and Transfer functio flow graphs - Ma Jnit II T Standard test si	closed loop systems-Terminology and in concept- Modeling of mechanical sy ason's gain formula IME RESPONSE ANALYSIS gnals - Time response of First and Se	ystems, cond or	, Blo	ck di syste	agram r	eduction	techniques -	tems Signa 12 ut time
Open loop and Transfer functio flow graphs - Ma Jnit II T Standard test si response specif	closed loop systems-Terminology and in concept- Modeling of mechanical sy ason's gain formula IME RESPONSE ANALYSIS gnals - Time response of First and Se ications - Type of systems - Steady sta	ystems, cond or	, Blo	ck di syste	agram r	eduction	techniques -	tems Signa 12 ut time
Open loop and Transfer functio flow graphs - Ma Jnit II T Standard test si response specif PD, PI, PID Cor	closed loop systems-Terminology and in concept- Modeling of mechanical sy ason's gain formula IME RESPONSE ANALYSIS gnals - Time response of First and Se ications - Type of systems - Steady sta atroller	ystems, cond or	, Blo	ck di syste	agram r	eduction	techniques -	tems - Signa 12 ut time sics of
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Open loop and Transfer functio flow graphs - Ma Jnit II T Standard test si response specif PD, PI, PID Cor Jnit III S Stability and the conditionally sta	closed loop systems-Terminology and in concept- Modeling of mechanical sy ason's gain formula IME RESPONSE ANALYSIS gnals - Time response of First and Se ications - Type of systems - Steady sta itroller STABILITY OF SYSTEMS e roots of characteristic equation- Routh ble systems- Root locus technique -Ru	ystems, cond or te error h Hurwi	, Blo rder con	ck di syste stant iterio	agram r em for st s, gener	eduction ep input a alized err	techniques - and ramp inpu or series - Ba	tems - Signa 12 ut time sics of 12
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2 M.N.Bandyapadhyay, Control Engineering, PHI, 2003.	

1	Ogata K, Modern Control Engineering, Tata McGraw Hill, 2005.	
2	D.Roy Choudhury, Modern Control Engineering, PHI, 2006	

R.W Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUN					R 2019	Semester IV	EEC
Course Code	Course Name	Hour	s/W			Total	Maximum M	arks
the second s		L	Т	Ρ	С	Hours		and
19HS401	LANGUAGE SKILLS	0	0	2	0	30	100	
 To involve To improve To focus th To enhance To integrate 	ve (s): The purpose of learning this the students in effective listening a e the oral communication skills in pr ne effective reading of general and t e and comprehend the written text. the LSRW skills. es: At the end of this course, learned	ctivities. oper man technical	text.					
Understar Communi Comprehe Write the Integrate	nd the technical talks. cate to his peer group properly. end the general and technical text. reports and job application in clear in LSRW skills. STENING mportance –Listening strategies - L	manner.			informat	ion - aive	information, as	6 part of
Jnit II SF	on - Being an active listener: giving PEAKING rmation - ask for personal informat							6
asics - pronund	iation practice - conversation start emic readings and lectures							
	EADING						MARKEN AND AND A REAL PROVIDED	6
nd title - Read f	ctive reading - Read and recognize or details - Use of graphic organ and use of connectors in a passag	izers to r	eview	w ar	nd aid c	omprehen	a storage and storage and storage	andin
the second se	RITING						· · · · · · · · · · · · · · · · · · ·	6
escriptive paragr riting - Types of e	J - Develop a paragraph: topic sente aph – Write a paragraph with reas essays- descriptive-narrative- issue TEGRATION OF LSRW	ons and o -based-ar	exam gum	nples enta	s - Write tive-anal	an opinic ytical	on paragraph –	E-ma
ask based Instru	ction : watching a video –Listing,	-				ing and a	, ,	
ask based Instru	ction : watching a video –Listing, per and creating topic based videos	-					, ,	2.1

Chairman - BoS Dept.of ECE - ESEC

	ELECTRONICS AND COMMUNICAT				RING	R 2019	Semester	IV
Course Code	Course Name		Hour Wee		Credit	Total	Maximur	n
Course Code	oourse nume	L	T	P	С	Hours	Marks	
19TPS04	QUANTITATIVE APTITUDE AND LOGICAL REASONING - II	2	0	0	0	30	100	
Course Objec	tive (s): The purpose of learning this co	urse i	is to				X	
	e basic of partnership and chain rule in s	1			10.000			
	oblems using fast track method by learni	ng pr	ofit a	nd lo	oss with p	ercentage.	4	
	e angle of elevation and depression.							
	e relationship, direction concepts in easy out coding and decoding through logical							
	mes: At the end of this course, learners		e abl	e to	Sec. X			-
	blems by using shortcut in partnership a							
	e tips and tricks of profit and loss with per				gh fast tra	ack method	S.	
	ind the concepts of angles.							
	critically the real life situations by resorti	ng an	d an	alyzi	ng analy	ical reason	ing of key	
	nd factors.							
	the logical way of thinking by solving pro	blem	s coo	des a	and ranki	ngs concep	its.	6
	FNERSHIP & CHAIN RULE : Ratio of division of gains: Simple Partr	orchi	n = 0	om	nound Pa	rtnorshin -	Working and	
leeping partner	-	ier sin	p-c	Join	pound r	annersnip -	working and	
	Definition – Direct proportion and Indirect	propo	ortion	۱.				
UNIT 2 PROF	FIT & LOSS, PERCENTAGE			1				6
	OSS: Basic definition and types of profit					discount ar	nd marked pr	ice
	v/s false value – Application in data inte		ation	prot	olems.			
	Percentage – Percentage using shortcu	ts.		-				-
	HT AND DISTANCE						te de trion	6
	ISTANCES: Line of sight – Angle of elev	Contraction of the		gle	of depres	sion.		-
	DD RELATIONSHIP & DIRECTION SEN	NO.		iene	hin diam	om Comil	1 troo	6
	IONSHIP: Analysis the gender relations NSE TEST: Distance between the startin							thy
100	CAL SEQUENCE OF WORD, CODING							
	SEQUENCE TEST				,			6
	JENCE OF WORDS: Sequence of occur	rence	ofe	vent	s – Sequ	ence of ohi	anto in a alas	
roun - Sequenc	ce of increasing/decreasing size, value, in						ects in a class	s or
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Department	ELECTRONICS AND COMMUNIC	ATIO	NEN	IGINE	ERING	R 2019	Semester-IV PC	
Course Code	Course Name	Ho	urs /	Week	Credit	Total	Maximum	Maulia
1050104	LINEAR INTEGRATED CIRCUITS	LTPC			С	Hours	Waximum	warks
19EC404	LABORATORY	0	0	2	1	30	100	
Course Object	tive (s): The purpose of learning this	cour	se is	to				
• Understa	and the basics of linear integrated circ	cuits	using	op-an	nps			
• Design t	he circuits using the operational amp	lifier.						
 Apply op 	erational amplifiers in linear and non	linear	appl	ication	IS.			
	the basic knowledge of special function		1.5					
Acquire	the basic knowledge ADC/DAC circui	ts						
Course Outco	omes: At the end of this course, learn	ners v	vill be	able t	:0:			17 M - 19 M
 Design a 	mplifiers, oscillators, D-A converters	using	ope	rationa	al amplifie	ers.		
 Design fi 	Iters using op-amp and performs an	exper	imen	t on fre	equency	response.		
	the working of PLL and describe its a							
	f ADC/DAC circuits using op-amps							
-	ne voltage regulators.							

Exp No.	Name of Experiments
17	Design and testing of Inverting, Non-Inverting Amplifiers, Summer, Subtractor, Differentiator and Integrator using op-amps and Spice Simulation.
2	Design and testing of Precision half wave and Full wave rectifiers using op-amps and Spice Simulation.
3	RC phase shift and wein bridge oscillator using Op-Amps-Multisim
4	Design and testing of Comparator, Zero crossing Detectors, Peak Detector and Schmitt trigge using op-amps and Spice Simulation.
5	Design of Astable and Monostable Multivibrator & Schmitt trigger circuit using IC 741
6	Design and testing of Active Analog Filters using op-amp.
7	Astable multivibrator, Monostable multivibrator & Schmitt trigger circuit using IC 555
8	Design of D/A Converter using R-2R ladder network and A/D Convertor using flash type.
9	Study of Phase Locked Loop (PLL) and Spice Simulation.
10	Voltage regulator using 78XX and Spice Simulation.

List of Equipment:

- CRO/DSO (Min 30MHz) -- 15 Nos
- Signal Generator /Function Generators (2 MHz) 15 Nos
- Dual Regulated Power Supplies (0 30V) -- 15 Nos
- Digital Multimeter -- 15 Nos
- IC Tester -- 5 Nos
- Standalone desktops PC -- 15 Nos
- Components and Accessories 50 Nos
- Components and Accessories: Transistors, Resistors, Capacitors, diodes, Zener diodes, Bread Boards, Transformers, wires, Power transistors, Potentiometer, A/D and D/A convertors, LEDs. Note: Op-Amps uA741, LM 301, LM311, LM 324, LM317, LM723, 7805, 7812, 2N3524, 2N3525, 2N3391, AD 633, LM 555, LM 565 may be used.

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Department	ELECTRONICS AND COMMUN	Service and a service of the	Negosal - Oa	and the second second	EERING	R 2019	Semester-IV PC
Course Code	Course Name	Hou	rs / W	leek	Credit	Total	Maximum Marks
19EC405	DIGITAL SIGNAL	L	Т	Ρ	С	Hours	Maximum Marks
1920405	PROCESSING LABORATORY	0	0	2	1	30	100
 Perform b Perform b Implement Study the 	tive (s): The purpose of learning this asic signal processing operations of asic signal processing operations su t FIR and IIR filters in MATLAB and arithmetic operations of DSP process convolution and filter circuits	CT ar ich as DSP F	nd DT Linea	signa r Cor		nd correla	tion methods
 Design of Design of Design of Analyze th 	omes: At the end of this course, lear basic signal processing operations of Linear Convolution and correlation r FIR and IIR filters in MATLAB and D be operations of basic arithmetic circ tation of convolution and filter circuit	of CT a nethoo)SP Pr uits us	and D ds roces:	T sigi sor	nals		
Exp No.		me of	Expe	erime	nts		
sing Matlab			1		1		
1	Generation of basic continuous-tir unit step iii) ramp iv) exponential v						
2	Basic operation on CT and DT s signal addition v) signal multiplicat	-	10.00		Server and the server and		
3	Computation of convolution and C	orrelat	ion of	give	n signals		
4	Overlap add and overlap save me	thod fo	or per	formir	ng Convolu	ution	
5	Implementation of FFT algorithm.						
6	Sampling and Reconstruction of a	signal					
7	IIR Filter Design using bilinear tran	nsform	ation	and in	mpulse inv	ariant tech	nnique.
8	FIR Filter design using windows.		Lar II		- 1. 7. 7		
9	Graphical simulations and modelin	g of a	n ima	ge us	ing MATLA	٩B	
10	Modeling and Prototyping With Sir	nulink	22				
Using DSP Pr	ocessor	1.1.1	1			7 n. č. j	
11	Arithmetic operation using Digital S	Signal	Proce	essor.			
12	Wave form generation using Digita	I Sign	al Pro	cess	or.		
13	Implementation of FIR filter using I			1.			

List of Equipment:

- PCs with Fixed / Floating point DSP Processors (Kit / Add-on Cards) 15 Units
- MATLAB with Simulink and Signal Processing Tool Box or Equivalent Software in desktop systems -15 Nos
- Signal Generators (1MHz) 15 Nos
- CRO (20MHz) -15 Nos

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Department	ELECTRONICS AND COMM	UNICAT	ION	ENG	INEERING	R 2019	Semester V	PC	
		Hours	s / W	eek	Credit	Total			
Course Code	Course Name	L	т	Р	С	Hours	Maximum N	larks	
19EC501	ANTENNAS AND WAVE PROPAGATION3034510						100)	
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REF	ERENCE(S):
1.	Harish A R and Scahidananda M, Antennas and Wave Propagation, Oxford University Press, Chennai, 2009
2.	Edward C Jordan, Keith G Balmain, Electromagnetic waves and Radiating systems, Prentice Hall of India, New Delhi, 2015.

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19EC502	DIGITAL COMMUNICATION	3	0	0	3	45	100	100	
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A CONTRACTOR OF	
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3.	H P Hsu, Schaum Outline Series Analog and Digital Communications, 2nd Edition TMH 2003
4.	J.G Proakis, Digital Communication, 5th Edition, Tata Mc Graw Hill Company, 2008

Chairman - BoS Dept.of ECE - ESEC

Det	partment	ELECTRONICS AND COMMUN					R 2019	Semester-	V
Cour	rse Code	Course Name	Hour	rs/W T	eek P	Credit C	Total Hours	Maximum M	Mark
19	EC503	MICROPROCESSOR, MICROCONTROLLER AND INTERFACING	3	0	0	3	45	100	
Cours	e Objectiv	e (s): The purpose of learning this of	course i	is to				ge of the last	
• K	now the bas	sic concepts of digital fundamentals	to Micr	oproc	cesso	r			
• U	nderstand t	he interfacing techniques of various	s contro	ollers.					
 St 	tudy about 8	39C51 controller and instruction se	ts.						
• Ki	now the arc	hitecture and assembly language p	rogram	ming	197				_
		he concept of interrupts and interfac				peripheral	S.		
		es: At the end of this course, learne							
	and the second	sic concepts of digital fundamentals				a manufacture and the second second		computer sys	tem.
	•	oprocessor applications using asse		-		-	-		
		the different peripherals (8255, 827	79, 825	3, 823	37, 82	251, 8259) are inte	erfaced with	
	icroprocess		u du a ll a u	haaa	al avra		arinharal	daviana vain	~
	esign, deve C microcon	lop and interface complete microco	ntroller	base	a sys	tems to p	eripnerai	devices usin	g
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-09100		ns - Animmetic Instructions - 112	ansfer	and a	contro	ol instruc			
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nstruc	ctions. Simp	ole Assembly Language Programm					tions - F	Processor co	ontrol
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3.	http://www.nptel.ac.in/courses/Webcourse-contents/IISc-	BANG/	Microprocessors%20	and%20
	Microcontrollers / New_index1.html			
4.	http://nptel.ac.in/courses/106108100/			

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Department	ELECTRONICS AND COMMUNIC	CATIO	ON E	NGIN	IEERING	R 2019	Semest er-V	HS	
Course Code	Course Name	Hou	rs / W	leek	Credit	Total	Maximu	n Mark	
		L	Т	Ρ	С	Hours	IVIAAIIIIUI	m Marks	
19HS402	UNIVERSAL HUMAN VALUES 2 : UNDERSTANDING HARMONY		2 1 0) 3	60	100		
To help the ensure sust To facilitate as well as reality and to Values and To highlight p trustful and m Course Outcome Students an society, natu Students w solutions. Students w solutions. Students w solutions. Students wo solutions in re Students wou Unit I Introc Lectures - Unders Continuous Happing	e (s): The purpose of learning this constructed as the essential constructed happiness and prosperity which the development of a Holistic perspective towards happiness and prosperity the rest of existence. Such a holistic movement towards value-based livin lausible implications of such a Holistic utually fulfilling human behavior and s: At the end of this course, learners re expected to become more awa	ch are bective base ic per ng in a tic und mutu s will l re of life, ent to ave le e mad	ement e the c e amo d on specti a natu dersta ally e be abl them and oward earnt t le in the spiration a piration	ore a ong s a co ve fo ral w nding nrichi e to: selve in ha s wh to the nis di as th ons -	aspirations tudents to rrect und orms the l ay. g in terms ing interact es, and th andling p at they h eir own s rection .	s of all hu owards lif erstandin oasis of U of ethica ction with neir surro roblems nave unc elf in diff	man being e and pro g of the Jniversal I human c Nature bundings with sust lerstood (erent day	gs. fession Human Human conduct, (family, ainable (human r-to-day 9+3 ration - ionship	
	Session] - Sharing about Oneself	- E	xplorii	ng H	uman Co	nsciousn	ess - Ex	ploring	
	mony in the Human Being		-					6+3	
between the Needs Harmony in the Sel Health Tutorials [Practice Imagination in the S	tanding Human being as the Co-ex of the Self and the Body – The Bo If - Harmony of the Self with the I Session] - Exploring the difference self - Exploring Harmony of Self with mony in the Family and Society	ody a: Body of Ne	s an I - Pr eds o	nstru ograr	ment of ti mme to e	ne Self - nsure se	Underst If-regulation	anding on and	
Lectures - Harmo Relationship – 'Tru Understanding Harr Tutorials [Practice Exploring Systems t	ny in the Family – the Basic Unit of ust' – the Foundational Value in Re nony in the Society - Vision for the U Session] - Exploring the Feeling to fulfil Human Goal	elatior Jniver	iship sal Hu	- 'Re uman	spect' – a Order	as the Ri	ght Evalu	Human ation -	
Lectures - Unde Fulfilment among th Holistic Perception of	mony in the Nature/Existence rstanding Harmony in the Nature - le Four Orders of Nature – Realiz of Harmony in Existence Session] - Exploring the Four C	ing E	xisten	ce as	s Co-exis	tence at a		Mutual - The	

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Un	it V Implications of the Holistic Understanding	9+3
Basis Profe Studi Tuto Educ	ures - Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conducts for Humanistic Education, Humanistic Constitution and Universal Human Order - Competencessional Ethics - Holistic Technologies, Production Systems and Management Models-Typicaties - Strategies for Transition towards Value-based Life and Profession rials [Practice Session] - Exploring Ethical Human Conduct - Exploring Humanistic Modestration - Exploring Steps of Transition towards Universal Human Order (T BOOK(S):	ence in I Case
1.	A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P B 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1	agaria,
2.	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R G Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-4 53-2	
REF	ERENCE(S):	
1.	Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999	
2.	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004	
3.	The Story of Stuff (Book)	
4.	The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi	
5.	Small is Beautiful - E. F Schumacher	
6.	Slow is Beautiful - Cecile Andrews	
7.	Economy of Permanence - J C Kumarappa	
8.	Bharat Mein Angreji Raj – PanditSunderlal	
9.	Rediscovering India - by Dharampal	
10	Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi	

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Department	COMMON TO ALL BRA	NCH	ES			R 2019	Semester	۷	
Course Code	Course Name	Hours/ Week Credit		Total Hours	Maximun Marks	ı			
	QUANTITATIVE APTITUDE AND	L	Т	Р	С				
19TPS05	LOGICAL REASONING - III	2	0	0	0	30	100		
	ctive (s): The purpose of learning this c		e is to	C					
•	nelp people make sense of numerical da								
	he calendars and series in simplified wa	-					1		
	d the concept of the interest amount in S			data	rmine the	onowor	4		
	procedure to deal with a situation and su ting arrangements in rows or in small gro			dete	rmine the	answer.			
	omes: At the end of this course, learners			hle t	0.			5	
	te various principles involved in solving					and thereb	w reducing the	2	
	to solve Aptitude Questions.	incitin	erna	ioui	probleme		y roudoing are		
	uestion based on calendar, odd man ou	it and	seri	es b	y using sh	nortcut met	hods.		
	he interest by using shortcut methods in								
Induce thei	r critical thinking by solving the syllogism	n and	cou	rse c	of action.				
	e conditions and do interpretation.		1.3	1.1					
submitted by the second s	A INTERPRETATION & CLOCKS					and the second	and the second second	6	
	RETATION: Tabulation – Bar graphs – F								
	nition – important points – Angular differe	ence	betw	een	two hand	s at differen	nt timings-		
correct clock.	ENDADS ODDMAN OUT & SEDIES		-		1212				
UNIT 2 CAL	ENDARS, ODDMAN OUT & SERIES		<u> </u>	-				6	
	Odd days – Leap year – Ordinary year & SERIES: Odd man out – Power serie								
UNIT 3 SIMF	PLE & COMPOUND INTEREST							6	
	EST: Principal - Rate of interest - Num	ber o	f yea	rs –	Using for	mulae and	shortcuts		
	ITEREST: Compounded Annually – Co nnually – Rates are different for differer			d Ha	lf-Yearly	– Compoui	nded Quarterl	y —	
and the second	TEMENT & COURSE OF ACTION, SYL							6	
	ND COURSE OF ACTION: Courses of	action	1 - D	ecisi	on taken	 Improvem 	nent, Follow-up	0 0	
	regard to the given statement.						01		
	OGICAL VENN DIAGRAMS: Relations						Classification	of	
	nmediate deductive inference – Immedia FING ARRANGEMENTS & DATA SUFF				interence.			6	
EATING ARR	ANGEMENTS: Persons seating in the ci	ircula	r – F	lecta	ingular – S	Square.		0	
ATA SUFFICI									
	ENCY: Reasoning ability using a set of	direc	tions	5.		то			
	ENCY: Reasoning ability using a set of	direc	tions	3.		то	TAL : 30 HOL	JR	
1. Abhijit Guh	ENCY: Reasoning ability using a set of 3: a, Quantitative Aptitude for Competitive				, Fourth E	6	1	JR	
 Abhijit Guh Publishing Arun Sharr 	ENCY: Reasoning ability using a set of S:	Exar	ninat	ions		dition, Tata	a McGraw-Hill	JR	
. Abhijit Guh Publishing 2. Arun Sharr Publishing	ENCY: Reasoning ability using a set of a, Quantitative Aptitude for Competitive Company Ltd, 2012 na, How to prepare for Data Interpretation	Exar on for	ninat the	ions CAT	, First Edi	dition, Tata ition, Tata I	a McGraw-Hill McGraw-Hill	JR	
Publishing 2. Arun Sharr Publishing 3. R.V.Pravee	ENCY: Reasoning ability using a set of a, Quantitative Aptitude for Competitive Company Ltd, 2012 na, How to prepare for Data Interpretatio Company Ltd, 2012. en, "Quantitative Aptitude and Reasoning garwal, Quantitative Aptitude, Revised and	Exar on for "Thir	ninat the d Ed	ions CAT ition,	, First Edi , PHI Leai	dition, Tata ition, Tata I rning ,2016	a McGraw-Hill McGraw-Hill	JR	



ELECTRONICS AND COMMUNICAT	R 2019	Semester-V	PC				
Course Name		Hours / Week		Credit	Total	Maximu	
MICROPROCESSOR,	L	TP		С	Hours	Marks	
MICROCONTROLLER AND INTERFACING LABORATORY		0	2	1	30	100	
/e (s): The purpose of learning this cour	se is	to					
	Course Name MICROPROCESSOR, MICROCONTROLLER AND INTERFACING LABORATORY	Course NameHMICROPROCESSOR,LMICROCONTROLLER AND0INTERFACING LABORATORY0	Course NameHour WeeMICROPROCESSOR, MICROCONTROLLER ANDLT	Course NameHours / WeekMICROPROCESSOR, MICROCONTROLLER AND INTERFACING LABORATORYLT002	Course NameWeekCreditMICROPROCESSOR,LTPCMICROCONTROLLER AND0021INTERFACING LABORATORY0021	Course NameHours / WeekCreditTotal HoursMICROPROCESSOR, MICROCONTROLLER AND INTERFACING LABORATORYLTPCHours002130	Course NameHours / WeekCreditTotalMaximuMICROPROCESSOR, MICROCONTROLLER AND INTERFACING LABORATORYLTPC.HoursMarks002130100

Gain hands-on experience in doing experiments on microprocessors (8086) and 89c51 Microcontroller.

- interface the microprocessor / microcontroller with various peripherals for various applications
- Able to use an Integrated Development Environment (IDE) as a modern software tool for Embedded system development.

Course Outcomes: At the end of this course, learners will be able to:

- Perform the basic operations of 8086 microprocessor using Assembly language Programming.
- Perform various operations like sorting, finding the maximum & minimum numbers & string operations
 using 8086 microprocessor
- Interface 8085/8086 microprocessor to implement various operations likeADC,DAC,8279,Traffic Light controller
- Perform basic operations using 89c51 Microcontroller.
- Generate an interrupt, LED operations using push button and Input capture operations using 89c51

Exp No.	Name of Experiments							
1	Arithmetic operations using 8086.							
2	Sorting, searching and string manipulation using 8086							
3	Hex. to ASCII/BCD code conversion using 8086 microprocessor							
4	Matrix Addition / Subtraction using 8086 microprocessor							
5	Addition / Subtraction / Multiplication / Division using 89c51 microcontroller							
6	Interfacing of switch and LED with 89c51/8086 microcontroller							
7	Interfacing of ADC with 89c51/8086 microcontroller.							
8	Interfacing of DAC with 89c51/8086 microcontroller.							
9	Stepper Motor/DC Motor interfacing with 89c51/8086 microcontroller							
1%	UART /LCD interfacing with 89c51/8086 microcontroller							

List of Equipment:

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS: HARDWARE: 8086 development kits - 30 nos Interfacing Units - Each 10 nos

Microcontroller - 30 nos

Interfocontroller - 30 nos

SOFTWARE: Intel Desktop Systems with MASM - 30 nos

8086 Assembler 8051 Cross Assembler

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Department		ELECTRONICS AND COMMUNICA	TION	ENG	SINE	ERING	R 2019	Semester-V	PC
Course Code		Course Name			Hours / Week		Total	Maximum Mar	
19EC505		COMMUNICATION SYSTEMS		Τ	Ρ	С	Hours		
		LABORATORY	0	0	2	1	30	100	Mul D
Course O Under	bjectiv stand	ve (s): The purpose of learning this co the fundamental communication syste	ourse i em pai	s to ame	ters	such as	bandwidt	h, power,	i si
signal	to qua	antization noise ratio and data rate.							
 Learn 	the di	gital modulation techniques (QPSK ar	nd QAI	A) ai	nd th	eir deteo	ction.		
		oncept and details of source coding an					echniques	3	
		nes: At the end of this course, learners nsistor based digital pulse modulation		e ab	le to				
-		characteristics of analog and digital c		s in	a co	mmunica	ation syste	ems	
		analyze different line coding technique							
		analyze different source & error contro							
Analyz	ze the	characteristics of pulse shaping circuit	its in d	igital	con	nmunicat	tion		
Exp No.		Name of E	xperin	nent	s				
1	AM	modulation and demodulation	7				2		
2	FM	transmitter & receiver							
3	Sigr	nal sampling and reconstruction							-
4	PAN	I,PPM,PWM modulation and demodu	lation						
5	Puls	se code modulation and demodulation							
6	Delt	a modulation and demodulation		1		1			
7		e Division Multiplexing						- X	
8	1-202011/01-0476	lulation and demodulation of shift keyi	•		ues		5.2.1		
9	Charles Call	iation pattern measurement of dipole	and the second second second	332.02					
10	-	iation pattern measurement of Yagi-u		enna	5			and the little	
11		ign and simulate the shift keying tech		-					1
12	Sim	ulation of convolution coding scheme.							

List of Equipment:

LAB Requirements for a Batch of 30 students (3 students per experiment):

- Kits for Signal Sampling, TDM, AM, FM, PCM, DM and Line Coding Schemes
- CROs/DSOs 15 Nos, Function Generators 15 Nos.
- MATLAB or equivalent software package for simulation experiments
- PCs 15 Nos

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING			ERING	R 2019	Semester-V	EEC		
Course Code	Course Code	Course Name	Hours / Week Cree				Total	Maximum	Marka
	Course Name	L	Т	P	С	Hours	Maximum Marks		
19EC506	MINI PROJECT	0	0	2	1	30	100		

Conceptualize a novel idea / technique into a product

- Apply the acquired knowledge to carry out a capstone project having substantial multidisciplinary component
- Understand the management techniques of implementing a project
- Take on the challenges of teamwork,
- Prepare a presentation in a professional manner, and document all aspects of design work.
- Course Outcomes: At the end of this course, learners will be able to:
- Have hands-on experience in converting a small novel idea / technique into a working model / prototype
- Involving multi-disciplinary skills and / or knowledge and working in at team.

Guidelines

The students in a group of 5 to 6 works on a topic approved by the head of the department and prepares a comprehensive mini project report after completing the work to the satisfaction. The progress of the project is evaluated based on a minimum of two reviews. The review committee may be constituted by the Head of the Department. A mini project report is required at the end of the semester. The mini project work is evaluated based on oral presentation and the mini project report jointly by external and internal examiners constituted by the Head of the Department.

Learning Resources

IEEE Journal, Elsevier Journals, Springer Jour nals, and any open access journal, reference / user manuals, etc.

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING				IEERING	R 2019	Semester - V	EEC
Course Code	Course Name	Hour	s/ W	leek	Credit	Total	Maximum M	larke
Course Coue	Course Name	L	Τ	P	С	Hours	Maximum	10115
19EC507	INTERNSHIP / INDUSTRIAL TRAINING	0	0	2	1	30	100	
ourse Objecti	ve (s): The purpose of learning this	course	is to)	- 2 - 2 - 2	and all one is	n ti le line di	nía - s
Unde	rstand one or more practical applica	ation of t	the c	ore o	courses le	arned		
	n inside view of an industry and org							
		anizatio	11/00	mpa	ily .			
	valuable skills and knowledge							
	professional connections and enha						0	
 Get e 	xperience in a field to allow the stuc	lent to n	nake	a ca	areer trans	sition		
Course Outco	mes: At the end of this course, lear	ners will	be	able	to provide	short-ter	rm work experie	ence in
an Industry/ Co	mpany/ Organization					·**		
Guidelines	 A set of the board 	S 11, 14		k ne	1.11	a second	State of the second	1
1. It is manda	tory for every student to undergo th	is cours	e.					
	ent is expected to spend a minimu			ys in	an Indus	stry/ Com	ipany/ Organiza	ation,
-	t must submit the "Training Comple	tion Ce	rtific	ate" i	ssued by	the indus	stry / company /	
	on as well as a technical report no						and a second sec	
	making a presentation before the co				and the second second		construction of composed to	
and the second					and the second	Star man		46.0
4. The comm	nittee assesses the student perf	ormanc	e, r	asec	a on the	report	submitted and	the

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Department	ELECTRONICS AND COMMUNIC	CATION	I ENG	GINE	ERING	R 2019	Semester-VI	PC
Course Code	Course Name	Hour	s / We	eek	Credit	Total	Maximum	Marka
Jourse Code	Course Name	L	Т	Ρ	С	Hours	Maximum	warks
19CS403	COMPUTER NETWORKS	3	0	0	3	45	100	
	ctive (s): The purpose of learning the stress of the stres							1
	y the concepts of data communicat	ions and	d func	tions	s of diffe	rent layer	s of ISO/OSI	
	ce architecture							
	erstand the error detection and corr					of LAN		
	y the concepts of sub netting and ro	0						
	erstand the different types of protoc			ork c	ompone	nts.		- //
	the application protocols and netw						han a sa téa	
	omes: At the end of this course, lea							
	and the fundamentals of data comr					a state of the second stat		
	the error detection and corre	ection r	netho	ds	and und	derstand	the different	networ
technolo	5	meninet	innal	-		d a alaat	the meet en	
	the requirements for a given or ing architecture and routing techno		ionai	stru	cture an	d select	the most app	propriate
	and the transport layer principles a		alo da	to tr	anefor			
	and the application layer protocols					aranhy a	nd network secu	irity
	ATA COMMUNICATIONS AND PH				or crypto	graphy a	id fietwork seed	9
the second se	nistory and development of comp				etworks	topologie	s ISO/OSI mo	del and
	erent types of transmission medi							
	Z, NRZI, Manchester, 4B/5B). MAC							Supply Supply Supply
	TA LINK LAYER	Layer.	AIUII	a, 1L	JVIA, CL			9
		Cliding	Mind		Ctop or	d Mait a	notocolo I ANI:	
	n (Parity, CRC, Hamming code),					and a second sec		-
	of popular technologies, switchin			Gig	abit Eth	ernet, Io	ken Ring, Tok	en Bus
	Fi, Wi-Max, FDDI, PPP, bridging ar	nd SDN	•		and the second second			
	TWORK LAYER	4						9
	col, IPv6, ARP, DHCP, ICMP, Di						outing, Classles	s Inter
	g, RIP, OSPF, BGP, Subnetting, , I	Network	Addr	ess	Translat	ion.	24.2	
	ANSPORT LAYER						-	9
	connection establishment and terr							
ontrol, timers	, retransmission, TCP extensions	, Desig	iss in iss	ues	in proto	cols at c	lifferent layers,	Socke
rogramming.								
Init V API	PLICATION LAYER	3 L - C		61.50		510 	1.22 State	9
NS, E-Mail	-SMTP, MIME, POP3, IMAP,	FTP, H	HTTP,	W	WW, sy	mmetric	and asymmet	ric key
	Sharing of symmetric keys – Diffie				22 C			
	ation Protocols, Firewalls.				0,			
	M.	(LINE)		-			- yan su a su	- y
EXT BOOK(S	o).							
· AS Taner	baum, DJ Wetherall, "Computer Ne	otworke	" Eth	Edit	on Dror	tion Hall	2012	

2. Behrouz A. Forouzan, "Data communication and Networking", 4th Edition, Tata McGraw Hill, 2017

REFERENCE(S):

Characterian Solar Characterian Solar Characterian Solar

Peterson & Davie, "Computer Networks, A Systems Approach", 3rd Edition, Harcourt, 2013
 William Stallings, "Data and Computer Communications", 10th Edition, PHI, 2017

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Department	ELECTRONICS AND COMMUNI						Semester-VI	P
Course Code	Course Name			Veek	Credit	Total	Maximum Mar	ks
		L	T	Ρ	C	Hours		
19EC601	MOBILE COMMUNICATION	3	0	0	3	45	100	
	s): The purpose of learning this cou							
	e concepts of 2G,3G and 4G netwo		nnolo	gy				
	e concepts of mobile radio propagat	lion						
and the second	reless channel modeling							
	pread Spectrum Systems and acces	s meth	nods.					
	ity of wireless network channels : At the end of this course, learners	will be	able	a to:				
	s of 2G,3G and 4G network technol			5 10.				
and the second sec	ts of mobile radio propagation	logy						*
-	s channel modeling							
	Spread Spectrum Systems and acce	ess me	othod	S				
 Contraction and the second seco	ity of wireless network channels	000 1110	Surrou	0.				
	TRODUCTION				10 C	21		9
Introduction to wire	less communication systems-Moder	rn wire	less	comm	unication	system	s: 2G - 3G- 4G	
	e –WLAN-PAN- Cellular concept- sy							
Interference and sy	stem capacity, Improving Coverage	and C	Capad	city.				
Unit II N	IOBILE RADIO PROPAGATION							9
Free space propag	ation model, Three basic propagatic	on med	hani	sms, F	Reflection	n-Two-Ra	ay model,	
Diffraction - Knife-	edge diffraction model, Scattering, L	.og-noi	rmal	shado	wing, Ok	umara n	nodel, Hata	
model, Log-distanc	e path loss model.							
Unit III V	/IRELESS CHANNEL MODELING	1.1.1.1.1		1.1.1	1			-
Construction of the second sec	The state of the second s							9
	th propagation, Parameters of mobi	ile mul	tipath	n char	nels, Typ	pes of sr	nall scale fading	10.52
Small-scale multipa Rayleigh and Ricea	th propagation, Parameters of mobi in distribution, Physical modeling for	r wirele	ess c	hanne	els - Input			2.52
Small-scale multipa Rayleigh and Ricea wireless channel -	th propagation, Parameters of mobi in distribution, Physical modeling for Fime and frequency coherence - Sta	r wirele atistica	ess c I cha	hanne nnel r	els - Input nodels.			g,
Small-scale multipa Rayleigh and Ricea wireless channel -	th propagation, Parameters of mobi in distribution, Physical modeling for	r wirele atistica	ess c I cha	hanne nnel r	els - Input nodels.			2.52
Small-scale multipa Rayleigh and Ricea wireless channel - Unit IV N	th propagation, Parameters of mobin of distribution, Physical modeling for Fime and frequency coherence - Sta IODULATION AND MULTIPLE AC	r wirele atistica CESS	ess c l cha SCH	hanne nnel n EMES	els - Input nodels. 3	/output	model of the	g,
Small-scale multipa Rayleigh and Ricea wireless channel - Unit IV N OFDM Modem, Spi	th propagation, Parameters of mobi in distribution, Physical modeling for Fime and frequency coherence - Sta	r wirele atistica CESS	ess c l cha SCH	hanne nnel n EMES	els - Input nodels. 3	/output	model of the	g,
Small-scale multipa Rayleigh and Ricea wireless channel - Unit IV N OFDM Modem, Spi SDMA and CSMA,	th propagation, Parameters of mobin of distribution, Physical modeling for Fime and frequency coherence - Sta IODULATION AND MULTIPLE ACC read Spectrum Systems, RAKE rece Diversity Techniques	r wirele atistica CESS eiver-A	ess c l cha SCH	hanne nnel n EMES	els - Input nodels. 3	/output	model of the	g,
Small-scale multipa Rayleigh and Ricea wireless channel - Unit IV N OFDM Modem, Spi SDMA and CSMA, Unit V C	th propagation, Parameters of mobin of distribution, Physical modeling for Fime and frequency coherence - Sta IODULATION AND MULTIPLE ACC read Spectrum Systems, RAKE rece Diversity Techniques APACITY OF WIRELESS CHANNI	r wirele atistica CESS eiver-A ELS	ess c l cha SCH Acces	hanne nnel n EMES s met	els - Input nodels. 5 hods - FE	/output	MA - CDMA -	g, 9
Small-scale multipa Rayleigh and Ricea wireless channel - Unit IV M OFDM Modem, Spi SDMA and CSMA, Unit V C AWGN channel cap	th propagation, Parameters of mobi on distribution, Physical modeling for Fime and frequency coherence - Sta IODULATION AND MULTIPLE ACC read Spectrum Systems, RAKE rece Diversity Techniques	r wirele atistica CESS eiver-A ELS nels , F	ess c l cha SCH cces	hanne nnel n EMES s met	els - Input nodels. 3 hods - FE	/output	MA - CDMA -	g, 9
Small-scale multipa Rayleigh and Ricea wireless channel - Unit IV M OFDM Modem, Spi SDMA and CSMA, Unit V C AWGN channel cap	th propagation, Parameters of mobin of distribution, Physical modeling for Fime and frequency coherence - Sta ODULATION AND MULTIPLE ACC read Spectrum Systems, RAKE rece Diversity Techniques APACITY OF WIRELESS CHANNI pacity – capacity of flat fading chann	r wirele atistica CESS eiver-A ELS nels , F	ess c l cha SCH cces	hanne nnel n EMES s met	els - Input nodels. 3 hods - FE	/output	MA - CDMA -	g, 9

1.	Theodore S. Rappaport, Wireless Communications, Pearson Education, Asia, Second Edition, 2012.
2.	David Tse and Pramod Viswanath, Fundamentals of Wireless Communication, Cambridge University Press, 2013.

REFERENCE(S):

1.	KamiloFeher, Wireless Digital Communications, Modulation & Spread Spectrum Applications, PHI, 1995.
2.	Samuel Y. Lee, Mobile Communication Engineering, McGraw Hill, 2 nd Edition 2008.
3.	Andrea Goldsmith ,Wireless Communications, Cambridge University Press,2015

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	ELECTRONICS AND COMMUN				RING	R 2019	Semester-VI	PC
Course Code	Course Norme	Hours	s / We	eek	Credit	Total	Maximum M	Anula
Course Code	Course Name	L	T	P	С	Hours	waxinum	harks
19EC602	CMOS VLSI DESIGN	3	0	0	3	45	100	
Contraction and the second	ve (s): The purpose of learning this							
	ut CMOS Fabrication process and		-					
	d the concepts of MOS Circuit De	a se de la companya d	SS.					
	ut CMOS circuits using Various Lo	-						
	operation of CMOS Memory and C	and the second	ategi	es				
	d the building block of VLSI system		able	4				
	es: At the end of this course, learn							
	te CMOS Fabrication process and OS Circuit Design Process.	a Layout De	esign.					
	circuits using Various Logic Style	c						
	operation of CMOS Memory and		tratec	ies				
	lding block of VLSI system.	chooking c	auog	,				
	DELING OF VERILOG HDL			_				9
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	Modeling of HDL (Gate Level, Da							
	cuits: Adder- Ripple Carry adder-							
	emultiplexer- ALU. Design of Seq							
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	ELECTRONICS AND COMMUNICATIO				ERING	R 2019	Semester	V
Course Code	Course Name		Hour Wee	k	Credit	Total	Maximun	n
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Course Object	ctive (s): The purpose of learning this co	ourse	e is t	0	· · · · · · · · · · · · · · · · · · ·			
	the occurrence of an event on the basis							
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	time, speed and distance by relative spee	ed co	once	pts.				
	how various phenomena are related.	_					1.12.18.1.1	
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	e cause and effect of problems by using o				g.			-
	OBABILITY, PERMUTATIONS & COME							6
	Y: Rolling an unbiased dice – Tossing a							
	 Picking up balls of certain color from a 							
	DNS: Numbers with digits - Words with le	etter	s - A	rran	gements	of person i	n a row -	
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COMBINATIO	NS: Formation of committee - Selection	of (DOLIN	tions	s from all	estion nand	ore	
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REFERENCES:

Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Fourth Edition, Tata McGraw-Hill Publishing Company Ltd, 2012

Arun Sharma, How to prepare for Data Interpretation for the CAT, First Edition, Tata McGraw-Hill Publishing Company Ltd, 2012.

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Dr.R S Aggarwal, Quantitative Aptitude, Revised and Enlarged Edition, S.Chand Publishing Company Ltd, 2017.

Arun Sharma "How to Prepare for Quantitative Aptitude" Eight Edition, McGraw Hill Education, 2018. "Reasoning and Aptitude" for GATE and ESE Prelims, Made Easy Publication, 2020.

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Department	ELECTRONICS AND COMMUNIC	CATION		IGINE	ERING	R 2019	Semester - V	EEC
Course Code	Course Name	Hour	s/V	Veek P	Credit C	Total Hours	Maximum M	larks
19HS601	PROFESSIONAL SKILLS	0	0	2	0	30	100	
	tive (s): The purpose of learning the							
	students' communicative competer		10.000		Listenin	g skills.		
	their ability to communicate effectiv							
	the learners to fine-tune their compr	ehendir	ng le	vel of	different	texts.		
	the error-free documents. nen their thinking level and update th	opir kno	wloc	lao for	career o	rowth	and the part of the	
	mes: At the end of this course, lear					lowur.		
	listening skills to comprehend gene							
 Make ef 	fective presentations in group/pair a	and atte	end j	ob inte	erviews			
	and various concepts by reading dif							
	e the writing skills to express the ide	as of th	le le	arners				
the second se	nen their soft skills.				in the Color			6
	FENING I skills (formal and informal) - N	Natchir	0. (Proup	discuss	ion & e	ffective prese	
	ning interviews conversations, docu							
and the second sec	AKING			de viter	ANS N			6
Different types anguage	Group Discussion - Participating i of Interview format - answering qu features) - Articulation of sounds - I	uestion	s - (offering	g informa	ation - Mo	ock interviews	amics - - Body
MARKET COLUMN	DING							6
	rent genres ranging from newspap filling exercises - Sequencing the			cal arti	cles and	short st	ories - Predic	ting the
Unit IV WRI	TING							6
Writing Job app Reports - Inter	plications - Resume preparation - E- preting the visual texts – Common E	mail wr Errors ir	iting n En	- Lette glish -	ers(forma Preparat	al & inform ion of Es	nal) - Memos - says	
Unit V CAR	REER SKILLS				19-51	× 1		6
changes -Time	Employability and Career Skills - de Management - General awareness Leadership traits - Team work - In	of Curr	ent /	Affairs	- Manag	ing chang	ges - Stress	ninking
EXT BOOK(S):	1999 (P. 1999)		anna an	-	The second se		-
	esh Kumar et al. Communication for	Profess	siona	al Suco	cess. Ori	ent Black	swan: Hydera	bad,
							E III	

TELL	ERENCE(S):
1	Butterfield, Jeff Soft Skills for Everyone. Cengage Learning: New Delhi, 2015.
2	Interact English Lab Manual for Undergraduate Students, OrientBalck Swan: Hyderabad, 2016.
3	Raman, Meenakshi and Sangeeta Sharma. Professional Communication. Oxford University Press: Oxford, 2014
4	S. Hariharanetal. Soft Skills. MJP Publishers: Chennai, 2010

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Department	ELECTRONICS AND COMMUNI	CAT	ION	ENGINE	ERING	R 2019	Semester-VI	PC	
Course Code	Course Name	Hours / Week Cred	Hours / Week C		Credit	Total	Maximum Marks		
1050002		L	Т	Р	С	Hours			
19EC603	VLSI DESIGN LABORATORY	0	0	2	1	30	100		
Course Object	tive (s): The purpose of learning th	nis co	urse	is to				12.1	
Learn Hard	dware Descriptive Language(Verilo	g/VH	IDL)						
Learn the f	undamental principles of VLSI circ	uit de	esign	in digita	al domain	n			
	undamental principles of VLSI circ			and the state of t					
	fusing of logical modules on FPG				•				
Provide ha	nds on design experience with pro	fessi	onal	design (EDA) pla	tforms			
Course Outco	mes: At the end of this course, lea	rners	s will	be able	to:				
Model and	simulate digital systems using har	dwar	e de	scription	languag	e like veril	og		
Synthesis	digital systems from register transfe	er lev	el to	higher l	evel of de	escription			
 Stream State Stat	the logic circuit designs in FPGA b			J					
	design and analyze VLSI circuits f			s applica	tion usin	a desian t	ools		
	ulation using EDA tools					5			

Exp No.	Name of Experiments							
1	Design and simulation of combinational circuits							
2	Design and simulation of Binary Multiplier (Array /Wallace tree/Booth).							
3	Design and simulation of MAC							
4	Design and simulation of sequential circuits (Counter/Shift Registers).							
5	Design and simulation of FSM.							
6	Design and implementation of 4-bit Adder (RCA/CLA/CSA).							
7	Design and implementation of 4 bit ALU on FPGA board.							
8	Design and implementation of 4 bit Ripple Counter							
9	Design and implementation of Traffic Light controller / Real Time Clock on FPGA board.							
10	Design and simulation of CMOS gates using Microwind / Tanner EDA Tool.							

List of Equipment:

- Xilinx ISE/Altera Quartus/ equivalent EDA Tools 10 User License
- Xilinx/Altera/equivalent FPGA Boards 10 no
- Cadence/Synopsis/ Mentor Graphics/Tanner/equivalent EDA Tools 10 User License
- Personal Computer 30 no

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Course	e Code	Course Name	Ho	urs /V	Veek	Credit	Total	Maximum BA	
			L	Т	Р	С	Hours	Maximum Ma	arks
19CS	406	NETWORKING LABORATORY	0	0	4	2	60	100	
The purp • Kr • Ur • Le	now the landerstan	ve (s): The purpose of learning this earning this course is to basic switch set up d LAN and Router setup configuration of Network and Etherr						Set Manor Set Manor Set Set Manor	
		figuration of DHCP, Port and ACL dthe RIP Connectivity							
Se Se Co Co	et up swi et up LAN onfigure onfigure	es: At the end of this course, learne tches N and Router Network and Ethernet address DHCP, Port, RIP and ACL CCNA Certification	ers w	ill be a	able to):			
List of E									
 2. C 3. V 4. B 5. P 6. C 6. C 7. C 8. C 9. C 10. C 	onfigurir LAN and asic rout repare the onfigure onfigure onfigure onfigure heck the	tch setup ng switch interfaces d VTP configuration ter setup ne Network, perform all the necessa and Activate Serial and Ethernet A erfaces. the DHCP configurations in the res the Port Security for the ports conn the access-list in routers connectivity to all the devices insid RIP Routing on the Router and ver	ddres pecti lected de yo	ve rou d to th ur LA	and as uters ne swit N	sign appr ches	opriate a	ddresses to the	
EXT BO	DOK(S)								
		n Silberschatz, Peter B.Galvin, Gre -Wesley, 2015	eg G	agne,	Opera	ating Sys	tem Con	cepts. Ninth ed	ition
	Andrew 2016.	S. Tanenbaum, Modern Operating	g Sys	stem,	4 th Eo	dition, Pr	entice H	all of India Pvt.	Ltd
3.	AS Tane	enbaum, DJ Wetherall, "Computer N	letwo	orks",	5th Ed	lition, Pre	ntice-Hal	II, 2013.	
REFERE	NCE(S)			1			748		-
1	Richard			- 01		tion McG	Fraw Hill	2017	
1. 1	Diahand	Petersen, The Linux Complete Refe	erenc	e, Six	th Ear	tion, wice			-
2 1	Wiley, 20	Petersen, The Linux Complete Refe Blum and Christine Bresnahan , Lin		18		A			litior

R.W-

Department	ELECTRONICS AND COMMUNIC	AND COMMUNICATION ENGINEERING R 2019 Semester - VI						EEC
Course Code	Course Name	Hour	Hours/ Week			Total	Maximum Mar	arke
Course Code	Course Name	L	Т	Р	С	Hours	rs	
19EC604	COMPREHENSION REVIEW	0	0	2	0	30	100	

Course Objective (s): The purpose of learning this course is to

• To encourage the students to comprehend the knowledge acquired from the first Semester to fifth Semester of B.E Degree Course through periodic exercise.

Course Outcomes:

At the end of this course, Ability to review, prepare and present technological developments.

Guidelines for Evaluation:

 The students will be assessed 100% internally through weekly test with objective type questions on all the subject related topics.

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SEMESTER-VII

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			ATION ENGINEE		C Rocci	R 2019	Semester-VII P
Course Code	Course Name	Hou		Concerne and		Total	Maximum
f.		L	Т	P	С	Hours	Marks
19EC701	MICROWAVE ENGINEERING tive (s): The purpose of learning th	3	1	0	4	60	100
Under Under Under Study Elabor Course Outco An An Co Dis De par Unit I MICRO Circuit and S p	stand the concepts various wavegus stand the concepts of microwave se performance of microwave tubes rate the principles of semiconductor mes: At the end of this course, lea alyze various waveguide component alyze the performance of microwav mpare various microwave semicon ocuss the principles of semiconduct sign of waveguide components and rameters DWAVE DEVICES AND ITS CHAR parameter representation of N ports fect of changing the reference plan	ide con emicon r micro rners v nts e tubes ductor or micro d micro ACTE S- Reci	mpon nducto vill be s devic rowav wave RISTI procit	ents or dev oscill able es e osc trans CS y The	ators to: illators mission l eorem- Lo	ossless ne	etworks and unita
Unit II MIC Two cavity Kly Reflex Klystror	and movable shorts. ROWAVE TUBES vstron amplifier - Transit time effect n- Slow-Wave structures - Helix Tra	veling-	-Wave	e Tub	es- Conv	ection Cu	rrent- Axial Electr
	odes- Bandwidth, Power and Gain considerations.	e entere					
and frequency	odes- Bandwidth, Power and Gain considerations.						1
and frequency Unit III MIC Slotted line measurements coupler-Introdu	considerations.	ce me meters er and	easure s - Re d its	emen eturn uses	loss me s- return	ion loss asuremer	and attenuation at using direction
and frequency Unit III MIC Slotted line measurements coupler-Introdu Measurement	considerations. ROWAVE MEASUREMENTS VSWR measurement- impedances is measurement of scattering para inction to vector network analyz	ce me meters er and ng Spe	easure s - Re d its	emen eturn uses	loss me s- return	ion loss asuremer	and attenuation at using direction
and frequency Unit III MIC Slotted line measurements coupler-Introdu Measurement Unit IV MIC Gunn-Effect Microwave Ge TRAPATT Dio Nonlinear. Rea	considerations. ROWAVE MEASUREMENTS VSWR measurement- impedances measurement of scattering para action to vector network analyzes of return loss and Insertion loss using	ce me meters er and ng Spe VICES /e Res escript	easure - Re d its ectrum sistan ion- /	emen eturn uses n anal nce- I	loss me s- return yzer. Modes d nche Mul	ion loss asuremer loss au f Operat tiplication	1 and attenuation at using direction and insertion loss 1 ion- Amplification IMPATT Diodes

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EXT	BOOK(S):
1.	David.M.Pozar, Microwave Engineering, John Wiley, 2003
2.	Samuel.Y.Liao, Microwave Devices and Circuits, PHI, 2000
REFE	ERENCE(S):
1.	Annapurna Das and SisirK.Das,Microwave Engineering, Tata Mc Graw-Hill,2000
2.	R.E.Collin, Foundations for Microwave Engineering - IEEE Press 2002.
3.	BharathiBhat, ShibanK.Koul, Stripline-like transmission lines for microwave integrated circuits. New Age International, 2007

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Department	ELECTRONICS AND COMMUNI	ND COMMUNICATION ENGINEERING R 2019		NICS AND COMMUNICATION ENGINEERING R 2019		ECTRONICS AND COMMUNICATION		Semester- VII	PC
Course Code	Course Name	Hou	rs / W	/Week Credit Total Max		Maximum M	lark		
Course Coue		L	Т	Ρ	С	Hours	maximum	nei ne	
19EC702	OPTICAL FIBER COMMUNICATION	3	0	0	3	45	100		
Course Obje	ctive (s): The purpose of learning t	this cou	rse is	to				5	
fabricatio Technique	es.			nk sti	ructure, d	characteris	stics of fiber a	nd	
	d the concepts Fiber attenuation N				-				
	ut the characteristics of an optical			Deteo	ctor				
	d the concept of optical receiver o	•							
	ut Analyze power launching and co				4	-	_		
	mes: At the end of this course, lea					u and fab	vication		
technique									
	e propagation characteristics of ar		10. The second se			5.0.5.			
 Choose ap methods. 	opropriate optical source for an app	olication	and A	Analy	ze powe	r launchin	g and couplin	g	
Compare t	he characteristics of optical detect	ors.							
 Analyze or 	otical fiber transmission system.								
Unit I IN	TRODUCTION	15						9	
Optical Spectr	al bands, Evolution of fiber optica	al syster	n -Ele	men	ts of Op	tical Fiber	r Systems –o	ptical	
Laws and Defi	nitions Optical Fiber Modes and Co	onfigura	tions-	– Sir	ngle Mod	e Fiber –	Graded Index	fibo	
Eibor Matoria		-						inner	
- Tiber Materia	als-Fiber Fabrication-Fiber optic Ca							3	
Unit II A1	TENUATION MECHANISMS	ables.						9	
Unit II AT Attenuation - A	TENUATION MECHANISMS	ables. es, Bend	ling L			and Clado	ding losses. S	9 igna	
Unit II Al Attenuation - A Distortion in	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information	ables. es, Bendon on Caj	ling L bacity	de	terminati	and Clado on -Grou	ding losses. S up Delay-Ma	9 igna teria	
Unit II A1 Attenuation - A Distortion in Dispersion, W	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Informati ave guide Dispersion, Signal d	ables. es, Bend on Caj istortion	ling L bacity in S	de M f	terminati ibers-Pol	and Clado on -Grou arization	ding losses. S ıp Delay-Ma Mode disper	9 igna teria sion	
Unit II AT Attenuation - A Distortion in Dispersion, W Intermodal dis	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information	ables. es, Bend on Caj istortion	ling L bacity in S	de M f	terminati ibers-Pol	and Clado on -Grou arization	ding losses. S ıp Delay-Ma Mode disper	9 ignal teria sion,	
Unit II AT Attenuation - A Distortion in Dispersion, W Intermodal dis	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Informati ave guide Dispersion, Signal d	ables. es, Bend on Caj istortion	ling L bacity in S	de M f	terminati ibers-Pol	and Clado on -Grou arization	ding losses. S ıp Delay-Ma Mode disper	9 ignal terial rsion, ut-off	
Unit IIA1Attenuation - ADistortion inDispersion, WIntermodal diswavelength.Unit IIIOF	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Desig	ables. es, Bendon on Caj istortion n Optir NG	ding L bacity in S nizatio	de SM f on o	terminati ibers-Pol of SM fi	and Clado on -Grou arization bers-RI p	ding losses. S up Delay-Ma Mode disper profile and c	9 ignal terial sion, ut-off 9	
Unit II A1 Attenuation - A Distortion in Dispersion, W Intermodal dis wavelength. Unit III OF LED structures	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Design PTICAL SOURCES AND COUPLIN -Light source materials -Quantum	ables. es, Bendon on Caj istortion n Optir NG n efficier	ding L bacity in S nizatio	de SM f on o	terminati ibers-Pol of SM fi D power	and Clado on -Grou arization bers-RI p	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes	9 igna teria sion ut-off 9 s and	
Unit II A1 Attenuation - A Distortion in Dispersion, W Intermodal dis wavelength. Unit III OF LED structures	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Desig	ables. es, Bendon on Caj istortion n Optir NG n efficier	ding L bacity in S nizatio	de SM f on o	terminati ibers-Pol of SM fi D power	and Clado on -Grou arization bers-RI p	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes	9 ignal terial sion, ut-off 9 s and	
Unit IIA1Attenuation - ADistortionDispersion,Mintermodaldiswavelength.Unit IIIOFLEDStructuresThresholdco	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Design PTICAL SOURCES AND COUPLIN -Light source materials -Quantum	ables. es, Bendon Caj istortion n Optir NG n efficier nal Qu	ding L bacity in S nization ncy an antum	de SM f on c d LE	terminati ibers-Pol f SM fi D power ficiency	and Clado on -Grou arization bers-RI p - Lasers I -Resona	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes nt frequencie	9 igna teria sion ut-off 9 s and es -	
Unit IIA1Attenuation - ADistortion inDispersion, MIntermodal diswavelength.Unit IIIOFLED structuresThreshold coTemperature	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Design TICAL SOURCES AND COUPLIE -Light source materials -Quantum Indition -Rate equations -Externation effects. Power Launching and co	ables. es, Bendon Caj istortion n Optir NG n efficier nal Qu	ding L bacity in S nization ncy an antum	de SM f on c d LE	terminati ibers-Pol f SM fi D power ficiency	and Clado on -Grou arization bers-RI p - Lasers I -Resona	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes nt frequencie	9 igna teria sion ut-off 9 s and es -	
Unit IIA1Attenuation - ADistortion inDispersion, MIntermodal diswavelength.Unit IIIOFLED structuresThreshold coTemperature ofSplicing-Conne	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Design TICAL SOURCES AND COUPLIE -Light source materials -Quantum Indition -Rate equations -Externation effects. Power Launching and co	ables. es, Bendon on Caj istortion n Optir NG n efficier nal Qu oupling-	ding L bacity in S nization ncy an antum	de SM f on c d LE	terminati ibers-Pol f SM fi D power ficiency	and Clado on -Grou arization bers-RI p - Lasers I -Resona	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes nt frequencie	9 ignal terial rsion, ut-off 9 s and es -	
Unit IIATAttenuation - ADistortion inDispersion, WIntermodal diswavelength.Unit IIIOFLED structuresThreshold coTemperatureSplicing-ConneUnit IVPH	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Design PTICAL SOURCES AND COUPLIE -Light source materials -Quantum Indition -Rate equations -Extern effects. Power Launching and consectors	ables. es, Bendon on Caj istortion n Optir NG n efficier nal Qu oupling- ER	ding L pacity in S nization ncy an antum Lens	de SM f on o nd LE n ef sing	terminati ibers-Pol f SM fi D power ficiency schemes	and Clado on -Grou arization bers-RI p -Lasers I -Resona s-Fiber to	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes nt frequencie fiber joints-	9 ignal terial sion, ut-off 9 s and es - Fiber 9	
Unit II A1 Attenuation - A Distortion in Dispersion, M Intermodal dis wavelength. Unit III OF LED structures Threshold co Temperature of Splicing-Conne Unit IV PH PIN Photo determine	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Desig TICAL SOURCES AND COUPLIN - Light source materials -Quantum Indition -Rate equations -Extern effects. Power Launching and context ectors	ables. es, Bendon on Caj istortion n Optir NG n efficier nal Qu oupling- ER oto dete	ding L pacity in S nization ncy an antum Lens	de SM f on o d LE n ef sing	terminati ibers-Pol of SM fi ED power ficiency schemes - Detecto	and Clado on -Grou arization bers-RI p : Lasers I -Resona s-Fiber to	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes nt frequencie fiber joints-	9 igna teria sion ut-off 9 s and es - Fiber 9 nche	
Unit II A1 Attenuation - A Distortion in Dispersion, M Intermodal dis wavelength. Unit III OF LED structures Threshold co Splicing-Conne Unit IV PF PIN Photo dete multiplication of	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Desige TICAL SOURCES AND COUPLIE - Light source materials -Quantum Indition -Rate equations -Extern effects. Power Launching and consectors INTODETECTORS AND RECEIVI ector- Avalanche Photodiodes- Pho-	ables. es, Bendon on Capistortion n Optir NG n efficier nal Qu oupling- ER oto dete	ding L pacity in S nization ncy an antum Lens ctor n ntal F	de SM f on o d LE n ef sing oise Recei	terminati ibers-Pol f SM fi D power ficiency schemes - Detecto ver oper	and Clado on -Grou arization bers-RI p : Lasers I -Resona s-Fiber to	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes nt frequencie fiber joints-	9 ignal terial sion, ut-off 9 s and es - Fiber 9 nche	
Unit II A1 Attenuation - A Distortion in Dispersion, M Intermodal dis wavelength. Unit III OF LED structures Threshold co Splicing-Conne Unit IV PH PIN Photo dete multiplication of sources - Rece	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information ave guide Dispersion, Signal dispersion, Mode Coupling -Desig TICAL SOURCES AND COUPLIE -Light source materials -Quantum Indition -Rate equations -Extern effects. Power Launching and consectors IOTODETECTORS AND RECEIVE ector- Avalanche Photodiodes- Photo of Noise- Temperature effects. Fu	ables. es, Bendon on Caj istortion n Optir NG n efficier nal Qu oupling- ER oto dete undame error- Qu	ding L pacity in S nization antum Lens ctor n ntal F mantum	de SM f on c ad LE n ef sing oise Recei n lim	terminati ibers-Pol f SM fi D power ficiency scheme: - Detecto ver oper it.	and Clado on -Grou arization bers-RI p : Lasers I -Resona s-Fiber to	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes nt frequencie fiber joints-	9 ignal terial sion, ut-off 9 s and es - Fiber 9 nche	
Unit II AT Attenuation - A Distortion in Dispersion, M Intermodal dis wavelength. Unit III OF LED structures Threshold co Temperature of Splicing-Connect Unit IV PH PIN Photo determultiplication of sources - Rece Unit V OF	TENUATION MECHANISMS Absorption losses, Scattering losse Optical Wave guides-Information wave guide Dispersion, Signal dispersion, Mode Coupling -Desig TICAL SOURCES AND COUPLIN -Light source materials -Quantum Indition -Rate equations -Extern effects. Power Launching and consectors IOTODETECTORS AND RECEIVING ectors Avalanche Photodiodes- Photo for Noise- Temperature effects. Fue inver Configuration- Probability of e	ables. es, Bendon on Caj istortion n Optir NG n efficier nal Qu oupling- ER oto dete undame error- Qu MEASU	ding L pacity in S nization ncy an antum Lens ctor n ntal F iantum	de SM f on o d LE n ef sing oise Recei n lim ENT	terminati ibers-Pol of SM fi D power ficiency schemes - Detecto ver oper it. S	and Clado on -Grou arization bers-RI p - Lasers I -Resona s-Fiber to pr respons ration - P	ding losses. S up Delay-Ma Mode disper profile and c Diodes-Modes nt frequencie fiber joints- se time- Avala reamplifiers-	9 iigna teria sion ut-off 9 s and es - Fiber 9 nche Error 9	

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TEX	T BOOK(S):
1.	Keiser G, Optical Fiber Communicationsll, McGraw Hill, New Delhi, Fifth edition, 2014
2.	John M. Senior, Optical Fiber Communications Principles and Practicell, PHI, New Delhi, Third edition, 2009.

REFERENCE(S):

	G.P. Agarwal, Fiber optic Communication Systems, John Wiley and sons, Fourth Edition, 2011
Ζ.	Franz J.H. Jain V.K, Optical Communication, Components and systems, Narosa publications, New Delhi, 2000.
3.	Gower, J Optical Communication Systems, PHI, New Delhi, Second edition, Fifth reprint, 2001
4.	K. Mynbaev and Lowell L Scheiner, Fiber Optic Communication Technologyll, Prentice Hall 2001.

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Department	ELECTRONICS AND COMMUNICA	TION	TION ENGINEERING				Semester- VII	РС
		Hou	irs / W	/eek	Credit	Total		1
Course Code	Course Name	L	Т	Р	С	Total Hours	Maximum M	larks
19EC703	EMBEDDED AND REAL TIME SYSTEMS	3	0	0	3	45	100	
 Gain kn Program Learn th Underst 	ctive (s): The purpose of learning this co owledge of hardware and software archin n Embedded systems using computing p ne various types of networking technique and the various types of real-time chara	tecture latform s cteristic	s of va n cs		Embedd	ed Syste	ems	
Course Outco Gain kn Able Pro Learn th Underst	n real time operations in RTOS using var omes: At the end of this course, learners owledge of hardware and software archi ogram Embedded systems using compu- ne various types of networking technique and the various types of real-time charac	s will be tecture ting pla s cteristic	e able s of va tform cs	to: arious	Embedd	ed Syste	ems	
Unit I Embedded C process- Re Components,	EMBEDDED ARCHITECTURE omputers, Characteristics of Embedded quirements, Specification, Architectur System Integration, Unified modeling	l Comp ral De Langu	outing esign,	Applio Desi	gning H	lardware	and Softv	vare
Structural Des	cription Rehavioral Description Design	Evam	No. M	T labe	rain Con	troller		ign
Signal proces	Scription, Behavioral Description, Design EMBEDDED PROCESSOR AND COM or- Architecture and memory organizat ssor- Architecture and Memory organi	PUTIN ion, Ins zation,	G PLA structio Addre	TFOF on set	R M , Flow o , modes,	f Control Instruct		9 gital
ARM process Signal process Control, CPU	EMBEDDED PROCESSOR AND COM or- Architecture and memory organizat ssor- Architecture and Memory organizat Bus configuration, ARM Bus, SHARC B	PUTIN ion, Ins zation,	G PLA structio Addre	TFOF on set	R M , Flow o , modes,	f Control Instruct		9 gital v of
ARM process Signal process Control, CPU Unit III Distributed E systems- I2C Communication scheduling, D	EMBEDDED PROCESSOR AND COM or- Architecture and memory organizat ssor- Architecture and Memory organi	PUTIN on, Ins zation, us - De Softw hernet, alysis,	G PLA structic Addre sign E vare A Myri Hard	Archite net, ware	RM , Flow o , modes, le : Alarr ectures, Internet, platform	f Control Instruct n Clock. Network Network design	tion set, Flow s for embed k-Based des , Allocation	9 gital v of 9 ded ign- and
ARM process Signal process Control, CPU Unit III Distributed E systems- 120 Communication scheduling, D Personal Digit	EMBEDDED PROCESSOR AND COM or- Architecture and memory organizat ssor- Architecture and Memory organiz Bus configuration, ARM Bus, SHARC B NETWORKS mbedded Architecture- Hardware and C, CAN Bus, SHARC link ports, Et on Analysis, system performance An esign Examples: Elevator Controller, In	PUTIN on, Ins zation, us - De Softw hernet, alysis,	G PLA structic Addre sign E vare A Myri Hard	Archite net, ware	RM , Flow o , modes, ile : Alarr ectures, Internet, platform	f Control Instruct n Clock. Network Network design	tion set, Flow s for embed k-Based des , Allocation	9 gital v of 9 ded ign- and
ARM process Signal process Control, CPU Unit III Distributed E systems- I2C Communication scheduling, D Personal Digition Unit IV Clock driven of systems, effect challenges in	EMBEDDED PROCESSOR AND COM or- Architecture and memory organizat ssor- Architecture and Memory organiz Bus configuration, ARM Bus, SHARC B NETWORKS mbedded Architecture- Hardware and C, CAN Bus, SHARC link ports, Et on Analysis, system performance An esign Examples: Elevator Controller, In cal Assistants, Set-top Boxes REAL-TIME CHARACTERISTICS Approach, weighted round robin Approactive release times and deadlines, Optivalidating timing constraints in priority dr	PUTIN on, Ins zation, us - De Softw hernet, alysis, k jet pr ch, Pri mality	G PLA structic Addre sign E vare A Myri Hard inter- ority d of the	Archite net, ware Hardv	RM , Flow o , modes, ectures, leternet, platform vare Des Approac est dead	f Control Instruct n Clock. Network Network design ign and h, Dynar line first	tion set, Flow s for embed k-Based des , Allocation Software Des mic Versus St (EDF) algorit	9 gital v of 9 ded ign- and ign, 9 atic hm,
ARM process Signal process Control, CPU Unit III Distributed E systems- 120 Communication scheduling, D Personal Digit Unit IV Clock driven A systems, effect challenges in Unit V	EMBEDDED PROCESSOR AND COM or- Architecture and memory organizat ssor- Architecture and Memory organiz Bus configuration, ARM Bus, SHARC B NETWORKS mbedded Architecture- Hardware and C, CAN Bus, SHARC link ports, Et on Analysis, system performance An esign Examples: Elevator Controller, In cal Assistants, Set-top Boxes REAL-TIME CHARACTERISTICS Approach, weighted round robin Approactive release times and deadlines, Opti	PUTIN on, Ins zation, us - De Softw hernet, alysis, k jet pr ch, Pri mality iven sy	G PLA structic Addre sign E vare A Myri Hard inter- ority d of the stems	Archite net, ware Hardv Earlie , Off-I	RM , Flow o , modes, le : Alarr ectures, Internet, platform vare Des Approac est dead ine Versi	f Control Instruct n Clock. Network Network design ign and h, Dynar line first us On-lin	tion set, Flow s for embed k-Based des , Allocation Software Des mic Versus St (EDF) algorit e scheduling.	9 gital v of 9 ded ign- and ign, 9 atic hm, 9

TE)	XT BOOK(S):
1.	Wayne Wolf, Computers as Components: "Principles of Embedded Computing System Design", Morgan Kaufman Publishers, 2008.
2.	Rajkamal, "Embedded System Architecture – Programming and Design" Tata McGraw- Hill, Fifth reprint, 2010
3.	Jane.W.S. Liu , "Real-Time systems", Pearson Education Asia, 2000

RE	FERENCE(S):
1.	C. M. Krishna and K. G. Shin, "Real-Time Systems", McGraw-Hill, 2009
	Frank Vahid and Tony Givargi Embedded System Design: "A Unified Hardware/Software Introduction", John Wiley & Sons, 2006

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Department	ELECTRONICS AND COMMUNI	CATIC	N EN	GINE	ERING	R 2019	Semester-VII PC	
Course Code	Course Name	Hou	Hours / Week 0		Credit	Total	Maximum Maril	
19EC704	OPTICAL AND MICROWAVE	L	Т	P	С	Hours	Maximum Marks	
1920704	LABORATORY	LABORATORY 0 0 3		3	1	45	100	
Course Objecti	ve (s): The purpose of learning this	cours	e is to)		,		
 Study the cl 	naracteristic of passive microwave	compo	nents					
A Contraction of the second	diation characteristics of microwav	conservation servas						
• Study the cl	naracteristics of Microwave sources	3						
 Perform exp Analyze the 	periment to verify the characteristics performance of fiber optic commun	s of op	tical so n link	ource				
	nes: At the end of this course, learn			ble to):		and the second second	
 Measure 	and analyze the parameters of rec	tangula	ar wav	reguio	des			
	experiments to measure the charac					vave com	ponents	
 Measure 	and analyze the radiation characte	ristics	of mic	rowa	ve anten	nas		
 Verify the 	e characteristics of Microwave sour	ces						

• Measure and verify the characteristics of optical source

Exp No.	Microwave Experiments						
1	Reflex Klystron mode characteristics						
2	Radiation pattern of Horn antenna						
3	Impedance measurement using VSWR						
4	Power measurement of Gunn Diode oscillator						
5	Characteristics of Gunn Diode oscillator						
6	Determination of coupling factor, insertion loss, isolation and directivity of directional						
Exp No.	Optical Experiments						
1	Measurement of Bending loss						
2	Measurement of the numerical aperture and data communication system using a fibre-						
3	LED/Laser diode characteristics						
4	Mode characteristics of an optical fiber & digital link establishment using LED/Laser diode						
Exp No.	Practical applications based experiments						
1	Study the performance of communication through satellite link						
2	Study of Connector and splicer in optical fibers						
3	Study the Measurement of attenuation in optical fiber using light runner.						

List of Equipment:

- Trainer kit for carrying out LED and PIN diode characteristics, Digital multi meter, optical power meter
- Trainer kit for determining the mode characteristics, losses in optical fiber
- Trainer kit for analyzing Analog and Digital link performance, 2 Mbps PRBS Data source, 10
 MHz signal generator, 20 MHz Digital storage Oscilloscope
- Kit for measuring Numerical aperture and Attenuation of fiber
- Advanced Optical fiber trainer kit for PC to PC communication, BER Measurement, Pulse broadening.
- MM/SM Glass and plastic fiber patch chords with ST/SC/E2000 connectors
- LEDs with ST / SC / E2000 receptacles 650 / 850 nm
- PIN PDs with ST / SC / E2000 receptacles 650 / 850 nm

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING R 2019 VII						Semester- VII	PC									
Course Code	Course Name	Hou	rs / W	leek	Credit	Credit	Credit	Credit	Credit	Credit	Credit	Credit	Credit	Credit	Total	Maximum M	auka
	EMBEDDED AND REAL	LT	LT	L	·L	· L	L	TP			LT	P	С	Hours			
19EC705	TIME SYSTEMS LABORATORY	0	0	3	1	45	100										
 Understand the Learn the conce Write programs 	ng of ARM processor Building Blocks of Embedded S opt of memory map and memory to interface memory, I/Os with p	interfa	се														
 Course Outcomes: Write programs Interface memo Analyze the per Write program f 	upt performance At the end of this course, learn in ARM for a specific Applicatio ry, A/D and D/A convertors with formance of interrupt or interfacing keyboard, display,	n ARM s motor	ystem														

Formulate a mini project using embedded system

Exp No.	Name of Experiments	
1	Study of ARM evaluation system	the set of the set of the
2	Interfacing ADC and DAC	
3	Interfacing LED and PWM.	
4	Interfacing real time clock and serial port.	i a fhaile i sta
5	Interfacing keyboard and LCD.	
6	Interfacing EPROM and interrupt.	
7	Mailbox.	
8	Interrupt performance characteristics of ARM and FPGA.	4
9	Flashing of LEDS.	
10	Interfacing stepper motor and temperature sensor.	
11	Implementing zigbee protocol with ARM.	

List of Equipment:

- Embedded trainer kits with ARM board 10 Nos
- Embedded trainer kits suitable for wireless communication 10 Nos
- Adequate quantities of Hardware, software and consumables

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING				R 2019	Semester-VII	EEC	
Course Could	Course Name	Ho	urs /V	Veek	Credit	Total	Maximum Marks	
Course Code	Course Name	L	Т	Р	С	Hours		arks
19EC706	PROJECT WORK PHASE- I	0	0	2	2	45	100	1

Course Objective (s): The purpose of learning this course is to

Conceptualize a novel idea / technique into a product

 Apply the acquired knowledge to carry out a capstone project having substantial multidisciplinary component

• To understand the management techniques of implementing a project

To take on the challenges of teamwork,

• To prepare a presentation in a professional manner, and document all aspects of design work. **Course Outcomes:** At the end of this course, learners will be able to:

Have hands-on experience in converting a small novel idea / technique into a working model / prototype

Involving multi-disciplinary skills and / or knowledge and working in at team.

Guidelines

A multidisciplinary project to be taken up by a team of maximum of ten students. Development of prototype product, a 3D model, simulation, blueprint for a larger project and any other development work are permitted. The contribution of the individuals in the project should be clearly brought out. A combined report is to be submitted. A presentation is to be made for the reviewers on the work done by the candidate.

Learning Resources

IEEE Journal, Elsevier Journals, Springer Jour nals, and any open access journal, reference / user manuals, etc.

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SEMESTER-VIII

Department						ELECTRONICS AND COMMUNICATION ENGINEERING R		R 2019	Semester-VIII	EEC
Osuma a Os da	Course Name	Hou	irs / V	Veek	Credit	Total	otal Maximum Marks			
Course Code	Course Name		C	Hours		irks				
19EC801	PROJECT WORK	0	0	12	6	180	100			

Course Objective (s): The purpose of learning this course is to

- Conceptualize a novel idea / technique into a product
- Apply the acquired knowledge to carry out a capstone project having substantial multidisciplinary component
- To understand the management techniques of implementing a project
- To take on the challenges of teamwork,
- To prepare a presentation in a professional manner, and document all aspects of design work.

Course Outcomes: At the end of this course, learners will be able to:

Have hands-on experience in converting a small novel idea / technique into a working model / prototype

Involving multi-disciplinary skills and / or knowledge and working in at team.

Guidelines

A multidisciplinary project to be taken up by a team of maximum of ten students. Development of prototype product, a 3D model, simulation, blueprint for a larger project and any other development work are permitted. The contribution of the individuals in the project should be clearly brought out. A combined report is to be submitted. A presentation is to be made for the reviewers on the work done by the candidate.

Learning Resources

IEEE Journal, Elsevier Journals, Springer Journals, and any open access journal, reference / user manuals, etc.

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Department	ELECTRONICS AND COMMUNICA		AND STREET, ST		R 2019	Semester-V	PE
Course Cod	e Course Name	-	/ Weel	Credit C	Total Hours	Maximum	Marks
19ECX01	MEDICAL ELECTRONICS	01776	0 0	3	45	100	
 Gain k the me Under Study Gain k 	ective (s): The purpose of learning this nowledge about the various physiologic ethods of recording and also the method stand the non-electrical physiological pa about the various assist devices used in nowledge about equipment used for phy	cal param d of transmarameters n the hosp	eters b mitting and th pitals	these pa neir meas	arameters surement	s. t	
	stic and therapeutic techniques. stand the recent trends in medical instru	umentatio	n syste	ems.		et a geographie	
 Know Comp tempe Interpr and ve Comp and bi 	comes: At the end of this course, learned the human body electro- physiological p rehend the non-electrical physiological p rature, blood pressure, pulse, blood cell et the various assist devices used in the intilators rehend physical medicine methods eg. u p-telemetry principles and methods about recent trends in medical instrume	parameter parameter count, bl e hospital ultrasonic	rs and rs and lood flo s viz. p	recording their mea w meter bacemak	asureme etc. ers, defib	nt – body prillators, dialy:	
	ECTRO-PHYSIOLOGY AND BIO-POT		RECO	RDING			9
	io medical signals, Bio-potentials, Bio-p	and south statistics are and	and the second s	and the set of settings	ogical am	plifiers, ECG.	EEG
	typical waveforms and signal characteri				- J	,	
Jnit II B	O-CHEMICAL AND NON ELECTRICA		METER	MEASU	JREMEN	IT S	9
	O2, Colorimeter, Blood flow meter, Car easurement, Blood Cell Counters.	diac outp	ut, res	piratory,	blood pre	essure, tempe	rature
	SSIST DEVICES		N NOT		and the second second		9
	emakers, DC Defibrillator, Dialyzer, V aging Systems.	entilators/	s, Mag	netic Re	sonance	Imaging Sys	tems
	IYSICAL MEDICINE AND BIOTELEME	ETRY		5. H			9
Jnit IV PI				in onalio	ations 9	Surgical Diath	ermy
Diathermies-	Shortwave, ultrasonic and microwave	e type a	nd the	er applic	auono, v		
Diathermies- Biotelemetry				аг аррис			9
Diathermies- Biotelemetry Jnit V RI		IMENTAT	ΓΙΟΝ			ab on a chip.	9
Diathermies- Biotelemetry Jnit V RI Telemedicine	ECENT TRENDS IN MEDICAL INSTRU e, Insulin Pumps, Radio pill, Endo micro	IMENTAT	ΓΙΟΝ			ab on a chip.	9
Diathermies- Biotelemetry Jnit V RI Telemedicine EXT BOOK	ECENT TRENDS IN MEDICAL INSTRU e, Insulin Pumps, Radio pill, Endo micro (S): omwell, Biomedical Instrumentation and	JMENTAT scopy, Br	ΓΙΟΝ rain ma	achine in	terface, L		
Diathermies- Biotelemetry Jnit V RI Felemedicine EXT BOOK 1. Leslie Cr New Delh	ECENT TRENDS IN MEDICAL INSTRU e, Insulin Pumps, Radio pill, Endo micro (S): omwell, Biomedical Instrumentation and i, 2014. Webster, Medical Instrumentation Applic	JMENTAT scopy, Br d Measure	ΓΙΟΝ rain ma ement,	chine in Prentice	terface, L e Hall of I	ndia, 2 nd Editio	on,
Diathermies- Biotelemetry Jnit V RI Telemedicine EXT BOOK 1. Leslie Cr New Delh 2. John G. edition, 2 REFERENCE	ECENT TRENDS IN MEDICAL INSTRU e, Insulin Pumps, Radio pill, Endo micro (S): omwell, Biomedical Instrumentation and i, 2014. Webster, Medical Instrumentation Applic 2020.	IMENTAT scopy, Br d Measure cation and	ΓΙΟΝ rain ma ement, d Desig	Prentice	terface, L Hall of I dition, W	ndia, 2 nd Editio liley India, Fifth	on, 1
Diathermies- Biotelemetry Jnit V RI Telemedicine EXT BOOK 1. Leslie Cr New Delh 2. John G.V edition, 2 REFERENCE	ECENT TRENDS IN MEDICAL INSTRU e, Insulin Pumps, Radio pill, Endo micro (S): omwell, Biomedical Instrumentation and i, 2014. Vebster, Medical Instrumentation Applic 2020.	IMENTAT scopy, Br d Measure cation and	ΓΙΟΝ rain ma ement, d Desig	Prentice	terface, L Hall of I dition, W	ndia, 2 nd Editio liley India, Fifth	on, 1

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Department	ELECTRONICS AND COMMUNICA	ATION I	ENG	INEE	RING	R 2019	Semester-V	PE
Course Code	Course Name	Hour	s/W	/eek	Credit	Total	Maximum N	larke
Course coue	Course Name	L	Т	Ρ	С	Hours		arks
19ECX02	WAVELETS AND MULTI- RESOLUTION PROCESSING	3	0	0	3	45	100	
see a second	ve (s): The purpose of learning this co	ourse is t	to					
	d the basic elements of wavelets							
	multi resolution analysis							
	various continues wavelet transforms d the various discrete wavelet transfo	rmo						
	d the applications of wavelets and mu		ution	proc	nizzar			
	ies: At the end of this course, learners				cooling			
	g the basic elements of wavelets							
2000 C 200 C	out the multi resolution analysis							
-	he various continues wavelet transforr							
	he various discrete wavelet transforms							
	ding the applications of wavelets and	multi-res	solut	ion p	rocess	ng	*	0
	- properties - dot product - basis	dimo	ncio		thogon	ality and	orthonormal	9
	veen vectors and signals - Signal spa							
	Generalised Fourier Expansion.	000 00	onioc	pt of	oonvo	genee		
	JLTI RESOLUTION ANALYSIS					1.0		9
	ti Resolution Analysis (MRA) – Haar							
	r MRA – Continuous time MRA interp	pretation	for t	the D	TWT –	Discrete	time MRA- B	asis
functions for the	DTWT – PRQMF filter banks		1		1.1			
	NTINUOUS WAVELET TRANSFORM							9
	orm - definition and properties - co							
	ALL THE CONTON OF LESS			21/010	at tunci	: (D		
	velet Transform (CWT) - Scaling fun						ubechies, Co	
Unit IV DIS	nc, Gaussian, Bi-Orthogonal) – Tiling c						ubechies, Co	iflet,
	nc, Gaussian, Bi-Orthogonal) – Tiling o SCRETE WAVELET TRANSFORM	of time -	scale	e plar	ne for C	WT.		iflet, 9
Filter Bank and s	nc, Gaussian, Bi-Orthogonal) – Tiling c	of time -s Filters -	scale Inve	e plar rse D	ne for C	WT.	n by Filter bar	9 ks -
Filter Bank and s Basic Properties DWT - Lifting	nc, Gaussian, Bi-Orthogonal) – Tiling of SCRETE WAVELET TRANSFORM sub band coding principles - Wavelet F of Filter coefficients - Choice of wa Scheme: Wavelet Transform using	Filters - Filters - avelet fu Polyph	scale Invei inctio	e plar rse D on co	ne for C WT co pefficier	mputation	n by Filter bar lat's algorithm	9 ks - for
Filter Bank and s Basic Properties DWT - Lifting foundations of lift	nc, Gaussian, Bi-Orthogonal) – Tiling of SCRETE WAVELET TRANSFORM sub band coding principles - Wavelet F of Filter coefficients - Choice of wa Scheme: Wavelet Transform using ting scheme - Lifting scheme in Z –do	Filters - Filters - avelet fu Polyph	scale Invei inctio	e plar rse D on co	ne for C WT co pefficier	mputation	n by Filter bar lat's algorithm	9 ks - for rical
Filter Bank and s Basic Properties DWT - Lifting foundations of lift Unit V AP	nc, Gaussian, Bi-Orthogonal) – Tiling of CRETE WAVELET TRANSFORM sub band coding principles - Wavelet F of Filter coefficients - Choice of wa Scheme: Wavelet Transform using ting scheme - Lifting scheme in Z –don PLICATIONS	of time -: Filters - avelet fu Polyph main	scale Inver Inctionase	e plar rse D on co mat	NWT co DWT co Defficier Trix Fa	WT. mputation nts - Mal ctorizatio	n by Filter bar lat's algorithm n – Geomet	9 ks - for rical 9
Filter Bank and s Basic Properties DWT - Lifting foundations of lift Unit V AP Image Compress	nc, Gaussian, Bi-Orthogonal) – Tiling of SCRETE WAVELET TRANSFORM sub band coding principles - Wavelet F of Filter coefficients - Choice of wa Scheme: Wavelet Transform using ting scheme - Lifting scheme in Z –do PLICATIONS sion using DWT – Sequential / Progra	Filters - avelet fu Polyph main essive -	Inver Inver Inctionase	e plar rse D on co mat	WT co befficier trix Fa	mputation nts - Mal ctorizatio	n by Filter bar lat's algorithm n – Geomet mage denoisi	9 ks - for rical 9 ng -
Filter Bank and sBasic PropertiesDWT - Liftingfoundations of liftUnit VAPImage CompressEdge detection	Ac, Gaussian, Bi-Orthogonal) – Tiling of CRETE WAVELET TRANSFORM Sub band coding principles - Wavelet F of Filter coefficients - Choice of wa Scheme: Wavelet Transform using ting scheme - Lifting scheme in Z –don PLICATIONS sion using DWT – Sequential / Progre and object Isolation and Object	Filters - avelet fu Polyph main essive - Detecti	Inver Inver Inctionase JPE	e plar rse D on co mat :G 20 - Im	WT co oefficier rix Fa 000 sta age F	mputation nts - Mal ctorizatio	n by Filter bar lat's algorithm n – Geomet mage denoisi	9 ks - for rical 9 ng -
Filter Bank and sBasic PropertiesDWT - Liftingfoundations of liftUnit VAPImage CompressEdge detection	nc, Gaussian, Bi-Orthogonal) – Tiling of SCRETE WAVELET TRANSFORM sub band coding principles - Wavelet F of Filter coefficients - Choice of wa Scheme: Wavelet Transform using ting scheme - Lifting scheme in Z –do PLICATIONS sion using DWT – Sequential / Progra	Filters - avelet fu Polyph main essive - Detecti	Inver Inver Inctionase JPE	e plar rse D on co mat :G 20 - Im	WT co oefficier rix Fa 000 sta age F	mputation nts - Mal ctorizatio	n by Filter bar lat's algorithm n – Geomet mage denoisi	9 ks - for rical 9 ng -
Filter Bank and s Basic Properties DWT - Lifting foundations of lift Unit V AP Image Compress Edge detection Multiwavelets - N	Ac, Gaussian, Bi-Orthogonal) – Tiling of CRETE WAVELET TRANSFORM Sub band coding principles - Wavelet F of Filter coefficients - Choice of wa Scheme: Wavelet Transform using ting scheme - Lifting scheme in Z –don PLICATIONS sion using DWT – Sequential / Progre and object Isolation and Object	Filters - avelet fu Polyph main essive - Detecti	Inver Inver Inctionase JPE	e plar rse D on co mat :G 20 - Im	WT co oefficier rix Fa 000 sta age F	mputation nts - Mal ctorizatio	n by Filter bar lat's algorithm n – Geomet mage denoisi	9 ks - for rical 9 ng -
Filter Bank and s Basic Properties DWT - Lifting foundations of lift Unit V AP Image Compress Edge detection Multiwavelets - N TEXT BOOK(S):	nc, Gaussian, Bi-Orthogonal) – Tiling of CRETE WAVELET TRANSFORM sub band coding principles - Wavelet F of Filter coefficients - Choice of wa Scheme: Wavelet Transform using ting scheme - Lifting scheme in Z –don PLICATIONS sion using DWT – Sequential / Progra and object Isolation and Object Ion linear wavelets – Ridgelets – Curv	Filters - avelet fu Polyph main essive - Detecti velets - 0	Inver Inver Inctionase JPE on Cont	e plar rse D on cc mat G 20 - Im ourle	be for C befficier arix Fa 000 sta age F ts.	mputation nts - Mal ctorizatio ndard - I usion -V	n by Filter bar lat's algorithm n – Geomet mage denoisi Vavelet Pack	iflet, 9 ks - for rical 9 ng - ets-
Filter Bank and s Basic Properties DWT - Lifting foundations of lift Unit V AP Image Compress Edge detection Multiwavelets - N TEXT BOOK(S): 1. C. Sidney E	Ac, Gaussian, Bi-Orthogonal) – Tiling of CRETE WAVELET TRANSFORM Sub band coding principles - Wavelet F of Filter coefficients - Choice of war Scheme: Wavelet Transform using ting scheme - Lifting scheme in Z –don PLICATIONS sion using DWT – Sequential / Progre and object Isolation and Object Ion linear wavelets – Ridgelets – Curv Burvus, Ramesh A.Gopinath haito, "	Filters - avelet fu Polyph main essive - Detecti velets - 0	Inver Inver Inctionase JPE on Cont	e plar rse D on cc mat G 20 - Im ourle	be for C befficier arix Fa 000 sta age F ts.	mputation nts - Mal ctorizatio ndard - I usion -V	n by Filter bar lat's algorithm n – Geomet mage denoisi Vavelet Pack	iflet, 9 ks - for rical 9 ng - ets-
Filter Bank and s Basic Properties DWT - Lifting foundations of lift Unit V AP Image Compress Edge detection Multiwavelets - N TEXT BOOK(S): 1. C. Sidney E Prentice Hal	nc, Gaussian, Bi-Orthogonal) – Tiling of CRETE WAVELET TRANSFORM sub band coding principles - Wavelet F of Filter coefficients - Choice of wa Scheme: Wavelet Transform using ting scheme - Lifting scheme in Z –don PLICATIONS sion using DWT – Sequential / Progra and object Isolation and Object Ion linear wavelets – Ridgelets – Curv	Filters - avelet fu Polyph main essive - Detecti velets - 0	JPE on Cont	e plar rse D on cc mat G 20 - Im ourle	verficier www.Fa wavelet	mputation nts - Mal ctorizatio ndard - I usion -V	n by Filter bar lat's algorithm n – Geomet mage denoisi Vavelet Pack	iflet, 9 ks - for rical 9 ng - ets-

REFERENCE(S):

1.	Strang G, Nguyen T, "Wavelets and Filter Banks," Wellesley Cambridge Press, 2 nd Edition 2009.
2.	Vetterli M, Kovacevic J, "Wavelets and Sub-band Coding," Prentice Hall, 2013.
3.	Mallat S., "Wavelet Signal Processing", Academic Press, , 3rd Edition 2009.

Department	ELECTRONICS AND COMMUNICA	and more setting	10 100/100 100	SN (200 - 52)	and the second	R 2019	Semester-V	PE
Course Code	Course Name	2003220000	rs / W		Credit		Maximum M	larks
		L	Т	Р	С	Hours	<u> </u>	
19ECX03	ELECTRICAL AND ELECTRONICS INSTRUMENTATION	3	0	0	3	45	100	
 Study ab Know ab Understation Study ab 	ctive (s): The purpose of learning this o out the measurement standards. out the indicating instruments. and the concepts of signal generation un out the DAS and Multiplexing out the transducers.		is to					
 Learning Explain a Identify th Explain a Explain a Unit I ME 	omes: At the end of this course, learne about the measurement standards. bout the indicating instruments. ne concepts of signal generation units. bout the DAS and Multiplexing bout the transducers. ASUREMENT STANDARDS							7
classification. statistical ana Unit II INI	ts. Significance of measurements-me calibration- functional elements of a r lysis. DICATING INSTRUMENTS Galvanometer- PMMC Mechanism- DO	neasu	remei	nt sys	stem - e			
	s-RLC measurements-using ac and c	dc brid	lges-r	neas	urement	of incre	emental induct	ance
and low capa measurement Unit III INS	s-RLC measurements-using ac and c citances-AC voltmeters using rectifiers -high frequency measurement of induc STRUMENTS FOR SIGNAL GENERA	dc brid - digita tances	lges-r al volt s and AND	meas mete capa ANA	urement rs- Q m citances _YSIS	of incre eters-RF	emental induct power and vo	ance Itage 9
and low capa measurement Unit III INS Introduction- generator-Wa frequency co	ts-RLC measurements-using ac and or citances-AC voltmeters using rectifiers thigh frequency measurement of induct STRUMENTS FOR SIGNAL GENERA Sine wave generator- frequency syn we analyzers-harmonic distortion analy unter and time interval measurement	dc brid - digita tances TION / thesize /zer-sp - Bloc	lges-r al volt s and AND ed sig bectru k diag	meas mete capa ANA gnal um ar gram	urement rs- Q mo citances LYSIS generat nalyzer-	of incre eters-RF s. or-pulse heterody	emental induct power and vo and square v ne wave analy	ance Itage 9 wave yzer
and low capa measurement Unit III INS Introduction- generator-Wa frequency co Measurement Unit IV AN	ts-RLC measurements-using ac and or citances-AC voltmeters using rectifiers t-high frequency measurement of induct STRUMENTS FOR SIGNAL GENERA Sine wave generator- frequency sym- tive analyzers-harmonic distortion analy unter and time interval measurement of voltage, current, phase and frequent ALOG AND DIGITAL DATA ACQUISI	dc brid - digita tances TION / thesize /zer-sp - Bloc ncy us	lges-r al volt s and AND a ed sig bectru k dia ing C SYST	meas mete capa ANAI gnal um ar gram RO. FEMS	urement rs- Q m citances _YSIS generat alyzer- of Ger	of incre eters-RF 5. or-pulse heterody eral Pur	emental induct power and vo and square v ne wave analy rpose Oscillos	ance Itage 9 wave yzer cope
and low capa measurement Unit III INS Introduction- generator-Wa frequency co Measurement Unit IV AN Components transducers systems-Uses Input conditio crystal display	s-RLC measurements-using ac and or citances-AC voltmeters using rectifiers t-high frequency measurement of induct STRUMENTS FOR SIGNAL GENERAT Sine wave generator- frequency sym- ve analyzers-harmonic distortion analy unter and time interval measurement of voltage, current, phase and frequent ALOG AND DIGITAL DATA ACQUISI of analog and digital data acquisit to Electronic control and measuring of data acquisition systems-Use of rec- ning systems digital data acquisition systems-Use of rec- ys.	dc brid dc digita tances TION / thesize /zer-sp - Bloc ncy us TION tion s og ins corder	lges-r al volt s and AND a ed sig bectru k dia ing C SYST ystem trume s in d	meas mete capa ANAI gnal um ar gram RO. FEMS ns In ents-N igital	urement rs- Q m citances _YSIS generat alyzer- of Ger strumer Aultiplex system	of incre eters-RF or-pulse heterody eral Pur itation S ing-Type s-Digital	and square w ne wave analy pose Oscillos Systems-Interfa	anco Itago 9 wave yzer cope 9 acing ems iquid
and low capa measurement Unit III INS Introduction- generator-Wa frequency co Measurement Unit IV AN Components transducers systems-Uses Input condition crystal display Unit V TR Classification Variable Diffe Piezo-electric VIRTUAL INS and WHILE Io	s-RLC measurements-using ac and or citances-AC voltmeters using rectifiers thigh frequency measurement of induct STRUMENTS FOR SIGNAL GENERA Sine wave generator- frequency sym- we analyzers-harmonic distortion analy- unter and time interval measurements of voltage, current , phase and frequent ALOG AND DIGITAL DATA ACQUISI of analog and digital data acquisit to Electronic control and measuring of data acquisition systems-Use of re- ning systems digital data acquisition s vs. ANSDUCERS of transducers-Selecting a transducer- rential Transformer(LVDT), Advantage Transducers and Optoelectronic Trans STRUMENTATION: Introduction to Vir- ops – Structures – Arrays and Clusters	dc brid - digita tances TION / thesize /zer-sp - Bloc ncy us ITION tion s ig ins corder system - strain es and ducers tual In	Iges-ral volt s and AND A ed sig bectruk dia ing C SYST ystem trume s in d s digi s digi a gaug t Disa s. mstrum	meas mete capa ANAI gnal um ar gram RO. TEMS ns In ents-N ligital ital di ges - advar menta	urement rs- Q mo citances _YSIS generat nalyzer- of Ger strumer Aultiplex systems splay ur Temper ntages -	of incre eters-RF or-pulse heterody eral Pur itation S ing-Type s-Digital its-segm rature Tr Capaciti Basics of	emental induct power and vo and square w ne wave analy rpose Oscillos Systems-Interfa es of multiple recording system nental display-li ansducers - Li ive Transducer f LabVIEW –	ance Itage 9 wave yzer cope 9 acing exing iquid nea rs, -
and low capa measurement Unit III INS Introduction- generator-Wa frequency co Measurement Unit IV AN Components transducers systems-Uses Input condition crystal display Unit V TR Classification Variable Diffe Piezo-electric VIRTUAL INS and WHILE Io Acquisition with	s-RLC measurements-using ac and or citances-AC voltmeters using rectifiers t-high frequency measurement of induct STRUMENTS FOR SIGNAL GENERA Sine wave generator- frequency syn we analyzers-harmonic distortion analy unter and time interval measurement of voltage, current , phase and frequent ALOG AND DIGITAL DATA ACQUISI of analog and digital data acquisit to Electronic control and measuring of data acquisition systems-Use of rec- ning systems digital data acquisition s vs. ANSDUCERS of transducers-Selecting a transducer- rential Transformer(LVDT), Advantage Transducers and Optoelectronic Trans STRUMENTATION: Introduction to Vir ops – Structures – Arrays and Clusters th LabVIEW.	dc brid - digita tances TION / thesize /zer-sp - Bloc ncy us ITION tion s ig ins corder system - strain es and ducers tual In	Iges-ral volt s and AND A ed sig bectruk dia ing C SYST ystem trume s in d s digi s digi a gaug t Disa s. mstrum	meas mete capa ANAI gnal um ar gram RO. TEMS ns In ents-N ligital ital di ges - advar menta	urement rs- Q mo citances _YSIS generat nalyzer- of Ger strumer Aultiplex systems splay ur Temper ntages -	of incre eters-RF or-pulse heterody eral Pur itation S ing-Type s-Digital its-segm rature Tr Capaciti Basics of	emental induct power and vo and square w ne wave analy rpose Oscillos Systems-Interfa es of multiple recording system nental display-li ansducers - Li ive Transducer f LabVIEW –	ance Itage 9 wave yzer cope 9 acing exing exing iquic 10 nea rs, -
and low capa measurement Unit III INS Introduction- generator-Wa frequency co Measurement Unit IV AN Components transducers systems-Uses Input condition crystal display Unit V TR Classification Variable Diffe Piezo-electric VIRTUAL INS and WHILE IO Acquisition wi TEXT BOOK(s-RLC measurements-using ac and or citances-AC voltmeters using rectifiers t-high frequency measurement of induct STRUMENTS FOR SIGNAL GENERA Sine wave generator- frequency syn we analyzers-harmonic distortion analy unter and time interval measurement of voltage, current , phase and frequent ALOG AND DIGITAL DATA ACQUISI of analog and digital data acquisit to Electronic control and measuring of data acquisition systems-Use of rec- ning systems digital data acquisition s vs. ANSDUCERS of transducers-Selecting a transducer- rential Transformer(LVDT), Advantage Transducers and Optoelectronic Trans STRUMENTATION: Introduction to Vir ops – Structures – Arrays and Clusters th LabVIEW.	dc brid - digita tances TION / thesize /zer-sp - Bloc ncy us TION tion s og ins corder system - strain es and ducers tual In s - Gra	Iges-ral volt s and AND A ed sig bectruk dia ing C SYST ystem trume s in d s digi a gaug I Disa s. nstrum aphs a	meas mete capa ANAI gnal um ar gram RO. FEMS ns In ents-N igital ital di ital di ges - advar menta and C	urement rs- Q m citances _YSIS generat nalyzer- of Ger strumer Multiplex systems splay ur Temper ntages -	of incre eters-RF , or-pulse heterody eral Pur tation S ing-Type s-Digital its-segm rature Tr Capaciti Basics of Introduc	emental induct power and vo and square w yne wave analy rpose Oscillos Systems-Interfa es of multiple recording system nental display-li ansducers - Li ive Transducer f LabVIEW – tion to DAQ –	anco Itag 9 wave yzer cope 9 acing ems iquid inea rs, - FOF Data

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REF	ERENCE(S):
1.	Joseph J Carr, Elements of Electronic Instrumentation and Measurement, Pearson Education, New Delhi, 2003.
2.	Nakra B C and Choudhury K.k., Instrumentation Measurement and Analysis, Tata McGraw Hill, New Delhi,4 th Edition, 2017.
3.	Jovitha Jerome, Virtual Instrumentation Using LabView, Prentice Hall of India, New Delhi, 2013.
4.	Garry M Johnson, Lab View Graphical Programming, Tata McGraw Hill, New Delhi, 2011.

R. Chairman - BoS Dept.of ECE - ESEC

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Departme	nt ELECTRONICS AND COMMU					R 2019	Semester-V	PE
Course Co	de Course Name	Hou	rs/V T	Veek P	Credit C	Total Hours	Maximum I	Marks
19ECX04	ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY	3	0	0	3	45	100	
 Unders Study Know i Unders Know i Course Out Learn i Learn i Formu Identify 	ective (s): The purpose of learning to stand the basic principles of EMI the various types of EMI coupling put the various aspects EMI/EMC coupli stand the suitable EMI testing and co about the EMC design of PCBs comes: At the end of this course, le the basic principles of EMI the various types of EMI coupling put late the various aspects EMI/EMC co y a suitable EMI testing and controlling	rinciples ing ontrolling teo arners will b rinciples oupling	chniq ve ab					
(C. 15	op the EMC design of PCBs		1	<u></u>			on taine."	9
		10.00		$p_{1} >$	11	n The Th		
	concepts and definitions, Sources of Frequency domain EMI, Units of me ESD							ime
Unit II I	EMI COUPLING PRINCIPLES	140	-					9
Common M	, Radiated and Transient Couplir lode and Ground Loop Coupling, R pling, Power Mains and Power Supp	adiated Diff						
Unit III I	EMI/EMC STANDARDS AND MEAS	UREMENT	s			talific s		9
Instruments	andards - FCC, CISPR,I EC, EN, s /Systems, EMI Shielded e ectors/Couplers, Test beds for ESD	Chamber,	Ope	en /	Area	Test S	Site, TEM	Test Cell,
Unit IV E	EMI CONTROL TECHNIQUES							9
	Filtering, Grounding, Bonding, Isolati trol, Component Selection and Mour		mer,	Tran	isient S	uppresso	ors, Cable Ro	uting,
Unit V E	EMC design of PCBs							9
	s Cross Talk, Impedance Control, Po d Propagation Delay Performance M		ution	Deco	oupling,	Zoning,	Motherboard	
REFERENC	E(S):							
	enry W., "Noise Reduction Techniqu	es in Electro	onic	Syste	ems", Jo	hn Wiley	& Sons, New	York
- ALCONTRACTOR	C.R., "Introduction to Electromagneti	c Compatib	ility",	John	Wiley 8	& Sons, I	New York, 200	06.
3. Kodali	, V.P., "Engineering EMC Principles n, 1996.							
	, Bernhard., "Principles of Electroma	anetic Com	patik	oility".	Third E	dition. A	rtech House	

Dedham, 1986.

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Dep	artment	ELECTRONICS AND COMMUNIC		1	Tes South State	Credit	R 2019	Semester-V	PE
Cour	se Code	Course Name	Hour	T	veeк Р	Credit	Total Hours	Maximum N	larks
19	ECX05	SPEECH PROCESSING	3	0	0	3	45	100	
Cou	rse Obje	ective (s): The purpose of learning this	s course	is to					
		e various digital models of speech sign							
		e different methods for speech proces	sing						
		and the mathematical tools to speech and the speech coding techniques							
		e various speech parameters with app	ropriate	techi	nique	es			
		comes: At the end of this course, learn						100	
		various digital models of speech signa							
		different methods for speech processi	ing						
		athematical tools to speech speech coding techniques							
		various speech parameters with appro	priate te	chnic	ques	i qu			
Unit		GITAL MODELS FOR SPEECH SIGN	and a later				19 P		9
Proc	ess and	of speech production - Acoustic theo	ory of sp	eech	proc	duction -	- Digital	models for sp	eech
signa	als.	and a programmer of the				- 6	an a su	1	
Unit	II TI	ME DOMAIN METHODS FOR SPEED	H PRO	CES	SING)	1.000		9
Time	domaii	n parameters of speech, methods for	or extrac	cting	the	parame	ters, Zer	o crossings,	Auto
corre	elation fu	nction, pitch estimation.	1	54.54					
Jnit	III FF	REQUENCY DOMAIN METHODS FOR	R SPEE	CH P	ROC	ESSING	G	100	9
		ourier analysis, filter bank analysis, nalysis - synthesis systems.	spectro	grap	hic a	analysis	Formar	nt extraction,	pitch
Jnit	IV LI	NEAR PREDICTIVE CODING OF SPE	EECH	с., I	ja.	· · 1815	Peer	1.00	9
Form	ulation	of linear prediction problem in time c	lomain,	solut	ion d	of LPC	equations	s, Interpretatio	on of
inea	r predict	ion in auto correlation and spectral dor	mains.						_
Jnit	V SF	PEECH ANALYSIS AND SYNTHESIS	Ř.						9
		ysis of speech, formant and pitch estir		Applic	catio	ns of spe	eech proo	cessing - Spee	ech
eco	gnition, S	Speech synthesis and speaker verificat	tion.					des a la la la com	
EXT	BOOK(6						
1.		abiner and R.E Schafer, Digital proces d, 2005.	sing of s	peed	ch sig	inals, Do	orling Kin	dersley (India))
	RENCE						<u></u>		
1.		abiner and Biling Hwang Juang, Funda ion,2nd Edition ,2005.	amentals	of S	peed	h recog	nition, Pe	earson	E.
2.		nagan, Speech Analysis Synthesis and		3-5945-5045C			- Spring	er Verlag, 198	3.
3.	1. A.	ten, Principles of Computer Speech, A							6
4	Thoma	s F. Quateri, Discrete-Time Speech Pr	ocessin	a Pri	ncinl	es and F	Practice	Pearson	

2.60 Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNICA	TION	ENG	INE	RING	R 2019	Semester-VI PE
Course Code	Course Name	Hou	1		Credit		Maximum Marks
		L	T	P	С	Hours	ind and in Marks
19ECX06	WIRELESS ADHOC AND SENSOR NETWORKS	3	0	0	3	45	100
	ive (s): The purpose of learning this co						
	nd the various routing protocols of Adh		twork	S			
	architecture of wireless sensor networ						
	protocols of wireless sensor networks						
	nd the sensor network security concep						
	out sensor network platforms and tools						
Course Outcon	mes: At the end of this course, learners	s will b	e abl	e to:			
 Analyze v 	various routing protocols of Adhoc netw	/orks					
 Describe 	the architecture of wireless sensor net	works					
 Analyze t 	he protocols of wireless sensor networ	ks					
 Analyze t 	he sensor network security concepts						
 Discuss t 	he sensor network platforms and tools						
	RODUCTION		1			ALC: DOLL	9
Fundamentals	of Wireless Communication Technol	logy -	- The	e Ele	ectroma	anetic S	pectrum - Radio
	echanisms - Characteristics of the Wire						
	ensor networks (WSNs) :concepts and						
networks. Desig	on Challenges in Ad hoc and Sensor No	etwork	S.				
Unit II MA	C PROTOCOLS FOR AD HOC WIRE	LESS	NET	WOF	RKS		9
Issues in desig	ning a MAC Protocol- Classification	of M/	AC P	rotoc	cols- Co	ontention	based protocols-
	ed protocols with Reservation Mechan						
	Multi channel MAC-IEEE 802.11						
RC RC	UTING PROTOCOLS AND TRANSPO	ORT L	AYE	RIN	AD HO	C WIREL	ESS
	TWORKS			-			9
Issues in desig	ining a routing and Transport Layer	protoc	ol fo	r Ad	hoc ne	etworks-	proactive routing.
	(on-demand), hybrid routing- Classifi						
hoc wireless Ne	etworks.						
Unit IV WII	RELESS SENSOR NETWORKS (WSN	IS) AN	ND M	AC F	ROTO	COLS	9
Single node an	chitecture: hardware and software of	compo	nents	s of	a sens	or node	- WSN Network
architecture: ty	pical network architectures-data rel	aying	and	ago	gregatio	n strateg	gies -MAC layer
protocols: self-o	rganizing, Hybrid TDMA/FDMA and CS	SMA b	ased	MAG	C- IEEE	802.15.4	
Unit V WS	N ROUTING, LOCALIZATION & QOS	;					9
	routing - OLSR- Localization - Indoc		Sen	sor N	Network	Localiza	tion-absolute and
	ation, triangulation-QOS in WSN-En						
Layer issues.	The second second second second second	0,			, in the second s		
			1	-	tres wine		
TEXT BOOK(S)							
Prentice H	am Murthy, and B. S. Manoj, "Ad Hoc Hall Professional Technical Reference,	2012.					
2. Carlos De Applicatio	Morais Cordeiro, Dharma Prakash Ag ns", World Scientific Publishing Compa	rawal any,2 nd	"Ad H Edit	Hoc &	& Senso 2011.	r Networ	ks: Theory and
REFERENCE(S):						
	o, Leonidas Guibas, Wireless Senso Iblication, 2008.	r Netv	vorks	: an	informa	ation pro	cessing approach
2. Kazem So	hraby, Daniel Minoli, & Taieb Znati, " ations", John Wiley, 2007.	Wirele	ess S	ensc	or Netwo	orks-Tecl	nnology, Protocols
	"Wireless Sensor Network Designs", J	ohn M	liev	2003	3		- X - C - Y - C - C - C - C - C - C - C - C
- vinia rido,	Theread ochool Network Designs, J		ney,	2000		- The second second	and the second

Pilo Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNI	CATION	ENG	INE	ERING	R 2019	Semester-V	I PE
Course Code	Course Name	Hours	5 / W	eek	Credit	Total	Maximum M	Antes
Course Code	e Course Name	L	Т	Р	С	Hours	waximum w	larks
19ECX07	HIGH SPEED NETWORKS	3	0	0	3	45	100	
	tive (s): The purpose of learning this							4
	pout the various broadband networkin							
	bout the queuing algorithms for high p							
	and the congestion control algorithm							
	and the concepts of various networkin	•				speed c	ommunication	
	e various protocols in high speed net				ng QoS			
	omes: At the end of this course, learn e various broadband networking algor		able	e 10.				
	queuing algorithms for high performa		rke					
	the congestion control algorithms in			work	S			
	the concepts of various networking s					ed com	nunication	
	arious protocols in high speed network						landadon	
	IGH SPEED NETWORKS							9
	etworks – Asynchronous Transfer M	ode (ATM) - A	MTA	protoco	I archited	ture, ATM loc	gical
	TM cell - ATM service categories							
ethernet.					-			
	ONGESTION AND TRAFFIC MANA			_				9
	sis- Queuing models – Single server							
	agement – Congestion control in pa	acket swit	ching	g ne	tworks -	- Frame	relay conges	stion
control. Jnit III T	CP AND ATM CONGESTION CONT	POI			the second			9
and a state of the	rol – TCP congestion control – Retra	and the fact they got to	ъ. – Т	imor	manad	omont _	Exponential F	
	RN's algorithm – Window managem							
	trol in ATM – Requirements.		ionn.	anoc			in include	ana
	NTEGRATED AND DIFFERENTIATE	D SERVI	CES	1	1.00	n en ree		9
	vices architecture – Approach, compo 0) - Differentiated services.	onents, se	ervice	es- C	ueuing	discipline	e – Random e	early
	ROTOCOLS FOR QOS SUPPORT				7			9
	& characteristics - Data flow - RSV	P operation	ons -	Pro	tocol m	echanism	ns - Multiprot	ocol
	g – Operations - Label stacking - P							
ransfer protoco	ol - RTCP.		1					
and the second second			126		1.1.1			
FEXT BOOK(S	\$):		1.11	-			and the second second	1.
1. Willia	m Stallings, "High-speed networks ar	nd internet	ts: pe	erform	mance a	and qualit	y of service",	2nd
Editio	n, Pearson Education India, 2010.							
REFERENCE(S):	19.00						1.00
Walr	and Jean and Varaiya Pravin., High	Performa	nce (Com	municati	ion Netw	orks, 2nd Edit	tion,
1. Harc	ourt Asia Pvt. Ltd., Singapore, 2001.							
Pene	<u> </u>	Jeff, MPLS	S and	d VP	N Archi	tecture.	Volume I & II.	1st
2 Pepe	ourt Asia Pvt. Ltd., Singapore, 2001. InjkIrvan, Guichard Jim and Apcar Jon, Cisco Press, London, 2014.	Jeff, MPLS	S and	d VP	N Archi	tecture, V	/olume I & II,	1st

3. William Stallings, "High-speed networks: TCP/IP and ATM Design Principles", 2nd Edition, Pearson Education, 1998.

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Department	ELECTRONICS AND COMMUN					R 2019	Semester-VI	PE
Course Code	Course Name	Hours		-	Credit	Total	Maximum M	larks
4050200		L	T	P	C	Hours	100	
19ECX08		3	0	0	3	45	100	
Concernation of the second second second second	ive (s): The purpose of learning t							
	stand the basic concepts of mac							
	about the various types of neura		 Santancia 	gene	etic algoi	rithms		
and the second sec	about bayesian and computation	hal learning						
	stand instant based learning							
the second se	about various advanced learning						and a serie of a	
Course Outcon	nes: At the end of this course, lea	arners will b	be ab	le to	:			
 Explai 	n the basic concepts of machine	learning						
 Explai 	n about the various types of neur	al network	s and	ger	netic algo	orithms		
 Identif 	y the concepts of bayesian and	computatio	nal le	arni	ng			
 Explai 	n about instant based learning							
 Identif 	y the various advanced learning	concepts						
	RODUCTION		-	1	Contraction in the			9
Learning Proble	ems - Perspectives and Issues	- Concep	t Lea	rnin	a – Ver	sion Spa	ces and Cano	lidate
	nductive bias – Decision Tree le				-			
Search.						genan		- p
Unit II NEL	JRAL NETWORKS AND GENET	TIC ALGOR	RITH	MS		_		9
	Representation - Problems - Pe				ver Netw	orks and	Back Propaga	
	vanced Topics - Genetic Algorith	1. A.						
	luation and Learning							
	YESIAN AND COMPUTATIONA	L LEARN	ING		1			9
	- Concept Learning - Maximum	Contraction of the second	States and	inim	um Des	cription I	enath Principle	
	Classifier – Gibbs Algorithm – Na					and a second second second		
and a state of the second	bability Learning – Sample Co				and the second second			
Mistake Bound N								
	TANT BASED LEARNING							9
and the second s	hbour Learning – Locally weighte	ed Rearess	sion –	Ra	dial Base	es Functi	ons – Case Ba	1985
Learning.				-				
1961	ANCED LEARNING		-	1.30		1000		9
	Rules – Sequential Covering Al	aorithm – I	earn	ina	Rule Set	- First (order Rules -	1.000
	ules - Induction on Inverted De			-				
	Theories – Explanation Base Le							
	ng – Temporal Difference Learnin		OOL	Aig	onunn	Reimore	cinent Leanin	ig -
Contract Contract		9	-		-	- Internet	and the second	
			n i			- incoment	and the second of	
KELEKENCEIS								
1 Ethem Alp		earning (Ar	dantiv		omnutat	ion and	Machine Learn	ning)
1. Ethem Alpa	aydin, Introduction to Machine Lo ress,4 th Edition, 2020.	earning (Ad	daptiv	ve C	omputat	ion and	Machine Learr	ning)

2. Stephen Marsland, Machine Learning: An Algorithmic Perspective, CRC Press, 2015

P.10->

Department	ELECTRONICS AND COMMUNI	CAYION	EN	GIN	EERING	R 2019	Semester-VI	PE
Course Code	Course Name	Hours	/We	P	Credit C	Total Hours	Maximum N	larks
19ECX09	ARTIFICIAL INTELLIGENCE	3	0	0	3	45	100	
	(s): The purpose of learning this c	-	-	U	5	40	100	-
 Understand Know about Understand Study about Course Outcome Explain the 	t the AI-Problem formulation and M knowledge representation using pr knowledge based systems and fra advanced plan generation systems the expert system. s: At the end of this course, learner AI-Problem formulation and Measu knowledge representation using pr	redicate lo ime based s. rs will be ire of perf	able	and eren to: ance	structure ce.	ed. alysis	15	
Identify theExplain abo	knowledge based systems and fran ut the advanced plan generation sy ut the expert system	ne based						
Unit I INTR	ODUCTION TO AI AND PRODUCT	TION SYS	TEN	NS				9
performance and	analysis of search algorithms.							
Game playing -	ESENTATION OF KNOWLEDGE - Knowledge representation, Knowledge represen							
Game playing - Introduction to p using other logic-	 Knowledge representation, Knowledge representation, Knedicate calculus, Resolution, Use Structured representation of knowledge 	e of predi						gic, tion
Game playing Introduction to pu using other logic- Unit III KNOV Knowledge represent chaining, Forward	 Knowledge representation, Knowledge representation, Use Structured representation of knowled VLEDGE INFERENCE sentation -Production based system d chaining, Rule value approach 	e of predi edge. em, Fram , Fuzzy	icate	e ca	lculus, K d systen	(nowledg	ge representat ence – Backw	gic, tion 9 ard
Game playing Introduction to plusing other logic- Unit III KNOV Knowledge repre chaining, Forwar Theory-Bayesian	 Knowledge representation, Knowledge representation, Use Structured representation of knowled VLEDGE INFERENCE sentation -Production based system d chaining, Rule value approach Network-Dempster – Shafer theory 	e of predi edge. em, Fram , Fuzzy	icate	e ca	lculus, K d systen	(nowledg	ge representat ence – Backw	gic, tion 9 ard
Game playing Introduction to plusing other logic- Jnit III KNOV Knowledge repre chaining, Forwar Theory-Bayesian Jnit IV PLAN Basic plan gene	 Knowledge representation, Knowledge representation, Use Structured representation of knowled VLEDGE INFERENCE sentation -Production based system of chaining, Rule value approach Network-Dempster – Shafer theory NING AND MACHINE LEARNING ration systems – Strips -Advance 	e of predi edge. em, Fram , Fuzzy ed plan g	ne b reas	ase ase	lculus, k d system ng – Ce	n. Infere rtainty f ms – K	ge representat ence – Backw actors, Bayes strips -Strate	gic, tion 9 ard tian 9
Game playing Introduction to pl using other logic- Unit III KNOV Knowledge repre chaining, Forwar Theory-Bayesian Unit IV PLAN Basic plan gener explanations -Wh	 Knowledge representation, Knowledge representation, Use Structured representation of knowled VLEDGE INFERENCE sentation -Production based systed chaining, Rule value approach Network-Dempster – Shafer theory NING AND MACHINE LEARNING 	e of predi edge. em, Fram , Fuzzy ed plan g	ne b reas	ase ase	lculus, k d system ng – Ce	n. Infere rtainty f ms – K	ge representat ence – Backw actors, Bayes strips -Strate	gic, tion 9 ard tian 9
Game playing Introduction to pu using other logic- Unit III KNOV Knowledge repre- chaining, Forwar Theory-Bayesian Unit IV PLAN Basic plan gener explanations -Wh Unit V EXPE Expert systems -	 Knowledge representation, Knowledge representation, Use Structured representation of knowled Structured representation of knowled Structured representation of knowled Structured representation based systems Sentation -Production based system of chaining, Rule value approach Network-Dempster – Shafer theory NING AND MACHINE LEARNING ration systems – Strips -Advanced y, Why not and how explanations. Let the system of the s	e of predi edge. em, Fram , Fuzzy d plan g _earning-	ne b reas Mac	ase onir ratic	lculus, k d system ng – Ce on system e learning stems –	n. Infere rtainty f ms – K g, adapti Knowled	ge representat ence – Backw actors, Bayes strips -Strate ve Learning.	gic, tion 9 ard ian 9 egic 9
Game playing Introduction to pu using other logic-3 Jnit III KNOV Knowledge repre- chaining, Forward Theory-Bayesian Jnit IV PLAN Basic plan gener explanations -Wh Jnit V EXPE Expert systems – Meta knowledge,	 Knowledge representation, Knowledge representation, Use Structured representation of knowled Structured representation of knowled Structured representation of knowled Structured representation based systems Sentation -Production based system chaining, Rule value approach Network-Dempster – Shafer theory NING AND MACHINE LEARNING ration systems – Strips -Advance y, Why not and how explanations. L RT SYSTEMS Architecture of expert systems, R 	e of predi edge. em, Fram , Fuzzy d plan g _earning-	ne b reas Mac	ase onir ratic	lculus, k d system ng – Ce on system e learning stems –	n. Infere rtainty f ms – K g, adapti Knowled	ge representat ence – Backw actors, Bayes strips -Strate ve Learning.	gic, tion 9 ard ian 9 egic 9
Game playing Introduction to pr using other logic- Jnit III KNOV Knowledge repre chaining, Forwar Theory-Bayesian Jnit IV PLAN Basic plan gener explanations -Wh Jnit V EXPE Expert systems – Meta knowledge,	 Knowledge representation, Knowledge calculus, Resolution, Use Structured representation of knowled VLEDGE INFERENCE sentation -Production based systed chaining, Rule value approach Network-Dempster – Shafer theory NING AND MACHINE LEARNING ration systems – Strips -Advance y, Why not and how explanations. L RT SYSTEMS Architecture of expert systems, R Heuristics. Typical expert systems 	e of predi edge. em, Fram , Fuzzy d plan g earning- coles of e – MYCIN	icate ne b reas Jene Mac Xper , DA	ase conir ratic hine t sy RT,	d system ng – Ce e learning stems – XOON, I	n. Infere rtainty f ms – K g, adapti Knowled Expert sy	ge representat ence – Backw actors, Bayes strips -Strate ve Learning. dge Acquisition ystems shells.	gic, tion 9 ard ian 9 egic 9
GameplayingIntroductionto playingIntroductionto playingJnit IIIKNOVKnowledgereprechaining,ForwardTheory-BayesianJnit IVJnit IVPLANBasicplangeneredexplanations-WhitEXPEExpertsystemsMetaknowledge,TEXTBOOK(S):1.Kevin	 Knowledge representation, Knowledge representation, Use Structured representation of knowled Structured representation of knowled Structured representation of knowled Structured representation based systems Sentation -Production based system chaining, Rule value approach Network-Dempster – Shafer theory NING AND MACHINE LEARNING ration systems – Strips -Advance y, Why not and how explanations. L RT SYSTEMS Architecture of expert systems, R 	e of predi edge. em, Fram , Fuzzy ded plan g _earning- coles of e _ MYCIN	icate ne b reas Mac Mac	ase ase conir ratic hine t sy RT,	d system ng – Ce e learning stems – XOON, I	n. Infere rtainty f ms – K g, adapti Knowled Expert sy	ge representat ence – Backw actors, Bayes strips -Strate ve Learning. dge Acquisition ystems shells.	gic, tion 9 ard ian 9 egic 9
GameplayingIntroductionto playingIntroductionto playingUnit IIIKNOVKnowledgerepresentchaining,ForwardTheory-BayesianForwardJnit IVPLANBasicplangenerations-WhJnit VEXPEExpertsystemsMetaknowledge,TEXTBOOK(S):1.KevinX.Dan W. Pa	 Knowledge representation, Knowledge calculus, Resolution, Use Structured representation of knowled VLEDGE INFERENCE sentation -Production based systed chaining, Rule value approach Network-Dempster – Shafer theory NING AND MACHINE LEARNING ration systems – Strips -Advance y, Why not and how explanations. L RT SYSTEMS Architecture of expert systems, R Heuristics. Typical expert systems 	e of predi edge. em, Fram , Fuzzy ded plan g _earning- coles of e _ MYCIN	icate ne b reas Mac Mac	ase ase conir ratic hine t sy RT,	d system ng – Ce e learning stems – XOON, I	n. Infere rtainty f ms – K g, adapti Knowled Expert sy	ge representat ence – Backw actors, Bayes strips -Strate ve Learning. dge Acquisition ystems shells.	gic, tion 9 ard ian 9 egic 9
Game playing Introduction to pr using other logic- Unit III KNOV Knowledge repre- chaining, Forwar Theory-Bayesian Jnit IV PLAN Basic plan gener explanations -Wh Jnit V EXPE Expert systems – Meta knowledge, TEXT BOOK(S): 1. Kevin Nigh 2. Dan W. Pa REFERENCE(S): 1. Peter Jacks	 Knowledge representation, Knowledge calculus, Resolution, Use Structured representation of knowled VLEDGE INFERENCE sentation -Production based systed chaining, Rule value approach Network-Dempster – Shafer theory NING AND MACHINE LEARNING ration systems – Strips -Advance y, Why not and how explanations. L RT SYSTEMS Architecture of expert systems, R Heuristics. Typical expert systems t and Elaine Rich, Nair B., "Artificial tterson, "Introduction to AI and ES", son, "Introduction to Expert System 	e of predi edge. em, Fram , Fuzzy ed plan g earning- coles of e – MYCIN, I Intelliger , Pearson	icate ne b reas gene Mac Mac Ance (i Edu	ase conir ratic chine t sy RT, SIE	d system ng – Ce on system e learning stems – XOON, I on, 2007 earson E	n. Infere rtainty f ms – K g, adapti Knowled Expert sy raw Hill- 7.	ence – Backw actors, Bayes strips -Strate ve Learning. dge Acquisition ystems shells. 2008.	gic, tion 9 ard ian 9 egic 9 n –
Game playing Introduction to playing Introduction to playing Jnit III KNOW Knowledge represent chaining, Forward Theory-Bayesian Jnit IV Jnit IV PLAN Basic plan Jnit V EXPE Splanations -Wh Jnit V EXPE Splanations -Wh Jnit V EXPE Splanations -Wh Jnit V EXPE TEXT BOOK(S): 1. Kevin Nigh 2. Dan W. Pa REFERENCE(S): 1. Peter Jacks 2. Stuart Russ	 Knowledge representation, Knowledge calculus, Resolution, Use Structured representation of knowled VLEDGE INFERENCE sentation -Production based systed d chaining, Rule value approach Network-Dempster – Shafer theory NING AND MACHINE LEARNING ration systems – Strips -Advance y, Why not and how explanations. L RT SYSTEMS Architecture of expert systems, R Heuristics. Typical expert systems t and Elaine Rich, Nair B., "Artificial tterson, "Introduction to AI and ES", 	e of predi edge. em, Fram , Fuzzy d plan g earning- coles of e – MYCIN, l Intelliger , Pearson s", 3rd Econ n Approad	icate ne b reas gene Mac Mac Ance (Edu ditior	asee conir ratic chine t sy RT, SIE ucati	d system og – Ce on system e learning stems – XOON, I) ⁷ , Mc Gr on, 2007 earson E Edition, F	n. Infere rtainty f ms – K g, adapti Knowled Expert sy raw Hill- 7. ducation Pearson	ence – Backw actors, Bayes strips -Strate ve Learning. dge Acquisition ystems shells. 2008.	gic, tion 9 ard ian 9 egic 9 n –

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R.br Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNICA	TIOI	N EN	GINEEF	RING	R 2019	Semester- VI
Course Code	Course Name	Ho		/ Week	Credit	Total	Maximum
		L	T	P	C	Hours	Marks
19ECX10	WIRELESS NETWORKS tive (s): The purpose of learning this co	3	0	0	3	45	100
 Unders Study a Unders Know a 	stand the Bluetooth link types and Zig-B about WLAN technologies and layers. stand GSM evolution for data and Layerin about TCP enhancements for wireless ne stand about 4G features and challenges.	ee te ng sti	chno ructui				+
 Identify Explain Analyz Explain Identify 	omes: At the end of this course, learners the Bluetooth link types and Zig-Bee te about WLAN technologies and layers. e the GSM evolution for data and Layerin about TCP enhancements for wireless the 4G features and challenges.	echno ng st netw	logy ructur orks				9
Unit I WIR	RELESS PERSONAL AREA NETWORK	(WF	AN)				9
establishment.	.1(Bluetooth): Protocol stack- Blueto IEEE 802.15.3 (WPAN-LR): Wireless cture- ZigBee technology. IEEE 802.15.3	sen	sor r	network	model-	802.15.3-1	
Unit II WIF	RELESS LOCAL AREA NETWORK (WI	_AN)	V.				9
MAC sub laye	ogies and topologies- IEEE 802.11 arch er- Power management- 802.11 b/n. HI etooth and WLAN)- IEEE 802.16 - WiMA	PER	LAN-	Multim	edia acc	ess comn	nunication, Co-
Unit III WIF	RELESS WIDE AREA NETWORKS						9
	evolution for data - High speed circui General packet radio service - CDMA 2						
Unit IV MO	BILE NETWORK AND TRANSPORT LA	AYEF	र	+			9
	Wireless TCP/IP - Network layer in int implementation-Mobile IP - SIP - WAP -					ts for wire	less networks -
Unit V 4G	NETWORKS			Star 1		2	9
Modulation, Sr	4G vision – 4G features and challenges nart antenna techniques, OFDM-MIMO Cognitive Radio.						
TEXT BOOK						Sec. 1	
1. Vijay K. C Publisher	Barg, "Wireless Communications and Ne s, 2007.	twork	king",	1st Edit	ion, Morg	gan Kaufn	nann
REFERENCE	(\$):						
	Pahlavan, Prashant Krishnamurthy, "Prin on Asia, 2013	ciple	s of V	Vireless	Network	s", 1st Ed	tion, Pearson
	Rogers & John Edwards, An Introduction, 2003.	on to	Wirel	ess Tec	hnology,	2nd Editio	on, Pearson
3. Clint Sm	ith, P.E. & Daniel Collins, 3G Wireless N	letwo	orks,	2nd Edit	ion, McG	Graw Hill, 2	2007.
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Doparti	nent	ELECTRONICS AND COMMUNICATI		1000				Semester-V	II PE
Course (Code	Course Name		rs / T	Week P	Credit C	Total Hours	Maximum N	lark
19ECX	(11	DATA COMPRESSION TECHNIQUES	3	0	0	3	45	100	
 Kno Und ratio Kno Stud Kno Course Des Calo ratio Exal Anal Com 	ow the derstan ow the dy abo ow about ow about ow about outco cribe the culate to mine the lyze difference with the outco	tive (s): The purpose of learning this cou basics of data compression d the efficiency of various text compressi types of speech and audio techniques at the different compression techniques at the various video compression standar mes: At the end of this course, learners of the basics of data compression he efficiency of various text compression he efficiency of various text compression he types of speech and audio techniques ferent compression techniques and standards	on algorial on alg	gor tan e at	dards fo ble to: ms in te	or image	9		on
Unit I	and second pro-	TRODUCTION		_					9
	ressior	a - Features — Storage requirements for – Metrics – Quantitative and Qualitative							
Unit II	TE	XT COMPRESSION					and the second		9
		of text data – Run Length Encoding - H ng — Dictionary techniques – LZW algor						ffmann Codir	
Arithmet	ic codi	of text data - Run Length Encoding - H						ffmann Codir	ng –
Arithmet Unit III Fundame compane	ic codi AL ental c ding -	of text data – Run Length Encoding - H ng — Dictionary techniques – LZW algor DIO AND SPEECH COMPRESSION concepts of speech and audio - Audio PCM, DPCM, DM, ADM - sub-band co	ithm · comp ding	- G	IF, TIF, ssion te	JBIG, J	BIG2. es – μ l	_aw and A-	ng – 9 Law
Arithmet Unit III Fundame compane MPEG a	ic codi AL ental c ding - udio –	of text data – Run Length Encoding - H ng — Dictionary techniques – LZW algor IDIO AND SPEECH COMPRESSION concepts of speech and audio - Audio	ithm · comp ding	- G	IF, TIF, ssion te	JBIG, J	BIG2. es – μ l	_aw and A-	ng – 9 Law
Arithmet Unit III Fundame compane MPEG a Unit IV Image da	ic codi AL ental c ding - udio – IM, ata rep	of text data – Run Length Encoding - H ng — Dictionary techniques – LZW algor DIO AND SPEECH COMPRESSION concepts of speech and audio - Audio PCM, DPCM, DM, ADM - sub-band co MP3, MP4 - LPC – CELP , RELP coders AGE COMPRESSION resentation – Transform Coding – DCT	ithm · comp ding - JPE	- G pre: - A	IF, TIF, ssion te Applicat Standar	JBIG, J echnique ion to s rd – Fur	BIG2. es – μ l speech c	aw and A- o oding – G.72	ng – 9 Law 22 – 9 ts –
Arithmet Unit III Fundame compane MPEG a Unit IV Image da Propertie	ic codi AL ental c ding - udio - IM ata rep es - Mu	of text data – Run Length Encoding - H ng — Dictionary techniques – LZW algor DIO AND SPEECH COMPRESSION concepts of speech and audio - Audio PCM, DPCM, DM, ADM - sub-band co MP3, MP4 - LPC – CELP , RELP coders AGE COMPRESSION	ithm · comp ding - JPE	- G pre: - A	IF, TIF, ssion te Applicat Standar	JBIG, J echnique ion to s rd – Fur	BIG2. es – μ l speech c	aw and A- o oding – G.72	ng – 9 Law 22 – 9 ts –
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Arithmet Unit III Fundame compane MPEG a Unit IV Image da Propertie UNIT V Fundame and com MPEG –	ic codi AL ental c ding - udio - IM, ata rep es - Mu ental c pensat 1, 2 au	of text data – Run Length Encoding - H ng — Dictionary techniques – LZW algor DIO AND SPEECH COMPRESSION concepts of speech and audio - Audio PCM, DPCM, DM, ADM - sub-band co MP3, MP4 - LPC – CELP , RELP coders AGE COMPRESSION presentation – Transform Coding – DCT - ulti Resolution Analysis - DWT – Sub-ban DEO COMPRESSION concepts of video – Digital video signal - V ion Techniques –Block based motion est and 4 H.264 Standard.	ithm comp ding - JPE nd coo /ideo	- Gl pre: - A G : ding sig on -	IF, TIF, ssion te Applicat Standar g – QMF nal repr – MPEC	JBIG, J echnique ion to s d – Fur Filters esentat G Video	BIG2. es – μ l peech c ndamenta – JPEG ion - Mot Compre	aw and A- oding – G.72 als of Wavele 2000 standar tion estimation	19
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Arithmet Unit III Fundame compane MPEG a Unit IV Image da Propertie UNIT V Fundame and com MPEG – TEXT BC Khal 2018 REFERE	ic codi AL ental c ding - udio – IM, ata rep es – Mu ental c pensat 1, 2 au DOK(S) lid Say 3.	of text data – Run Length Encoding - H ng — Dictionary techniques – LZW algor DIO AND SPEECH COMPRESSION concepts of speech and audio - Audio PCM, DPCM, DM, ADM - sub-band co MP3, MP4 - LPC – CELP , RELP coders AGE COMPRESSION resentation – Transform Coding – DCT ulti Resolution Analysis - DWT – Sub-ban DEO COMPRESSION concepts of video – Digital video signal - V ion Techniques –Block based motion est and 4 H.264 Standard.	ithm - comp ding s. - JPE nd coo /ideo imatio	- G pres - A G sig on - gan	IF, TIF, ssion te Applicat Standar g – QMF nal repr – MPEC Kauffm	JBIG, J echnique ion to s rd – Fur Filters resentat S Video	BIG2. es – μ I speech c ndamenta – JPEG ion - Mot Compre	aw and A- oding – G.72 als of Wavele 2000 standar tion estimation ssion standar	9 Law 22 – 9 ts – rd. 9 n ds:
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Chairman - BoS Dept.of ECE - ESEC

the second se	t ELECTRONICS AND COM	MONIOATION	ENG	INE	ERING	R 2019	Semester-VII	PE
Course Coo	le Course Name	Hour	s/W	eek	Credit	Total	Maximum M	arke
Course Coo	ie Course Name	L	T	Ρ	С	Hours	NALE ADDRESS OF A DATA DATA DATA DATA DATA DATA DATA D	ains
19ECX12	VIDEO ANALYTICS	5 3	0	0	3	45	100	
Course Ob	ective (s): The purpose of learn	ning this course	is to					
	stand the need for video Analyt							
 Know 	the basic configuration of fore g	ground extraction	n and	mo	rphologi	cal oper	ation.	
	the various types of classifiers a							
	stand the functional blocks of a	and the second se			President and the second second	N17		
	the various applications of vide					ons.		
	comes: At the end of this cours							
	in the need for video Analytics a							
	y the basic configuration of fore		on ar	nd m	orpholo	gical ope	eration.	
	in the various types of classifiers		a for	~~~~				
and the second se	y the functional blocks of a vide	New York, N				tione		
Expla Unit I	in the various applications of vid VIDEO ANALYTIC COMPON		busii	1622	applica	uons.		9
Need for V	ideo Analytics-Overview of vide	o Analytics- For	egrou	und e	extractio	n-Featu	Ire extraction-	
And the second sec	Preprocessing- edge detection-		eatu	re sp	bace-PC	A-FLD-	SIFT leatures	-
Unit II	FOREGROUND EXTRACTIO							9
							the second states and second s	
Backgroun	d estimation- Averaging- G	Baussian Mixtu	re I	Vlode	el- Op	tical Fl	ow based- Ir	nage
Segmenta	ion- Region growing- Region sp	Baussian Mixtu Ditting-Morpholo	re l gical	ope	el- Op rations-	tical Fl erosion-	ow based- Ir Dilation- Tracki	
Segmenta a multiple	ion- Region growing- Region sp camera environment	Baussian Mixtu Ditting-Morpholo	re l gical	ope	el- Op rations-	tical Florentical Florentical	ow based- Ir Dilation- Tracki	ng in
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Segmenta a multiple Unit III Neural net	tion- Region growing- Region sp camera environment CLASSIFIERS works (back propagation) - De	olitting-Morpholo	gical	ope	rations-	erosion-	Dilation- Tracki	ng in 9
Segmenta a multiple Unit III Neural net HMM base	tion- Region growing- Region sp camera environment CLASSIFIERS works (back propagation) - De d classifier	blitting-Morpholo	gical	ope	rations-	erosion-	Dilation- Tracki	ng in 9
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2. Nilanjan Dey, Amira Ashour and Suvojit Acharjee, Applied Video Processing in Surveillance and Monitoring Systems (IGI global), 2017.

1.	Zhihao Chen, Ye Yang , Jingyu Xue, Liping Ye, Feng Guo, The Next Generation of Video Surveillance and Video Analytics: The Unified Intelligent Video Analytics Suite, Create Space Independent Publishing Platform, 2014
2.	Caifeng Shan, Fatih Porikli, Tao Xiang, Shaogang Gong , Video Analytics for Business Intelligence, Springer, 2012

Department	ELECTRONICS AND COMMUNIC	-			RING	R 2019	Semester-VII	P
Course Code	Course Name	Но		Week	Credit		Maximum M	ark
1050110		L	Т	P	C	Hours		
19ECX13	DIGITAL IMAGE PROCESSING ive (s): The purpose of learning this of	3	0	0	3	45	100	
 Know the Study the Learn the Know to 0 	nd the digital image fundamentals methodology for smoothening and sl method to restore the image and obj image segmentation using edge dete Compress the image using lossy and	ect re ection, lossle	cogni thres ss co	tion sholding mpress	g and re	and how many a second second	ed approach.	
Analyze tiDevelop a	nes: At the end of this course, learne ne image using image transforms. a methodology for smoothening and s a method to restore the image and ob	sharpe	ning	of the ir	nage.			
 Segment 	the image using edge detection, three s the image using lossy and lossless of	sholdii	ng an	d regio		approac	:h.	
	AL IMAGE FUNDAMENTALS				1			9
Acquisition – I	Image Processing – Components – I mage Sampling and Quantization RGB, HSI models, Two-dimensional	- R	elatio	nships	betwee	n pixels	s - Color im	age
and the second se	E ENHANCEMENT							9
Iomomorphic fil Init III IMAG nage Restorati	Sharpening frequency domain fi tering, Color image enhancement. E RESTORATION on - degradation model, Properties, - Band reject Filters – Band pass F	Noise	e mo	dels –	Mean F	ilters -	Order Statistic	9 :s –
verse Filtering					leis - 0	pumum	Notch Filterin	g –
	– Wiener filtering					pumum	Notch Filtenn	
	– Wiener filtering E SEGMENTATION	6						9
dge detection, rowing – Regio	– Wiener filtering	Thresh lical p	oldin	g - Reg sing- e	ion base rosion a	ed segm nd dilati	entation – Reg on, Segmenta	9 gion tion
dge detection, rowing – Regio y morphologica	– Wiener filtering E SEGMENTATION Edge linking via Hough transform – T n splitting and merging – Morpholog	Thresh Jical pi n cons	oldin	g - Reg sing- e	ion base rosion a	ed segm nd dilati	entation – Reg on, Segmenta	9 gion tion
dge detection, rowing – Regio y morphologica Jnit V IMAG leed for data o tandard, MPE Descriptors – T matching.	– Wiener filtering E SEGMENTATION Edge linking via Hough transform – T n splitting and merging – Morpholog I watersheds – basic concepts – Dam E COMPRESSION AND RECOGNIT compression, Huffman, Run Length G. Boundary representation, Bou opological feature, Texture - Patte	Thresh jical pr n cons TON Enco ndary	oldin roces tructio oding des	g - Reg sing- e on – W , Shift scriptior	ion base rosion a atershed codes, n, Fouri	ed segm nd dilati segmen Arithmet er Des	entation – Reg on, Segmenta ntation algorith tic coding, JP criptor, Regio	9 gion tion m. 9 EG
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Department					EERING	R 2019	Semester-VII	PE
Course Code	Course Name	Hour			orean	Total	Maximum	Marks
		L	Т	Р	С	Hours		
19ECX14	BIOMEDICAL IMAGE PROCESSING	3	0	0	3	45	- 100	
Course Objec	tive (s): The purpose of learning t	his cour	rse is	s to				
 Understa 	and the basic concepts of acquisiti	on of im	nages	S.				
 Study the 	e origins of three dimensional Imag	ge Reco	onstr	uctior	ns.			
 Understa 	and Sources of reconstruction algo	rithms a	and s	scan i	motions.			
 Understa 	and use of Pulse techniques, motic	on supp	ressi	ion te	chniques		100 JUN 1	
 Know the 	e System components and Limitati	ons of l	Dopp	oler sy	/stems.		De attinue	
Course Outco	mes: At the end of this course, lea	arners w	vill be	e able	e to:		della tree	_
 Explain t 	he basic concepts of acquisition of	f image	s.		1.194			
	e origins of three dimensional Imag							
	he Sources of reconstruction algored							
	he use of Pulse techniques, motion				a contraction of the second strategy of the			
	he System components and Limita	ations o	t Dop	opler	systems.			
and the second s	DUISITION OF IMAGES						· · · · · ·	9
	Imaging Techniques - Single cryst							amera -
nultiple crystal	scintillation camera - solid state c	amera .	- reci	tilinea	ir scanne	r- Emissi	on computed	
		uniciu	100		ii oodiiiio		on computed	
Tomography.							on compared	0
Tomography. Unit II MAT	THEMATICAL PRELIMINARIES F	OR IM	AGE	REC	ONSTRU	JCTION		9 d Three
Fomography. Jnit II MAT mage Reconst	THEMATICAL PRELIMINARIES F truction from Projections in Two di	OR IM	AGE	REC Mathe	ONSTRU	JCTION Prelimina	ries for Two an	d Three
Fomography. Jnit II MAT mage Reconst dimensional In	THEMATICAL PRELIMINARIES F truction from Projections in Two di nage Reconstructions - Radon T	OR IM mensio	AGE ons- I m- F	REC Mathe Projec	ONSTRU ematical l ction The	JCTION Prelimina eorem - d	ries for Two an central slice Tl	d Three neorem
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Tomography. Unit II MAT mage Reconst dimensional In Sinogram- Two terative Recon	THEMATICAL PRELIMINARIES F truction from Projections in Two di nage Reconstructions - Radon T	FOR IM mensio ransfor struction	AGE ons- I m- F	REC Mathe Projec	ONSTRU ematical l ction The	JCTION Prelimina eorem - d	ries for Two an central slice Tl	d Three neorem
Tomography. Unit II MAT Image Reconst dimensional In Sinogram- Two terative Recon Unit III FLU Digital fluorosc	THEMATICAL PRELIMINARIES F truction from Projections in Two di nage Reconstructions - Radon T o Dimensional Projection Recons struction Techniques. OROSCOPY, CT, IMAGE QUALI opy- Automatic Brightness control	OR IM, mensio ransfor struction TY	AGE ons- I m- F n- TI	REC Vathe Projec hree	ONSTRU ematical l btion The Dimension hy- Princ	JCTION Prelimina corem - o onal Proj iples of c	ries for Two an central slice Tl ection Recons computed Tomo	d Three heorem truction 9 ographic
Tomography. Unit II MAT mage Reconsidimensional In Sinogram- Two terative Reconsidimensional In Jnit III FLU Digital fluorosc maging - Reconsiding -	THEMATICAL PRELIMINARIES F truction from Projections in Two di nage Reconstructions - Radon T o Dimensional Projection Recons struction Techniques. OROSCOPY, CT, IMAGE QUALI opy- Automatic Brightness control construction algorithms - Scan	OR IM, mensio ransfor struction TY	AGE ons- I m- F n- TI	REC Vathe Projec hree	ONSTRU ematical l btion The Dimension hy- Princ	JCTION Prelimina corem - o onal Proj iples of c	ries for Two an central slice Tl ection Recons computed Tomo	d Three neorem truction 9 ographic
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Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNICATIO		ENG		1		Semester-VII	PE
Course Code	Course Name		Veel T		Credit C	Total Hours	Maximum	Marks
19ECX15	STATISTICAL SIGNAL PROCESSING	3	0	0	3	45	100	
Course Obje	ctive (s): The purpose of learning this co	urse	is to					
 Learn t 	he concepts of discrete time random proc	ess						
	tand the knowledge in spectrum estimation		nd an	alys	is			
	various types of linear prediction							
	about the adaptive filter							
	he basic knowledge on speech processing	a						
	omes: At the end of this course, learners	-	be al	ole to	0:	1000	- <u>- 19</u>	
	the basic concepts of discrete time rando							
	e knowledge in spectrum estimation and			1				
	he various types of linear prediction	an ion.	,					
	about the adaptive filter							
	he basic concepts of speech processing							
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	e random process – Random process: El		ahla	21/01	anes- (Sauceiar	process - st	
	he auto-covariance and autocorrelation						(O)	
	Itering random process – spectral facto							
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	CTRUM ESTIMATION AND ANALYSIS	-			*			9
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nodel. Init III LIN	ch's method. Parametric methods: AR n IEAR PREDICTION d backward linear predictions, Solutio						<u>, 1968 T.</u> Tana a	9
	east mean squared error criterion – The er filters – Non causal IIR Wiener filter – t						linear predict	ion an
nit IV ADA	PTIVE FILTER							9
1	adaptive filter – FIR adaptive filters – L ursive filers– AR lattice structure and ARM		1.771					ellation
nit V OVE	RVIEW OF SPEECH PROCESSING					11.1		9
Acoustic Pho	damentals: Articulatory Phonetics – Pronetics – acoustics of speech productio tion (LP) analysis: Basis and development	n; S	hort	time	e Homo			
EFERENCE(S):							
	lonson H. "Statistical Digital Signal proc	essir	ng ar	nd M	lodeling	", John	Wiley and So	ns, Inc
2014	John G. and Manolakis, Dimitris G. "Digita	l Sig	nal F	Proce	essing:	Principle	s Algorithms a	nd
2. Proakis,	ons", PHI, 2007							
 Proakis, Application Ifeachor, 	ons", PHI, 2007 Emmanuel C. and Jervis, Barrie N. "I Nesley Publishing Company, 2002.	Digita	al Si	gnal	Proces	ssing: A	Practical Ap	proach
 Proakis, Application Ifeachor, Addison-N 	Emmanuel C. and Jervis, Barrie N. "I Wesley Publishing Company, 2002.	Digita	al Si	gnal	Proces			
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Chairman - BoS Dept.of ECE - ESEC

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Course Code	Course Name	Hour	s/We T	P	Credit C	Total Hours	Maximum M	arks
19ECX16	CAD FOR VLSI CIRCUITS	3	0	0	3	45	100	
 Lea Gain Stud Stud 	ctive (s): The purpose of learning on the design methodologies in the knowledge on Partitioning, F dy the routing and compaction dy the logic simulation erstand the logic synthesis				or plannii	ng		
Exp Gair Exp Gair Exp Gair Exp Jnit 1 DE ntroduction to	omes: At the end of this course, I ain the design methodologies the knowledge on Partitioning, F ain the routing and compaction the knowledge of logic simulation ain the logic synthesis and Assig SIGN METHODOLOGIES VLSI Design methodologies – R	Placeme on nment p leview o	nt and <u>roblem</u> f VLSI	Flor n Des	or plannii	mation to		
or combinator Jnit II PAI Placement an	omputational Complexity –Tracta ial optimization problems RTITIONING, PLACEMENT AND d Partitioning –Circuit represen or planning concepts –shape fu	FLOOF	R PLA Place	NNI men	NG t algorith	nms – P	artitioning- Partit	9 ioning
Simulated Ann	ealing.							
	UTING AND COMPACTION					1.53		9
Unit III RO Routing – Typ global routing							routing -algorithm	ms for
Jnit III RO Routing – Typ global routing constraint grap	UTING AND COMPACTION es of local routing problems – Are Compaction- Layout Compact						routing -algorithm	ms for
Unit III RO Routing – Typ global routing constraint grap Unit IV LOO Simulation –G	UTING AND COMPACTION es of local routing problems – Are Compaction- Layout Compact oh compaction.	tion –De	esign	rules	s –proble	em formu	routing –algorithr Ilation –algorithn	ms for ns for 9
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P.V-Chairman - BoS Dept.of ECE - ESEC

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Course Code	Course Name	Hou	rs/We	Р	Credit C	Total Hours	Maximum I	Marks
19ECX17	SYSTEM ON CHIP	3	0	0	3	45	100	
 Study th Know th Understand Learn th Course Outco Illustrate 	and the structure and operation e concepts of IP core design p e concepts involved in Process and the SOC Interconnects and e validation and verification of omes: At the end of this course the system-on-chip design pro- trate IP core design process	rocess sors and M d Interface the SOC a , learners	lemori s applica	es tions	to:			
Analyze	the concepts involved in Proces SOC Interconnects and Interfa	ces	Memo	ries				
	and Verify the SOC application TEM ON CHIP DESIGN PROC			-				9
day SoC- Can Software Code of Specification design issues - Unit II IP C	nallenges - SoC Technology - onical SoC Design - SoC Des sign flow- Top Down & Bottom n, System Design process, S Low Power - EDA Tools and N CORE/ MACRO DESIGN PROC Designs- Overview of Design	sign Flow n up Desig system lev /endors CESS	- Wate gn Met vel des	erfall hodo sign is	- Spiral logy – S ssues, D	SoC De pecificati esign fo	sign Flow - Ha on requirement r timing closure	rdware , Types e, Logic 9
Macro Design Blocks into chij	Process- Soft - Design Issues							egrating
	DCESSOR AND MEMORIES becessor Selection for SoC - Ba	asic Conc	ent of	Droo	essor Ar	chitectur	Dinaling	9
Processing - \ Memory Design Based (Off- Die	/LIW Processor - Superscalar n - Memory Technology -Cach e) Memory System - 3T & 1T [/ Cell - DRAM Memory Array -	Processo e Memory DRAM Me	or - Al Basic mory (RM M s - S Cell, 6	licro arc OC (On- ST SRAM	hitecture Die) -M 1 Memor	Memories :Ou emory System y Cell, PROM, e	tline o - Boarc
Processing - Memory Design Based (Off- Die Flash Memory Jnit IV SOC	/LIW Processor - Superscalar n - Memory Technology -Cach e) Memory System - 3T & 1T I / Cell - DRAM Memory Array - SUBSYSTEM INTERCONNEC	Processo e Memory DRAM Me SDRAM - CTS AND	or - AF Basic mory (DDR S INTER	RM M s - S Cell, 6 SDRA FAC	flicro arc OC (On- ST SRAM M – Mer ES	hitecture Die) -M 1 Memor nory con	Memories :Ou emory System y Cell, PROM, e npiler	tline o - Board DRAM 9
Processing - Memory Design Based (Off- Die Flash Memory Jnit IV SOC Interconnect A ARM AMBA, A Ethernet- PCI -	/LIW Processor - Superscalar n - Memory Technology -Cach e) Memory System - 3T & 1T [/ Cell - DRAM Memory Array -	Processo e Memory DRAM Me SDRAM - CTS AND ecture - S e Connect	or - AF Basic mory (DDR S INTER SOC S t- Silic	RM M cs - S Cell, 6 SDRA SDRA SDRA SDRA SDRA SDRA SDRA SDRA	flicro arc OC (On- ST SRAM M – Mer ES n Level S VISHBO	hitecture Die) -M 1 Memor mory con Standard NE- PC	Memories :Ou emory System y Cell, PROM, e npiler Interconnect E Based Interco	tline o - Board DRAM 9 Busses- nnects
Processing - Memory Design Based (Off- Die Flash Memory Unit IV SOC Interconnect A ARM AMBA, A Ethernet- PCI - HDMI	/LIW Processor - Superscalar n - Memory Technology -Cach e) Memory System - 3T & 1T I / Cell - DRAM Memory Array - SUBSYSTEM INTERCONNEC rchitectures- Bus Basic Archite AXI- Altera Avalon -IBM Core	Processo e Memory DRAM Me SDRAM - CTS AND ecture - S e Connect AG - SoC	or - AF Basic mory (DDR S INTER SOC S t- Silic Interce	RM M ss - S Cell, 6 SDRA FAC ysten ore V onneo	flicro arc OC (On- ST SRAM M – Mer ES n Level S NISHBO ct Switch	hitecture Die) -M 1 Memor mory con Standard NE- PC	Memories :Ou emory System y Cell, PROM, e npiler Interconnect E Based Interco	tline of Board DRAN 9 Busses- nnects
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		Hours	e / M	ook	0			0
Course Code	Course Name	L		P	Credit C	Total Hours	Maximum	Marks
19ECX18	DESIGN AND ANALYSIS OF DIGITAL INTEGRATED CIRCUITS	3	0	0	3	45	100	
Course Obje	ctive (s): The purpose of learning th		se is	to			2012 - 17 Contest - 17 Co	
 Undersite Undersite Know the study at the s	ne concepts on deep submicron digit tand the MOS inverter circuits, static tand various types of high speed CM ne concepts of semiconductor memo bout power grid and clock design omes: At the end of this course, lear	MOS (NOS log ory and	gate o gic de inter	circu sign conn	s ect desi	gn		
 Design Explain Impart t Explain 	e concepts on deep submicron digita the MOS inverter circuits, static MOS the various types of high speed CM he knowledge in semiconductor mer about power grid and clock design	S gate OS log nory ar	circui ic des	signs		esign		
and the second se	EP SUBMICRON DIGITAL IC DESI	C. Contraction of the						9
	gital Logic Gate Design-digital IC de							The MOS
	olar Transistor and circuits-IC Fabric	cation	lecnn	olog	y-Layout	basics-	SOLlechnology	
Unit II MC				100 Tel 100		No. 20		
Voltage trans	OS INVERTER CIRCUITS, STATIC I fer characteristics-noise margin defin	nitions-	-resis	tive I	load inve			
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Voltage transi load devices circuits-compl flops and latcl Unit III HI DE Switching tim slope - gate s gate – CMOS bootstrapping Unit IV SE Introduction-N content addre EEPROMs-fla coupling capa Unit V PO Power distribu REFERENCE 1. Hodges, Integrate 2. Sung-Ma Edition,	fer characteristics-noise margin define- CMOS inverter-pseudo-NMOS in ex CMOS gates-XOR and XNOR g mes – power dissipation in CMOS gates GH SPEED CMOS LOGIC DESIGN SIGN e analysis – detailed load capacita sizing for optimal path delay – optimal for aptimal path delay – optimal for appinal path de	nitions- verters lates-mo- tes-pov , TRAN ince can nizing p nic D I ITERCO esign-S ead-Wi C delay enna e es, pha nd Sal ology", S Digita	resis s-sizir hultipl wer a NSFE alcula bath v latche ONNI RAM rite m ys-bu ffects ase-lo leh, I , Tata al Inte	tive I ng in exer ind d R G tion with I es an ECT colu- nemc ffer i s. ocked Resv a McC egraf	load inverters- circuits elay trace ATE ANI - improviogical evidence ogical ev	 tristate Flip-flo le-offs D DYNA ving dela ffort – ba p-flops – leitage leitag	 inverters-CMG ops and latches MIC LOGIC ay calculation wasic concepts of domino logic domino logic memories-EPRG long wires-inter ked loops and Design of elhi, 2005. lysis and design 	sistors a DS gata – D flip 9 vith inpu f transfe –voltage 9 nitecture OMs and erconnec 9

R.W Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNIC	contraction of the second	-54 <u>- 1</u> 7 310.000	the sector set to the	2010/00/00/00/00	COMPACT MANAGEMENT	Semester-VII PE
Course Code	Course Name	Ho	urs /	Week	Credit C	Total Hours	Maximum Marks
19ECX19	LOW POWER VLSI	3	0	0	3	45	100
 Unders Unders Gain th Study a 	ctive (s): The purpose of learning this tand the sources of power dissipation i tand the low power design and optimiz e power at different levels. about the leakage reduction techniques tand the effect of capacitance on powe	n CMO ation te	S log echni	gic desig	gn.		
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	design, Degree of freedom. PPLY VOLTAGE SCALING		-			11.132	9
optimal trans Dynamic volta	e size scaling, Architectural level appro istor sizing, voltage scaling using hig ige scaling, Adaptive voltage scaling.						
Hardware So Techniques, (and DRAM. S	TCHED CAPACITANCE MINIMIZATION ftware Trade-off, Bus Encoding, Use Glitch power, Clock Gating, State enc pecial topics - Adiabatic Switching Circ low power synthesis.	of nu oding,	Logi	c styles	, Low po	wer tech	iniques for SRAM
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Hardware So Techniques, G and DRAM. S CAD tools for Unit IV LEA Standby leak threshold-volt leakage reduce multi level VD Unit V POV Power estima power analysi	ftware Trade-off, Bus Encoding, Use Glitch power, Clock Gating, State enc pecial topics - Adiabatic Switching Circ low power synthesis. KAGE POWER MINIMIZATION age reduction- Fabrication of multip age CMOS (VTCMOS), Multi-threshold ction- VDD scaling, combining power D scaling, Dual-Vt assignment approact VER ESTIMATION tion techniques – Logic level power of s.	e of nu oding, cuits Ba le thre d-voltag gating h (DTC	Logic attery shold ge Cl with CMOS	c styles y-aware d voltag MOS (M n Dynan S), dyna	, Low po Synthes ges, Trar ATCMOS nic voltag mic Vth s	wer tech is Variati nsistor si), Power ge and f scaling.	evel Optimization niques for SRAM on tolerant design 9 tacking, Variable- gating, Run time requency scaling, 9
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Department	ELECTRONICS AND COMMUNICA	TION	ENG	INE	ERING	R 2019	Semester-VII	PE
Course Code	Course Name	Hours / Week Credit			Credit	Total		
Course Code	Course Name	L	Т	Ρ	С	Hours	Maximum Marl	KS
19ECX20	TESTING OF VLSI CIRCUITS	3	0	0	3	45	100	
 Study the Understate Study the Know the Understate Course Outcome Explain the Gain the Explain the Explain the Outline for Unit 1 FA 	tive (s): The purpose of learning this co e various fault models and fault simulat and the faults in combinational and sec e various methods for delay tests e different testability methods and fault diagnosis approaches mes: At the end of this course, learner the various fault models and fault simula faults in combinational and sequential knowledge of various methods for dela different testability methods ault diagnosis approaches ULT MODELING AND SIMULATION	ion tec juentia s will b ation te logic c ay tests	hniqu I logi e abl echni ircuit	e to: ques s				9
testing-Simulat	Testing-Testing during the VLSI Lifed ion models- Logic Simulation-Fault Sim			mod	dels- Le	vels of a		
and the second	SIGN FOR TESTABILITY		4	1	1			9
	lysis –DFT Basics- Scan Cell Design RTL Design for Testability.	s- Sca	an Ar	chite	ectures-	Scan D	esign Rules- Sca	n
	ST GENERATION						9	3
ATPG- Untest	Generation- Designing a Stuck-at ATPG able Fault Identification- Designing S ed ATPG- ATPG for Non-Stuck at Fault	Simulat						
The second	ILT IN SELF TEST						9	•
	ules- Test Pattern generation- Output I ancement- BIST Timing Control- Logic I					gic BIST	Architecture- Fau	lt
the second s	GIC DIAGNOSIS AND MEMORY TES						9)
	Logic Diagnosis- Scan Chain Diagno st Algorithms- RAM Fault Simulation an						M functional Fau	lt
REFERENCE(S	5):			-				
	erng wang, Cheng wen wu, Xidogingwe r Testability", Morgan Kaufmann Publis			esting	Princip	les and a	Architectures:	
2 Abramovi	ci, M., Breuer, M.A and Friedman, A.D. g House, 2015.			stem	ns and T	estable	Design", Jaico	
3 Bushnell,	M.L and. Agrawal, V.D., "Essentials of SI Circuits", Kluwar Academic Publishe			ſesti	ng for Di	igital, Me	emory and Mixed-	
4. Nilcolici N Publisher	licoda, Al- HAshmini, "Power constraine s,2011.	ed Tes	ting c	of VL	SI Circu	its", Kluv	ver Academic	
	erng wang,Charles E.Stroud and Nur A ign Design for Testability", Morgan Kau						Architectures: Nan	10

P.lo Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMU	JNICATIC	ON EN	GINE	ERING	R 2019	Semester-V	II OF
Course Code	Course Name	Ηοι	urs / W	leek	Credit	Total	Maximum I	Marks
oourse ooue	Course Name	Ĺ	T	P	C	Hours	Maximum	viaina
19ECY21	RF MEMS	3	0	0	3	60	100	
 Study the Sy Understand Study Micro Study about Understand Course Outcomes Explain the sy Design the e Explain Micro 	(s): The purpose of learning this witch parameters Action Mechani the effect of inductor layout, appro- o mechanical filters using comb d the Micro machined transmission the basic overview of micro strip s: At the end of this course, learn Switch parameters Action Mecha effect of inductor layout, approach o mechanical filters using comb o	sms of R roaches f rives, ele n lines: Lo antennas ers will b nisms of nes for Im drives, ele	F MEN or Imp ctrosta osses i s and d e able RF ME oprovin ectrosta	roving tic co in Tra lesigr to: EMS S g qua atic c	g quality pupled be insmission parame Switches ality facto oupled b	eam struc on Lines	ictures	
	wledge about the Micro machine basic overview of micro strip ante						mission Lines	5
	MEMS RELAYS AND SWITCHE							9
Introduction-Swite electromagnetic E Modeling, design	ch parameters Action Mechanisn Bi-stable Relays and microactua evaluation	ns of RF tors - Dyi						tic & vitch
Introduction-Swite electromagnetic E Modeling, design Unit II ME Micro machining- pull- in voltage-M inductor-Effect of	ch parameters Action Mechanism Bi-stable Relays and microactuat evaluation MS INDUCTORS AND CAPACIT Micro machining as a Fabrication Alicro machined Passive element inductor layout-Approaches for l	ns of RF tors - Dyn TORS n process nts pros Improving	namics s, Fabr and c g qualit	icatio cons-l	witching n technic MEMS I tor-Mode	Operati ques-act nductors eling and	on MEMS Sv uator mechai -Micro mach design issue	tic & vitch 9 nism ined
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Introduction-Swite electromagnetic E Modeling, design Unit II ME Micro machining- pull- in voltage-M inductor-Effect of planar inductor-Po Unit III MI Introduction-Mode mechanical filters of Inter Digital Tra frequencies Unit IV ME Introduction-Type and polymer base transmission lines Unit V MI	ch parameters Action Mechanism Bi-stable Relays and microactuat evaluation MS INDUCTORS AND CAPACIT Micro machining as a Fabrication Alicro machined Passive element inductor layout-Approaches for I bymer based inductor-MEMS cap CRO-MACHINED RF FILTERS eling of Mechanical Filters-Mi using comb drives, electrostation ansducers-Capabilities, Limitation EMS PHASE SHIFTERS is of Phase shifters-Limitations-Med-Ferro electric Phase shifters I is Losses in Transmission Lines-O	TORS TORS	namics s, Fabr and c g qualit gap tun beam oplicatio nase s d and lines-N ixer. D	s of S ricatio cons-l ty fac hing a filters struc ons-M hifters bilate Micro eesign	witching n techni MEMS I tor-Mode nd area S-Electro ctures -S Aicro ma s-Switch ral Inter shield a n, Fabrica	Operati ques-act nductors eling and tuning ca static c AW filter chined fi ed delay digitatec nd meml ation and	on MEMS Sw uator mechan -Micro mach design issue apacitors omb drive-M rs Basic/s-De Iters for mmw r line, Distribution -Micro mach prance support levaluation	tic & vitch 9 nism ined es of 9 ficro sign vave 9 uted ined orted 9

1.	V.K.Varadan, K.J.Vinoyand K.A. Jose, RFMEMS and their applications, John Wiley & Sons Inc,2006
2.	G.M.Rebeiz, RFMEMS: THEORY, Design and Technology: John Wiley & Sons Inc., 2010.

REFERENCE(S):

1.	Hector J. DeSantos, RFMEMS circuit Design for Wireless Communications: Artech House, 2002
2.	www.marubeni-sys.com/mems/coventor/RF_MEMS_Application.pdf

Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMM						Semester-VI	PE
Course Code	Course Name		urs / W		Credit C	Total Hours	Maximum N	larks
4050200	NANO ELECTRONICS	L 3	T	P 0	3	45	100	
19ECX22	(s): The purpose of learning this	•	•	0		40	100	
-	nd the underlying operating print			device	s			
	Micro and mesoporous materia		Thano	uomoc	,0,			
	out the Sensors and high density		torage					
	nd the concepts of Diffusive tran				nfined svs	tems		
	Spin extraction and ferromagne							
	es: At the end of this course, lea							
	end the concepts of underlying of					vices		- 40
-	ne special Micro and mesoporou							
	nd construct the Sensors and hig			stora	ae.			
	the Diffusive transport in quantu							
	concepts of Spin extraction and					rization		
	ODUCTION TO NANOTECHN			- P1				9
	ottom-up and top-down approa			ensior	nal nanos	tructures	- Nano par	ticles
through homoge	neous nucleation and heteroge	eneous	nuclea	ation -	- One-din	nensiona	I nanostructur	es -
	nanostructures - PVD - CVD -							
Unit II SPE	CIAL NANO MATERIALS AND	FABR	CATIC	N OF	NANOST	RUCTUR	RES	9
Carbon fullerene	s and nano tubes – Micro and	mesop	orous	materi	ials- Core	shell st	ructures – Org	ganic
Inorganic hybrids	- Lithographic techniques - Str	uctural	charac	terizat	ion and c	hemical o	characterizatio	n
	RID SEMICONDUCTOR MOLE							9
	vices - Circuits - CMOL memo							
	ce effect – Defects – Phase tra			nsors	– High de	ensity dat	a storage – C	ptics
34	cations – Nano manipulators – (1000	is					
	NSPORT IN NANOSTRUCTUR		1					9
Introduction – S	Semiconductor device scaling	– Qua	antum	effect	devices	- Elect	tronic transpo	nτ in
	- Transport in nano scale syste					uantum c	commed syste	1115 -
and the second se	transport in nano scale system	s - 5 m	gie eie	curon u	unneiing			9
	TRONICS	orlovor	ovehou		unling (Ciant Ma	anoto Resista	1
Introduction – Me	etallic magnetic multilayers – Int junctions- Spin torque – Magne	eriayer	d Driv		Aganetic	Random	Access Mem	orv –
Somiconductor of	pintronics: Ferromagnetic semic	conduct	ors – S	co n	herence -	- Spin or	bit coupling -	Spin
injection - Spin 6	extraction and ferromagnetic pro	oximity	nolariz	ation -	- Lateral	spin valv	ve – Hanle eff	ect -
Spin hall effect	struction and renormagnetic pr	overing	poren					
The second second						-		
TEXT BOOK(S):								
Pradeep.T	, Nano The Essentials : Unders	standin	g nano	scienc	e and na		blogy, MicGraw	/ HIII
	Company Limited Principles of	r Comn	nunicat	ion Sy	stems - S	Simon Ha	aykin, zna ea	nion,
John Wiley	/,2009	-						
REFERENCE(S):		-					-	
Simon Del	eonibus, Electronic Device Arch	nitecture	es for t	he Na	no-CMOS	Era: Fro	om ultimate Cl	MOS
	Beyond CMOS devices Pan Sta							

scaling to Beyond CMOS devices, Pan Stanford Publishing, Singapore, 2019



Depa	artment	ELECTRONICS AND COMMUN	ICATIC	N E	IGINE	ERING	R 2019	Semester-VII	PE
	se Code	Course Name	Ηοι	ırs / \	Week	Credit	Total	Marian	
Cours	se coue		L	Т	Р	С	Hours	Maximum N	larks
2018502	ECX23	MODERN ELECTRONIC INSTRUMENTATION	3	0	0	3	45	100	
Cour Cour	Understan Study the Understan Study abo Understan se Outco Use differ Compare Develop p Create vir Draw ladd I MEA surement	tive (s): The purpose of learning of the different measuring instrum Comparison of various transduce and programs for virtual systems us out virtual system using the feature of the ladder diagram for industria omes: At the end of this course, learn the features of various transduce the features of various transduce orograms for virtual systems using tual system using the features of er diagram for industrial application SUREMENT CONCEPTS AND systems- Static and dynamic ch	nents ar er using La es of La al applic earners ensors r g LabVIE bons. MEASU aracteri	bVIE bVIE ation will b EW W RINC stics	W W s. e able	RUMEN its and s	tandards		
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		ANSDUCERS							9
Strair ransf	n gauge- ⁻ former- C	ANSDUCERS Thermistor - Humidity sensor- Va apacitive transducer – Piezoeleo transducers-Instrumentation amp	ctric trai	nsduc	cers -	Vibratio	n sensor		ential
Strair ranst Optoe	n gauge- ⁻ former- C electronic	Thermistor - Humidity sensor- Va apacitive transducer – Piezoeleo	ctric trai olifier us	nsduo ing o	cers -	Vibratio	n sensor		ential
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Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNICAT				ERING	R 2019	Semester-VII	PE	
Course Code	Course Name		ours Neel		Credit	Total Hours	Maximum M	larks	
		L	Т	P	С	Hours			
19ECX24	COMPUTER ARCHITECTURE AND INTERFACING	3	0	0	3	45	100	14	
	tive (s): The purpose of learning this c		e is t	0					
 Study the 	Bus structures, Software performance								
 Know the \$ 	Signed operand multiplication and fast	multi	plica	tion					
 Understand 	d the simple implementation scheme	2.010					n en proteine		
 Study the I 	Mapping functions and Performance co	onside	erati	on					
 Know the I 	Direct Memory Access (DMA), Buses a	and Ir	nterfa	ace	circuits			11	
Course Outco	mes: At the end of this course, learner	's will	be a	able	to:				
 Comprehe 	nd the Bus structures, Software perform	manc	e						
 Utilize Sigr 	ned operand multiplication and fast mul	Itiplic	atior	١					
 Explain the 	e simple implementation scheme								
 Explain the 	Mapping functions and Performance	consi	dera	tion					
- Gain the kr	nowledge about the Direct Memory Acc	cess	(DM	A), I	Buses ar	nd Interfa	ce circuits		
	ASIC STRUCTURE OF COMPUTERS				11	1.1.1.1	A land to 1	9	
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& addresses -	 Memory operations – Instruction ar 	nd in	struc	ction	sequer	ncing – A	Addressing mod	les -	
	 Memory operations – Instruction ar uage – Basic i/o operations – Stacks ar 				sequer	ncing – A	Addressing mod	des –	
Assembly langu	uage – Basic i/o operations – Stacks ar				sequer	icing – A	Addressing mod		
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P.Io-Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNIC	ATION	ENG	INEE	RING	R 2019	Semester-VII	P	
Course Code	Course Name	Hours	s / W	eek	Credit		Maximum Mar	ke	
course coue	Course Maine	L	T	P	С	Hours		aiks	
19ECX25	EMBEDDED INTERNET OF THINGS	3	0	0	3	45	100		
 Understand Study the of Know about Study about Understand Course Outcoor Comprehent Design IoT Provide IoT Develop diff Write progr 	tive (s): The purpose of learning this d the significance and applications of concepts of IoT based systems for In- at IoT based solutions using Rasper at the different control system with A d the programs using open source to mes: At the end of this course, learn ind the significance and applications based systems for Inter-disciplines based solutions using Rasperry Pi fferent control system with Arduino b rams using open source tools RODUCTION TO IoT	f IoT Iter-disci ry Pi dev rduino bo ools. ers will t of IoT develop	plines velopr oard oe ab	ment le to				9	
	haracteristics – Physical design – L	ogical de	esign	- Er	nabling	technolo	ogies – Levels a		
	nplates – Examples: Domain specific	loTs	-		- 1 R				
	NETWORKING		1	10.04	1.1.1.1	Transit 3		9	
with NETCONF	- Software defined networking – Ne -YANG – IoT design methodology	twork fur	nction	n virt	ualizatio	on – Sys	stem manageme		
	LOGICAL DESIGN							9	
and time operation	ata structures – Control flow – Func tion – Classes – Python packages c Linux on Raspberry Pi – Interfaces -	of IoT. Io	T Ph	ysica	al Desig	n: Basio	c building blocks		
Jnit IV RA	SPBERRY Pi FOR PROJECT DEVI	ELOPME	INT	-		5.QA		9	
	atform – GPIO – Establishment and ure monitoring system – Webcam ar						e – LAMP projec	ct -	
Jnit V CA	SE STUDY - ARDUINO FOR PROJ	ECT DE	VELC	DPM	ENT	The second		9	
	d Arduino powered garage door oper ack for Project development: Messag								
EXT BOOK(S)):					-		-	

1.	Arshdeep Bahga, Vijay Madisetti, Internet of Things: A Hands-On Approachll, Arshdeep Bahga, Vijay Madisetti , 2014
2.	Donald Norris , The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBone Black, 1st Edition, McGraw Hill, 2015

REF	ERENCE(S):
1.	Donald Norris, Raspberry Pi Projects for the Evil Genius, McGraw Hill Professional, 2014
2.	Adrian McEwen (Author), Hakim Cassimally, Designing the Internet of Things,1st Edition, John Wiley and sons, 2014
3.	Cuno Pfister.Getting started with the Internet of Things, 1st Edition, O'Reilly Media Inc, 2011

Chairman - BoS Dept.of ECE - ESEC

Department			ENG		ERING	R 2019	Semester-VII	I P
Course Code	Course Name		Veek T		Credit C	Total Hours	Maximum Ma	arks
19ECX26	SATELLITE COMMUNICATION	3	0	0	3	45	100	
 Stud Knov Und Knov 	tive (s): The purpose of learning this colly about the spacecraft sub system use we the various subsystems of spacecraft erstand the characteristics satellite links we the various medium access technique erstand the different types of broadcastic	ed in s S Ses	atelli	te c			ultimedia servi	ces
IdenAnalDesiAnal	omes: At the end of this course, learner tify the spacecraft sub system used in s yze various subsystems of spacecraft gn and analyze the characteristics sate yze the various medium access techniq y different types of broadcasting/military	atellit Ilite lir Jues	e cor nks	າກເ	unicatio		services	
	ATELLITE ORBITS	y uppi	louin			linioulu		9
Kepler's Laws and non Geo- point –Sun tra	, Newton's law, orbital parameters, orbi stationary orbits – Look Angle Determi nsit outage-Launching Procedures - lau	inatio	n- Lir	nits	of visib	oility – ed		
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Rio Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUN	CATION	N EN	GINE	ERING	R 2019	Semester-VII	I PE
Course Code	Course Name	Hou	rs / W	eek	Credit	Total	Maximum M	arks
oourse ooue	oourse Name	L	T	Ρ	C	Hours	Maximum	arka
19ECX27	GLOBAL POSITIONING SYSTEMS	3	0	0	3	45	100	
Course Object	tive (s): The purpose of learning	this cour	rse is	to				
• Lear	n the fundamentals of GPS							
• Lear	n the characteristics of signals							
• Impa	art knowledge on GPS receivers &	data er	rors					
• Lear	n the various types of GPS							
Lear	n the applications of GPS							
Course Outco	mes: At the end of this course, le	arners v	vill be	able	to:			1
Inde	ntify the fundamentals of GPS							
	yze the characteristics of signals							
	art knowledge on GPS receivers &	data er	rors					
	prehend the various types of GPS							
	ning the applications of GPS							
and the second sec		-6						9
	NASS Overview – Satellite Navi	nation -	Time	and	GPS -	User pos	sition and veloc	
	GPS – Satellite Constellation –	-				10.00		
	nt Phased development.		5 V	3			3 1 1	
	IAL CHARACTERISTICS							9
SHAMPIC DUR. PRESERVE	omponents – purpose, properties	and po	wer le	evel	- signal	acquisiti	on and trackin	q –
	ormation extraction – pseudo ran	and the second second second						
position calcula								
	RECEIVERS & DATA ERRORS	1						9
Receiver Archi	tecture - receiver design options	- Anten	na de	sign	- SA er	rrors - pr	opagation error	's –
	Itipath mitigation – Ephemeris dat							
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	ERENTIAL GPS							9
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 E.D.Kaplan, Christopher J. Hegarty, "Understanding GPS Principles and Applications", Artech House Boston, 3rd Edition, 2017.

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Department	ELECTRONICS AND COMMUNI	CATIC	ON EN	NGINE	FRING	R 2019	Semester-VIII PE
Department					Credit	Total	Maximum
Course Code	Course Name	L	T	P	Crean	Hours	Marks
19ECX28	RADAR AND NAVIGATIONAL AIDS	3	0	0	3	45	100
Study the product of the study the study the study the product of the study	tive (s): The purpose of learning the principles of radar d the operation of Moving Target I septs of navigational system different navigation systems nstrument landing system and distance mes: At the end of this course, lear inciples of radar peration of Moving Target Indicator ncepts of navigational system e different navigation systems strument landing system and distance NTRODUCTION TO RADAR Diagram- Radar Frequencies – Ra and False Alarm- Integration of Rador Fluctuations- Transmitter Power-	ndicat ance r rners r and p ace ma dar ea dar Pu	or and measu will be pulse easur quatio	d puls uring o e able Dopp ing ec on –Ap	equipme to: oler radar quipment oplication ar Cross	nt ns of Rac Section of	of Targets- Radar
System losses Unit II	MTI AND PULSE DOPPLER RAD			- 20	-		9
Unit II Introduction to Pulse Repetitie Performance Monopulse Tra Angle Trackin		itor (N essing Puls tial Lo	i - Mo e Do bing ·	oving 7 oppler - Limit	Target D Radar tations to	ine Canco etector - I – Trackin o Tracking	ellers - Staggered Limitations to MTI ng with Radar – g Accuracy – Low
Unit II Introduction to Pulse Repetitie Performance Monopulse Tra Angle Tracking Tracking with S	MTI AND PULSE DOPPLER RAD Doppler and Moving Target Indica on Frequencies – Digital MTI Proce - MTI from a Moving Platform . acking –Conical Scan and Sequent g - Tracking in Range - Other T Surveillance Radars (ADT).	itor (N essing Puls tial Lo	i - Mo e Do bing ·	oving 7 oppler - Limit	Target D Radar tations to	ine Canco etector - I – Trackin o Tracking	ellers - Staggered Limitations to MTI ng with Radar – g Accuracy – Low son of Trackers -
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Distance Measuring Equipment - Operation of DME - TACAN - TACAN Equipment Approach and Landing - Instrument Landing System (ILS) - Ground Controlled Approach (GCA) System -Microwave Landing System (MLS) Doppler Navigation - Doppler Effect - Beam Configurations -Doppler Frequency Equations - Track Stabilization - Doppler Spectrum - Components of the Doppler Navigation System - Doppler range Equation - Accuracy of Doppler Navigation Systems.

TE)	(T BOOK(S):
1.	Merrill I. Skolnik ," Introduction to Radar Systems", Tata McGraw-Hill (3rd Edition) 2018.
2.	N.S.Nagaraja, Elements of Electronic Navigation Systems, 2nd Edition, Tata McGraw-Hill, 2000.

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1.	Myron Kyton and W.R.Fried Avionics Naviagtion systems, John wiley & sons, (2nd Edition) 1997.
2.	Albert Helfrick.D,, Principles of Avionics, Avionics communications Inc,2015.
3.	Peyton Z. Peebles: "Radar Principles", John wiley, 2004.
4	J.C Toomay, " Principles of Radar", 2nd Edition Prentice Hall India, 2008.

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Dept.of ECE - ESEC

Department E	LECTRONICS AND COMMUN				1	March Sec.	Semester-VIII F
Course Code	Course Name		s/We	-	Credit	Total	Maximum Mar
19ECX29	REMOTE SENSING	L 3	T O	P 0	C 3	Hours 45	100
	ve (s): The purpose of learning		-		3	45	100
 Increase awa Describe how Gain an underegard to loca Understand the systems and a positioning sy Course Outcom Explain the company the position of the system of t	and analysis; spatial and statis areness of GIS and modelling to geographical information is us rstanding of how to manipulate l/state/national issues, emphas ne principles, applications, tren sciences, including remote sen stems (GPS). nes: At the end of this course, I oncepts of remote sensing in the erformance of LANDSAT,SPO d comprehend the microwave	ools for in sed, mana and app sizing land ds, and p nsing (RS) learners v ne electron T and its	nprovi aged, ly vec ds in a eertine), Pho will be magne image	ing c and tor a and r nt iss togra able etic s e inte	competiti markete ind raste near it. sues of g ammetry to: spectrum erpretatio	on and bu d globally r spatial c geographi , cartogra	usiness potential. data, particularly v ical information
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Department	ELECTRONICS AND COMMUN	IICATIO	N ENC			R 2019	Semester	-VIII PE
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- 1. Neeli Prasad and Anand Prasad, WLAN System & Wireless IP for Next Generation Communications, Artec House, 2002.
- 2. Moray Rumney : LTE and the Evolution to 4G Wireless, Wiley, 2013

Relas

De	nartment	ELECTRONICS AND COMMUNIC			SINF	FRING	R 2019	Semester-VIII	PF
	ourse				Contraction of the second	Credit		Cemeoter Vill	
	Code	Course Name	L	Т	P	C	Total Hours	Maximum Mar	rks
-	ECX31	NETWORK ON CHIP	3	0	0	3	45	100	
Co:	Introduce Ffamiliari Aacquain Learn abo	ctive (s): The purpose of learning the the concept of 3D NOC. ze interconnection Networks in NoC t the architectures design ofNoC out the testing of NOC nd low power Techniques in NOC		rse is	to				
••	Develop N Select a s Analyze o Test NOC	uitable switching and routing techni lifferent types of architectures		vill be	e abl	e to:			
Uni	stusy sectors and sectors	RODUCTION TO NOC							9
		ystem-on-Chip Integration and Its h Issues in NoC Development Exist					work-on-	Chip: A Paradig	jm
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		etwork Topologies-Switching Tech vice Support-NI Module	niques	-Rout	ing	Strategie	es-Flow	Control Protoco	1 -
Uni	and the second second	CHITECTURE DESIGN OF NETWO	ORK-C	N-CH	ΗP				9
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		ntroduction-Testing communication c algorithm-PSO baced strategy	n Fabr	ic-Tes	st T	ransport	time m	inimization-Testi	ing
Unit	V LO	W-POWER TECHNIQUES FOR NE	TWOF	RK-OI	N-CI	HIP		The second s	9
Link	s-Local re	andard Low-Power Methods for No configuration technique.Introduction B-D NoC Architecture-System- Leve	-3-D Ir	ntegra	ation	: Pros ar	nd Cons-	Design and	C
REF	ERENCE(S):					<u>Alterna</u>		3.8
1.		Kundu, Santanu Chattopadhyay, Ne gration, Taylor & Francis group2015		on-C	hip:	The Nex	t Genera	ation of System-o	on-
2.	and the second	omos Nicopoulos, Vijaykrishnan Na Ires AHolistic Design Exploration, S		ACT AV TO CONTRACT		R.Das, N	etworks-	on- Chip	
3.		ali, Haythamelmiligi, Hqhahed Watl CRC press, 2017.	heq E1	-Kha	rash	i, Netwo	rks-on-C	hips theory and	L.
4	Axel Jant	sch , Hannu Tenhunen, Networks o	n Chip	, Pub	lishe	er: Spring	ger; Soft	cover reprint of	

hardcover,2004
Giovanni De Micheli , Luca Benini, Networks on Chips: Technology and Tools (Systems on Silicon), Publisher: Morgan Kaufmann,2006.

2 10 Chairman - BoS Dept.of ECE - ESEQ

Departmen		How	re / M	look	ERING Credit		
Course Code	Course Name	L	T	P	Credit	Total Hours	Maximum Mark
19ECX32	COMPUTATIONAL ELECTROMAGNETICS	3	0	0	3	45	100
Course Obj	ective (s): The purpose of learning	ng this cou	irse is	sto			
and the second	ifferent laws of electromagnetics	J					
	and numerical differentiation.						
Know th	ne concepts of method of moment	ts					
Underst	and time domain methods		_				
	e different applications of CEM						
Course Out	comes: At the end of this course	, learners	will be	e abl	e to:		
	arious laws of Electromagnetics	lant Air					
Compre	hend the functionalities of numer	ical differe	ntiatio	on.			
 Apply th 	e concepts of method of moment	S					
	and implement finite difference tin	ne domain	meth	nods			
	ate different applications of CEM					100	
	M REVIEW rmittivity, Coulombs Law, Flux		<i>c</i>				
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R.L.

Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNICAT	TION	EN	GINEEF	RING	R 2019	Semester-VIII PE
Course Code	Course Name	-	-	/ Week	Credit	Total Hours	Maximum Marks
19ECX33	CRYPTOGRAPHY AND NETWORK SECURITY	L 3	Т 0	P 0	C 3	45	100
Course Object	tive (s): The purpose of learning this con	urse	is to				
	e the basic concepts in cryptography and	d net	work	<pre>securit</pre>	У		
	e concepts in symmetric cryptography						
	bout various public key cryptography						
	bout confidentiality, integrity of a data.				_		
	and the various system security issues		Service Sec				
	omes: At the end of this course, learners			ble to:			
	e concepts of cryptography and network	secu	rity				
	ne concepts in symmetric cryptography						
	strate and apply public key cryptography	data					
	message authentication and integrity of stem security issues	uala					
	RODUCTION					2430 - 24 <i>2</i> - 24	9
	s - Legal, Ethical and Professional Aspe	cts o	f Se	curity N	leed for	Security	
	es - Model of network security – Securit						
	- Classical encryption techniques: s			and the second se			
	y) Foundations of modern cryptograph						
cryptosystem -	- cryptanalysis.						
	MMETRIC CRYPTOGRAPHY				3.77.3		9
	S OF SYMMETRIC KEY CRYPTOGR						
	thm- Congruence and matrices - Group						
	DES – Block cipher Principles of DE						
	Block cipher design principles – Block			node of	operati	on – Ev	aluation criteria for
	ed Encryption Standard - RC4 – Key dist BLIC KEY CRYPTOGRAPHY	Input	on.				9
	S OF ASYMMETRIC KEY CRYPTOGR		Y. P	rimes -	Primalit	v Testin	
	function, Fermat's and Euler's Theorem					Contraction of the second s	•
	ASYMMETRIC KEY CIPHERS: RSA cr						
	key exchange - ElGamal cryptosystem –						
The second provide the second pr	SSAGE AUTHENTICATION AND INTEG	Carboy Constraints		4			9
	requirement - Authentication function -						
	A –Digital signature and authentication				and the second sec		and the second
and the second se	allenge Response protocols- Authentica			cations	- Kerber	ros, X.50	and the second se
	CURITY PRACTICE AND SYSTEM SEC						9
	security - PGP, S/MIME - IP security -	– We	eb S	ecurity -	SYSTE	EM SEC	URITY: Intruders –
Malicious softw	vare – viruses – Firewalls.			Schlar		Contil	
TEXT BOOK(S	·)•	-	-		1.1.1		
the second se	allings, Cryptography and Network Secu	rity. I	Drin	cinles ar	nd Pract	ice PHI	3rd Edition 2017
	annigs, cryptography and Network Secu	inty. I	1019	siples al	IU I TACI		
REFERENCE(63-8-0	1. E.	the state	
1. C K Shy India Pvi	yamala, N Harini and Dr. T R Padman t.Ltd	abha	n:C	ryptogra	phy and	d Netwo	rk Security, Wiley
the second se	A.Foruzan, Cryptography and Network S						
	Kaufman, Radia Perlman, and Mike Spe BLIC World, Prentice Hall.	ciner	, Ne	etwork S	ecurity:	PRIVAT	E Communication
							-1

Departmen	ELECTRONICS AND COMMUN				1		Semester-VIII	P
Course Cod	Course Name	Hours	/ We	P	Credit C	Total Hours	Maximum Ma	rks
19ECX34	COGNITIVE RADIO	3	0	0	3	45	100	
 Study t Describ Study t Illustrat 	ctive (s): The purpose of learning this ne principles of the software defined ne the architecture of software defined ne design considerations of cognitive e cognitive radio architecture ne knowledge of spectrum sensing, co	radio d radio radio		in fo	r cognitiv	ve radio		
Apply the Design Design Apply C Build co Manage Unit I	omes: At the end of this course, learn e principles of the software defined r a system with the knowledge of the a ognitive Techniques and Artificial Inte gnitive radio architecture on SDR spectrum sharing and upper layer is ITRODUCTION TO SOFTWARE DE	adio architecture elligence To ssues FINED RA	of s echn DIO	oftwa	S.			9
Definitions a architecture	nd potential benefits, software rac	dio archite	cture	e ev	olution,	technolo	ogy tradeoffs a	nd
	DR ARCHITECTURE					-		9
resources, s play modules Jnit III I Marking rad	TRODUCTION TO COGNITIVE RA o self-aware, cognitive techniques	DIOS DIOS	aces n av	s, int ware	erface to	opologie nvironm	s among plug a	nd 9
	os, optimization of radio resources, A OGNITIVE RADIO ARCHITECTURE		eilige	ence	rechniq	ues.		9
phases, Infe defined Radi	dio - functions, components and desi ence Hierarchy, Architecture maps, Architecture.	Building the						ire
ASSISTEDA DA	EXT GENERATION WIRELESS NE	CELLS INSTRUCTION CONTRACTOR	mon	000	mont on	ootrum	mobility opportu	9
	vork architecture, spectrum sensing, r layer issues, cross – layer design.	spectrum	man	ager	nent, sp	ectrum	mobility, spectru	m
TEXT BOOK			-			16 A. (19)	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	-
1. Joseph	Mitola III,"Software Radio Architectu ring", John Wiley & Sons Ltd. 2004.	ure: Object	-Orie	enteo	d Approa	aches to	Wireless Syste	em
ARTEC	W.Rondeau, Charles W. Bostain, "A HOUSE .2009.		-	1	n Wirele	ss comr	nunication",	
	Fette, "Cognitive Radio Technology				1 1 4			
/dynami	kyildiz, Won – Yeol Lee, Mehmet C. V c spectrum access / cognitive radio w s, May 2006.						generation r Computer	
	S):	1000		R.	1.00			
	aykin, "Cognitive Radio: Brain Empov		less	Con	nmunica	tions", IE	EEE Journal on	
1. Simon H	areas in communications, Feb 2005.							
 Simon H selected Hasari (areas in communications, Feb 2005. elebi, Huseyin Arslan, "Enabling L Elsevier Computer Communications,	_ocation a		Invir	onment	Awaren	ess in Cognitiv	е
2. Hasari (Radios",	elebi, Huseyin Arslan, "Enabling I	Location ai , Jan 2008.						e

	ELECTRONICS AND COMMUN				-	R 2019	Semester-VII	P
Course Code	Course Name	Hour	s / We T	ek P	Credit C	Total Hours	Maximum Ma	arks
19ECX35	SOFT COMPUTING	3	0	0	3	45	100	
Course Object	tive (s): The purpose of learning	this cour	se is t	0				
	tand the concepts of Neural Net							
•= Edify le	earning Networks							
 Know 	about Fuzzy Logic							
 Introdu 	ce Genetic Algorithm							
 Be awa 	are of the applications of Neural I	networks	Fuzzy	and	Genetic	Algorithr	n	
Course Outcon	mes: At the end of this course, le	earners w	vill be a	able	to:		*	
 Apply the second second	he concepts of Neural Network						8 T	
 Design 	a system with Neural Networks							
 Develo 	p a rule based Fuzzy systems							
 Apply C 	Genetic algorithm in problem solv	ving						
 Apply N 	leural Network and Fuzzy Logic	control to	real t	ime	systems			
Unit I NEU	RAL NETWORKS	100						9
Introduction -	Architecture - Back propaga	tion for	Feed	forv	vard Ne	tworks -	Extended ba	ck
propagation for	r recurrent networks – Hybrid Le	arning ru	le : Co	mbir	ning Stee	epest Des	cent and LSE.	
	RNING NETWORKS							9
Supervised Le	earning Neural Networks : Pe	rceptrons	5 – A	dalin	e – Ba	ck propa	aation Multilav	
	InSupervised Learning : Compe							er
Ferceptions, C	noupervised Learning . Compe	titive Lea	rning	Netw	orks - H		-	
3					vorks – I		-	
Networks - Lea	arning Vector Quantization – Hel				vorks – I		-	
Networks – Lea Unit III FUZ	arning Vector Quantization – He ZY LOGIC	bbian Lea	arning.		_	Kohonen	Self – Organisir	ng 9
Networks – Lea Unit III FUZ Fuzzy Sets:	arning Vector Quantization – He ZY LOGIC Introduction – Basic Definit	bbian Lea ions an	arning. d ter	mino	logies	Kohonen – MF I	Self – Organisir Formulation ar	ng 9 nd
Networks – Lea Unit III FUZ Fuzzy Sets: Parameterizatio	arning Vector Quantization – He ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela	ions an tions – F	arning. d ter	mino	logies	Kohonen – MF I	Self – Organisir Formulation ar	ng 9 nd
Networks – Lea Unit III FUZ Fuzzy Sets: Parameterization Sugeno Fuzzy	arning Vector Quantization – He ZY LOGIC Introduction – Basic Definit	ions an tions – F	arning. d ter	mino	logies	Kohonen – MF I	Self – Organisir Formulation ar	ng 9 nd
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGEN	arning Vector Quantization – He ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM	bbian Lea ions an tions – F dels.	d ter	mino reaso	logies oning –	Kohonen – MF I Mamdani	Self – Organisir Formulation ar Fuzzy models	ng 9 nd 9
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGENGenetic algori	arning Vector Quantization – Hel ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b	bbian Lea ions an tions – F dels. packgrour	d terr uzzy i nd -Ge	mino reaso enera	logies oning – al genet	Kohonen – MF I Mamdani ic algorith	Self – Organisir Formulation ar Fuzzy models	ng 9 nd 9 9
Networks – Lea Unit III FUZ Fuzzy Sets: Parameterization Sugeno Fuzzy Unit IV GEN Genetic algori Binary, Octal,	arning Vector Quantization – He ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b Hex, Permutation - Value and t	ions an tions – F dels. packgrour ree - Re	arning. d terr fuzzy r nd –Go produce	mino reaso enera	ologies oning – al genet - Cross	Kohonen – MF I Mamdani ic algorith over – M	Self – Organisin Formulation an Fuzzy models hm – Encoding lutation – Fitnes	ng 9 nd 9 9 -
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGENGenetic algoriBinary, Octal,scaling – Codir	arning Vector Quantization – He ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b Hex, Permutation - Value and t ngs – Multiparameter, mapped ,	ions an tions – F dels. packgrour ree - Re	arning. d terr fuzzy r nd –Go produce	mino reaso enera	ologies oning – al genet - Cross	Kohonen – MF I Mamdani ic algorith over – M	Self – Organisin Formulation an Fuzzy models hm – Encoding lutation – Fitnes	ng 9 nd 9 - ss
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGENGenetic algoriBinary, Octal,scaling – CodirUnit VAPP	arning Vector Quantization – Hel ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b Hex, Permutation - Value and t ngs – Multiparameter, mapped , I LICATIONS	bbian Lea ions an tions – F dels. packgrour ree - Re Fixed poi	d terr uzzy r nd –Go produc nt cod	mino reaso enera ction- ing –	logies oning – al genet - Cross - Discret	Kohonen – MF I Mamdani ic algorith over – M ization – (Self – Organisir Formulation ar Fuzzy models hm – Encoding lutation – Fitnes Constraints.	ng 9 nd 9 - ss 9
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGENGenetic algoriBinary, Octal,scaling – CodirUnit VAPPFuzzy Filtered	arning Vector Quantization – Hel ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b Hex, Permutation - Value and t ngs – Multiparameter, mapped , I LICATIONS Neural Networks: Plasma Spect	bbian Lea ions an tions – F dels. packgrour ree - Re Fixed poi	d terr fuzzy n nd –Ge produc nt cod	mino reaso enera ction- ing – Har	ologies oning – al genet - Cross - Discret	Kohonen – MF I Mamdani ic algorith over – M ization – (Self – Organisin Formulation ar Fuzzy models hm – Encoding lutation – Fitnes Constraints.	ng 9 nd 9 ss 9
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGENGenetic algoriBinary, Octal,scaling – CodirUnit VAPPFuzzy FilteredGenetic Algori	arning Vector Quantization – Hel ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b Hex, Permutation - Value and t ngs – Multiparameter, mapped , I LICATIONS Neural Networks: Plasma Spect thm - Medical Image Registra	bbian Lea ions an tions – F dels. packgrour ree - Re Fixed poi rum Ana ation with	d terr fuzzy n nd –Ge produc nt cod	mino reaso enera ction- ing – Har	ologies oning – al genet - Cross - Discret	Kohonen – MF I Mamdani ic algorith over – M ization – (Self – Organisin Formulation ar Fuzzy models hm – Encoding lutation – Fitnes Constraints.	ng 9 nd 9 ss 9 1-
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGENGenetic algoriBinary, Octal,scaling – CodirUnit VAPPFuzzy FilteredGenetic Algori	arning Vector Quantization – Hel ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b Hex, Permutation - Value and t ngs – Multiparameter, mapped , I LICATIONS Neural Networks: Plasma Spect	bbian Lea ions an tions – F dels. packgrour ree - Re Fixed poi rum Ana ation with	d terr fuzzy n nd –Ge produc nt cod	mino reaso enera ction- ing – Har	ologies oning – al genet - Cross - Discret	Kohonen – MF I Mamdani ic algorith over – M ization – (Self – Organisin Formulation ar Fuzzy models hm – Encoding lutation – Fitnes Constraints.	ng 9 nd 9 ss 9
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGENGenetic algoriBinary, Octal,scaling – CodirUnit VAPPFuzzy FilteredGenetic AlgoriDilemma Problem	arning Vector Quantization – Hel ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b Hex, Permutation - Value and t ngs – Multiparameter, mapped , I LICATIONS Neural Networks: Plasma Spect thm - Medical Image Registra	bbian Lea ions an tions – F dels. packgrour ree - Re Fixed poi rum Ana ation with	d terr fuzzy n nd –Ge produc nt cod	mino reaso enera ction- ing – Har	ologies oning – al genet - Cross - Discret	Kohonen – MF I Mamdani ic algorith over – M ization – (Self – Organisin Formulation ar Fuzzy models hm – Encoding lutation – Fitnes Constraints.	ng 9 nd 9 ss 9
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGENGenetic algoriBinary, Octal,scaling – CodirUnit VAPPFuzzy FilteredGenetic AlgoriDilemma ProbleEXT BOOK(S):	arning Vector Quantization – Hel ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b Hex, Permutation - Value and t ngs – Multiparameter, mapped , I LICATIONS Neural Networks: Plasma Spect thm - Medical Image Registra em - Introduction to Artificial Inte	bbian Lea ions an tions – F dels. packgrour ree - Re Fixed poi rum Ana ation with lligence.	d terr fuzzy i produce nt cod lysis – n Gen	mino reaso enera ction- ing – Har netic	oning – al genet - Cross - Discret nd – Writ Algorith	Kohonen – MF I Mamdani ic algorith over – M ization – (iten Nume ims – Ite	Self – Organisin Formulation an Fuzzy models hm – Encoding lutation – Fitnes Constraints. eral Recognition erated Prisoner	ng 9 nd 9 - ss 9
Networks – LeaUnit IIIFUZFuzzySets:ParameterizationSugeno FuzzyUnit IVGENGenetic algoriBinary, Octal,scaling – CodirJnit VAPPFuzzy FilteredGenetic AlgoriDilemma ProbleEXT BOOK(S):J.S.R.Jang,	arning Vector Quantization – Hel ZY LOGIC Introduction – Basic Definit on – Fuzzy rules – Fuzzy Rela Models – Tsukamoto Fuzzy mod ETIC ALGORITHM thm- Introduction – Biological b Hex, Permutation - Value and t ngs – Multiparameter, mapped , I LICATIONS Neural Networks: Plasma Spect thm - Medical Image Registra	bbian Lea ions an tions – F dels. packgrour ree - Re Fixed poi rum Ana ation with lligence. zy and S	d terr fuzzy i produce nt cod lysis – n Gen	mino reaso enera ction- ing – Har netic	oning – al genet - Cross - Discret nd – Writ Algorith	Kohonen – MF I Mamdani ic algorith over – M ization – (iten Nume ims – Ite	Self – Organisin Formulation an Fuzzy models hm – Encoding lutation – Fitnes Constraints. eral Recognition erated Prisoner	ng 9 nd 9 - ss 9

1.	Timothy J.Ross, Fuzzy Logic with engineering Applications, Wiley India, Third Edition, 2017.
2*	Laurene Fausett, Fundamentals of Neural Networks Architecture, Algorithms and Applications
4.	Pearson Education, 2008.

Ohainnan - B'sa Loobat BCF - agai

Rih Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND ENGINI	EERING			5-11-21 - L.	R 2019	Semester- V	OE
Course Code	0	Hours	SV(910-10-	1	Credit	Total	Maximum	Mark
19ECY01	Course Name VLSI DESIGN	2 L 3	Т 0	P 0	C 3	Hours	100	
	e (s): The purpose of learni		-	-	3	45	100	-
 Learn the des Learn the des Learn arithme Introduce Ves Course Outcome Realize the des 	adamentals of CMOS circuit sign and realization of comb esign and realization of sequ etic building blocks rilog HDL es: At the end of this course igital building blocks using N inational MOS circuits and p	pinational dig uential digital e, learners wi MOS transist	ital c circu II be tor.	able	ts.			
Design and cDesign arithm	onstruct Sequential Circuits netic building blocks and me	and Timing	syste	ems				
STATISTICS IN THE REPORT OF A	plement FPGA design flow		-					-
	DUCTION TO MOS TRANS			12			1.594	9
Bate Layouts, Sti Effects, DC Trans	CMOS logic, Inverter, Pass ck Diagrams, Long-Channe fer characteristics, RC Del lay, Delay in Logic Gate, Sc	el I-V Chart lay Model, E	ers	tics,	C-V Ch	arters tics	, Non ideal	I-V
	INATIONAL MOS LOGIC C							9
Pass Transistor Lo Pitfalls. Power: Dy	Static CMOS, Ratioed Circ ogic, Transmission Gates, E namic Power, Static Power, ENTIAL CIRCUIT DESIGN	Domino, Dua	I Ra	il Do	omino, Cl			
tatic latches and I	Registers, Dynamic latches	and Registe	rs, P	ipeli	ning, Tim	ing Issues	, clock strate	gies
Unit IV DESIG	N OF ARITHMETIC BUILD	ING BLOCK	S					9
adeoffs, Case Stu	ng Blocks: Data Paths, a	Adders, Mul	ltiplie	ers,	Shifters,	ALUs, po	ower and sp	With St
Unit V Verilog		1999 S 1 77						9
ataflow Modeling-	I Design with Verilog HDL- Behavioral Modeling- Des xer and Demultiplexer. Des nter.	ign of Comb	inati	onal	Circuits:	Ripple Ca	arry adder-Ar	ray
1. Neil H.E. We 4th Edition, F	este, David Money Harris CM Pearson , 2017 (UNIT I,II)			on restants				
	ey ,Anantha Chandrakasan Second Edition , Pearson ,	2016.(UNIT	III,IV)			- 19 S 19	
		o Digital Des	signa	anu	Synthesis	S. Feaisor	I FOLCADOL	
3. Samir Palnith Delhi, 2003 (11 11 11	-	-				
3. Samir Palnith Delhi, 2003 (REFERENCE(S): 1. Sung-Mo ka Design,4th e	unit-V) ang, Yusuf leblebici, Chulv dition McGraw Hill Educatio	on,2013.	MOS	3	- N.	grated Cir	cuits:Analysi	s &
 Samir Palnith Delhi, 2003 (REFERENCE(S): Sung-Mo ka Design,4th e R.Jacob Ba 	unit-V) ing, Yusuf leblebici, Chulv	on,2013.	MOS	3	- N.	grated Cir	cuits:Analysi	s &

Ribe Chairman - Bos Dept.of ECE - ESE

Department	ELECTRONICS AND COMMU				I constant	R 2019	Semester-V	OE
Course Code	Course Name		s/We	1	Credit	Total	Maximum I	Mark
course cours		L	Т	P	С	Hours	9	
19ECY02	COMMUNICATION ENGINEERING	3	0	0	3	45	100	a.a.
	tive (s): The purpose of learning		se is to)				
	and analog communication tech	niques.						
Contra and Contra and Contra and Contra	ulse Modulation techniques.							
	and digital communication techn							
and the second second second second	and multiuser Radio communica	ation						
	ommunication Technologies.	1		1.1				
	omes: At the end of this course,		ill be a	ible t	0:			
	nalog communication techniques	5.						
	ulse Modulation techniques							
	gital communication techniques							
	multi-user radio communication							
	and apply Communication Tech	nologies			and the second second		and the second se	
	ALOG COMMUNICATION		-	antes?				9
	o Communication Systems - M							
	dulation - SSB & DSB Techni				equency	and Pha	ise wooulatio	on –
	of Analog Communication Syster DULATION TECHNIQUES	ns (Aivi - r		IVI).				9
and the second se		ulation (DA	NA)	Dulas	Times	Andulatio		-
	unication: Pulse Amplitude Mod							
	ion (PCM) - Comparison of vario bout Data Communication and it			unica	uon Sys	stem (PAI		
	ITAL COMMUNICATION	5 Stanuarus	5.					9
	ift Keying (ASK) – Frequency S	hift Koving	(ECK)	Dh	aco Shif	+ Koving	(DSK) BDS	
Annuaue on								
	drature Amplitude Modulation	$(O\Delta M) = 8$	$\alpha \Delta M$					
QPSK - Qua	drature Amplitude Modulation							icy-
QPSK – Qua Comparison o	f various Digital Communication	System (A						
QPSK – Qua Comparison o Unit IV MUI	f various Digital Communication	ATION	SK –	FSK	– PSK -	- QAM).		9
QPSK – Qua Comparison o Unit IV MUI Global System	f various Digital Communication LTI-USER RADIO COMMUNICA n for Mobile Communications (G	ATION SM) - Cod	SK – e divis	FSK	– PSK - nultiple	– QAM). access (0	CDMA) – Cell	9 ular
QPSK – Qua Comparison o Unit IV MUI Global System Concept and	f various Digital Communication LTI-USER RADIO COMMUNICA n for Mobile Communications (G Frequency Reuse - Channel A	ATION SM) - Cod	SK – e divis	FSK	– PSK - nultiple	– QAM). access (0	CDMA) – Cell	9 ular
QPSK – Qua Comparison o Unit IV MUI Global System Concept and Multiple Acces	f various Digital Communication LTI-USER RADIO COMMUNICA n for Mobile Communications (G Frequency Reuse - Channel A ss Schemes.	ATION SSM) - Cod Assignmen	SK – e divis	FSK	– PSK - nultiple	– QAM). access (0	CDMA) – Cell	9 ular
QPSK – Qua Comparison o Unit IV MUI Global Systen Concept and Multiple Acces Unit V COI	f various Digital Communication LTI-USER RADIO COMMUNICA n for Mobile Communications (G Frequency Reuse - Channel A ss Schemes. MMUNICATION TECHNOLOGI	ATION SSM) - Cod Assignmen	SK – e divis t and	FSK ion r Han	– PSK - nultiple dover T	- QAM). access (0 echnique	CDMA) – Cell es - Overviev	9 ular v of 9
QPSK – Qua Comparison o Unit IV MUI Global System Concept and Multiple Acces Unit V COM	f various Digital Communication LTI-USER RADIO COMMUNICA n for Mobile Communications (G Frequency Reuse - Channel A ss Schemes.	ATION GSM) - Cod Assignmen ES In (3G,4G)	SK – e divis t and – Intr	FSK ion r Han	– PSK - nultiple dover T	– QAM). access ((echnique Optical (CDMA) – Cell s - Overviev Communicatio	9 ular v of 9 on -
QPSK – Qua Comparison of Unit IV MUI Global System Concept and Multiple Access Unit V COI Overview of N Satellite Com	f various Digital Communication LTI-USER RADIO COMMUNICA n for Mobile Communications (G Frequency Reuse - Channel A ss Schemes. MMUNICATION TECHNOLOGII Next Generation Communicatio	ATION GSM) - Cod Assignmen ES In (3G,4G)	SK – e divis t and – Intr	FSK ion r Han	– PSK - nultiple dover T	– QAM). access ((echnique Optical (CDMA) – Cell s - Overviev Communicatio	9 ular v of 9 on -
QPSK – Qua Comparison o Unit IV MUI Global System Concept and Multiple Acces Unit V COM Overview of N Satellite Com Zigbee, Wi-Fi,	f various Digital Communication LTI-USER RADIO COMMUNICA n for Mobile Communications (G Frequency Reuse - Channel A ss Schemes. MMUNICATION TECHNOLOGII Next Generation Communication munication – Bluetooth – Com Wi-Max, Li-Fi – IoT.	ATION GSM) - Cod Assignmen ES In (3G,4G)	SK – e divis t and – Intr	FSK ion r Han	– PSK - nultiple dover T	– QAM). access ((echnique Optical (CDMA) – Cell s - Overviev Communicatio	9 ular v of 9 0n -
QPSK – Qua Comparison o Unit IV MUI Global System Concept and Multiple Acces Unit V COM Overview of N Satellite Com Zigbee, Wi-Fi, EXT BOOK (S	f various Digital Communication LTI-USER RADIO COMMUNICA n for Mobile Communications (G Frequency Reuse - Channel A ss Schemes. MMUNICATION TECHNOLOGII Next Generation Communicatio munication – Bluetooth – Com Wi-Max, Li-Fi – IoT.):	ATION ATION SSM) - Cod Assignmen ES In (3G,4G) Inparison of	SK – e divis t and – Intr Com	FSK Han roduc muni	– PSK - nultiple dover T ction to cation	– QAM). access ((echnique Optical (Fechnolog	CDMA) – Cell s - Overviev Communicatio gies : Blueto	9 ular v of <u>9</u> on - oth,
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Department	ELECTRONICS AND COMMUN					R 2019	Semester-V OE
Course Code	Course Name	Hour	s/W	leek P	Credit C	Total Hours	Maximum Marks
19ECY03	PCB DESIGN	3	0	0	3	45	100
	tive (s): The purpose of learning th			3760	J		100
 Learn abo Introduce t Describe t Introduce 	fundamentals of PCB Designing ut the various components and the he various development tools' ne PCB designing PCB design concepts	_					
Course Outco	mes: At the end of this course, lea	rners will	be at	ole to) :	2.00	and the second
• Follow the	PCB Design concept						
Choose co	mponents dependent on the require	rement					
Apply deve	elopment tools						
 Design PC 							
Contraction of the second s	design concepts in real time.				1.1	and the second	
	ODUCTION TO PCB DESIGNING						9
	nd brief history - PCB - Difference						
and the second s	Layer) - Multi-Layer (Double Laye	and the second state of					
	- PCB Designing Using Graph Pa	The second second					The second states and second states
	duction to Electronic design autor						
	tools - Introduction to SPICE and	PSPICE	Envir	onm	ent - Int	roduction	and working of
PROTEUS	PONENT INTRODUCTION AND		TEC		=0		9
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	hrough Hole Packages - Metal Ele						
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Array(BGA) - I	Plastic Leaded Chip Carrier(PLCC))					
	ODUCTION TO DEVELOPMENT			-			9
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	etlising - Selecting the Component	Carl Carl Carl Carl			Concernent in the second	- Picking	and placing the
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Chairman - BoS Dept.of ECE - ESEC

Track - Track Length - Track Angle - Rack Joints - Track Size, Study of IPC Standards - IPC Standard For Schematic Design - IPC Standard For PCB Designing - IPC Standard For PCB Materials - IPC Standard For Documentation and PCB Fabrication

Unit V DESIGNING CONCEPTS

9

Starting The PCB Designing :Understanding the schematic Entry - Creating Library & Components - Drawing a Schematic - Flat Design / hierarchical Design - Setting up Environment for PCB - Design a Board, Autorouting : Introduction to Autorouting - Setting up Rules - Defining Contraints - Autorouter Setup, PCB Designing Practice : PCB Designing of Basic and Analog Electronic Circuits - PCB Designing of Power Supplies - PCB Designing of Different Sensor modules - PCB Designing of Electronics Projects - PCB Designing of Embedded Projects, Post Designing and PCB Fabrication Process : Printing the Design - Eaching - Drilling - Interconnecting and Packaging electronic Circuits (IPC) Standards - Gerber Generation - Soldering and Desoldering - Component Mounting - PCB and Hardware Testing

REF	ERENCE(S):
1.	Altium Designer Tutorial By Glenn Mercier First Edition, 2009
2.	Printed Circuits Handbook, Seventh Edition by <u>Clyde Coombs</u> <u>Happy Holden</u> Tata Mcgraw hill Publication
3.	Altium Rigid Flex-PCB Design A Guide Books for Designers by Ben Jordan
4.	The Circuit Designer's Companion by Peter Wilson Professor Newnes Publication
5.	Circuit design standard course for Altium Designer by yong yang chen xiao ge by Science Press

Department	ELECTRONICS AND COMMUNI						Semester-	/ 0
Course Code	Course Name	Hours			Credit	Total Hours	Maximum M	/larks
19ECY04	AUTOMOTIVE ELECTRONICS	L 3	T 0	P 0	C 3	45	1(00
Course Object Understar Know abo Learn sen Understar Introduce Course Outcor Apply the Analyze ig Apply sen Design Er	ive (s): The purpose of learning the ad the concepts of Automotive Elec- ut ignition and injection systems sors and actuators for automotive and Engine and Emission control Systems Chassis and Safety Systems nes: At the end of this course, lear concepts of Automotive Electronics phition and injection systems sors and actuators for automotive and gine and Emission control Systems	is cours tronics applicat stems ners wi s applicat	ions II be	to				
	t Safety systems with Chassis ODUCTION							9
Evolution of ele IV, Euro V sta	ectronics in automobiles – Emission ndards – Equivalent Bharat Stand mators – Requirements of starting	lards. C	harg	ing s	systems:	Working	, charging cir	uro
	ION AND INJECTION SYSTEMS	System	- 010			na starter	onound.	9
combustion – E injection – Dies Unit III SEN Working princi Hall effect, Thr	ss ignition - Direct ignition - S Engine fuelling and exhaust emissi- sel fuel injection. SORS AND ACTUATORS ole and characteristics of sensors ottle angle, Temperature, Exhaust n actuators, Stepper motor actuato	ons – E : Airflov gas ox	lectr v rat	onic e, Ei sens	control o ngine cra sor. Stud	f carbure inkshaft i y of fuel i	tion – Petrol f angular positi	fuel 9 on,
	INE AND EMISSION CONTROL S						1 Sec. 1	9
control subsys	orks: CAN, LIN, FLEXRAY, MOST tems – Ignition control methodo R – SCR – DeNox Trap. Diagnosti	logies	– E	ngine	manag	ement s	ystem. Catal	
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of automatic to suspension sys	mission control. Traction control sy ansmission - Antilock braking sy tem – Working of airbag and role or locking system – Climate control	stem - of MEN	Ele 1S in	ctron	ic Stabili	ty Progra	am – Electro	nic
Publishers, Ribbens,	ton, Automobile Electrical and E s, London, 2018. William B. Understanding Aut n, Burlington, 2013.						and an an an an an	
REFERENCE(S 1. C.A. Sch								mar

R.Ic Chairman - BoS

	ELECTRONICS AND COMMUN						Semester-VI	0
Course Code	Course Name	Hour	-	eek P	Credit	Total Hours	Maximum Ma	rks
19ECY05	ELECTRONIC MATERIALS	L 3	T 0	P 0	C 3	45	100	
 Understa Study c Learn se Understa Study at 	tive (s): The purpose of learning the and the concept of atomic structure onducting materials emiconductor and magnetic materia and the dielectric and insulating ma out Optoelectronic and nano Elect mes: At the end of this course, lea	es and b als aterials ronic M	oondii ateria	ng als				
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	mic structures and bonding, ty	000 0	f ho	ndina	band	formatio	n Defects an	
mperfections Classification o	in solids: Point, Line and Planer f materials based on bonding: cond	defec	ts; Ir	nterfa	cial defe	cts and	volume defects	3.
	NDUCTING MATERIALS				-			9
and its applications. S	perature dependence of resistivity, tions, high resistivity materials (m uperconductors: Meissner effect, cl	anganii	n, co	nstan	tin, nichr	ome, tur		
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PCG,EOG, lea	d systems and recording metho	ods-typic	al way	efor	m and signa	al charact	teristics.	
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	David Prutchi and Michael Norris, Design and Development of Medical Electronic
2.	Instrumentation: A Practical perspective of the design construction and test of Medical Device,
	2005.
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REFERENCE(S):

1.	RS Khandpur, Hand book of Bio medical Instrumentation, Tata McGraw-Hill, 2005.
	Joseph J. Carr and John M. Brown, Introduction to Bio medical equipment Technology, John Wiley, 2004.

Chairman - BoS Dept.of ECE - ESEC

	LECTRONICS AND COMM					R 2019	Semester-VI	OE
Course Code	Course Name		rs / W	1	Credit	Total	Maximum M	ark
		L	Т	P	С	Hours		
19ECY07	SENSORS FOR ENGINEERING APPLICATIONS	3	0	0	3	45	100	
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	onic sensors dependent on CTRO-PHYSIOLOGY AND			IAL R	ECORDIN	G		9
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photodiodes, p	ure, light flux, photo sensor hototransistors, photovolta sducers liquid crystal device	ic devic						
	AND TEMPERATURE				3		200 C 200 C	9
	, Bourdon temperature C thermistors, bolometer, P				ples, Re	sistance	thermometers	5,
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Course		-		GINEE	1	R 2019	Semester-VI C
		Ho			Credit		Maximum Marl
Code	Course Name	L	Т	Р	С	Hours	
19ECY08	PRINCIPLES OF DIGITAL IMAGE PROCESSING	3	0	0	3	45	100
 Learn Familia Learn Study Unders 	ective (s): The purpose of learning this of about the basic concepts of Digital Imag arize with the Image Enhancement Tech about Image restoration and multiresolu Image segmentation and feature Extract stand applications of Image Processing.	ge P nniqu tion tion	roces ies. analy	sing ysis			
 Implem Apply I Extract Apply I Design 	comes: At the end of this course, learned nent basic Image Processing Operations mage Enhancement Techniques. It features from Images with wavelet Train mage segmentation and feature Extract and develop a real time system with in	s. nsfo tion nage	rms a e proc	and ima	ge resto		
PERSONAL PROPERTY AND ADDRESS OF ADDRES	INDAMENTALS OF IMAGE PROCESS	Contraction and the second			-		
maging Syst undamental	Applications of Image Processing – S em – Sampling and Quantization – F s and Models – File Formats, Image Op	Pixel	Con	image inectivit	process y – Dis	sing App stance M	easures - Colou
	IAGE ENHANCEMENT						
Spatial and F	forms: Fast Fourier Transform and Dis requency Domain – Grey level Transfor ad Sharpening – Filtering in Frequency D	mati	ons–				
Unit III 🛛 IM	AGE RESTORATION AND MULTI-RE	SOL	UTIC	ON ANA	LYSIS	inter the	9
Multi Resoluti	on Analysis: Image Pyramids – Multi R mage Degradation Model–Noise Mo						
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estoration Al							ş
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Course Code	Course Name		lour Wee	k	Credit	Total Hours	Maximum M	arks
Code		L	Т	P	С	Tiours		191
19ECY09	DISCRETE TIME SIGNAL PROCESSING	3	0	0	3	45	100	
Under Learn Learn	Jective (s): the classification of signals and syst stand the analysis of Discrete time S IIR Filter Design FIR Filter Design stand finite word length effects							
 Analyz Analyz Desigr Desigr Analyz Unit I SIC 	toomes: At the end of this course, the different types of signals and syste the Discrete Time Signal in a digital IIR filter from analog filter u in a digital FIR filter with different wind the the finite word length effects in rea SNALS AND SYSTEMS and discrete time signals - Classifica	ems Ising Iowir I tim	suit ng te e sig	able echni gnal j	transforma ques. processing	ation techr applicatio	ons	9 riodi
Even and Oc and Sinusoid	Id - Energy and Power signals - Dete al signals - Periodicity - Analysis of L ALYSIS OF DISCRETE TIME SIGN	ermir _inea	nistio ar tim	and	Random s	signals –	Complex expon	
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Course		Ho	ours	/ Week			Maximum	n Marks
Code	Course Name	L	Т	Р	С	Hours		
19ECY10	Information and Coding Theory	3	0	0	3	45	100	D
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ntroduction – Entropy, Info Channel, Cha Jnit II So Gource Codir oding, Shan Jnit III CI Channel cap ikelihood (M ecoding algo Jnit IV Con /iterbi decod	Formation Theory - Discrete messages and Information co- prmation Rate, Mutual Information, Di- annel Capacity, Rate Distortion Theory, purce coding ng to increase average information per non fano coding, Dictionary techniques, nannel Coding acity, Block codes, linear block code IL) detection, syndrome decoding, BCH prithm and Network coding, Tradeoff ber nvolution Codes ling, state diagrams, Trellis diagram	iscre Loss er bit LZ7 s, H H and twee	te n y Sc . En 7 an amn d RS n po	mount or nemory burce Co tropy co d LZW t ning we S codes, wer and	f Informa less cl oding, H oding, H cechniqu ight, Ha , Reed-I l bandwi	ation, Av hannel, I luffman les. amming Muller co idth.	erage Inforr Binary Sym coding, Arit bound, Ma odes, soft-de	9 mation metric 9 hmetic 9 ximum ecision
htroduction – Intropy, Info Channel, Cha Jnit II So Source Codir oding, Shan Jnit III CI Channel cap ikelihood (M ecoding algo Jnit IV Con Viterbi decoor roduct code	Formation Theory - Discrete messages and Information co- prmation Rate, Mutual Information, Di- prime Capacity, Rate Distortion Theory, purce coding ng to increase average information per non fano coding, Dictionary techniques, nannel Coding acity, Block codes, linear block code IL) detection, syndrome decoding, BCH prithm and Network coding, Tradeoff ber nvolution Codes	iscre Loss er bit LZ7 s, H H and twee	te n y Sc . En 7 an amn d RS n po	mount or nemory burce Co tropy co d LZW t ning we S codes, wer and	f Informa less cl oding, H oding, H cechniqu ight, Ha , Reed-I l bandwi	ation, Av hannel, I luffman les. amming Muller co idth.	erage Inforr Binary Sym coding, Arit bound, Ma odes, soft-de	9 mation metric 9 hmetic 9 ximum ecision

TEXT BOOK(S):

T. M. Cover and J. A. Thomas, Elements of Information Theory, John Wiley. 1.

2. S. Lin, D. J. Costello, Error Control Coding, Pearson Education.

REFERENCE(S):

1. T. K. Moon, Error Correction Coding: Mathematical Methods and Algorithms, John Wiley 2. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann.

R.L. Chairman - BoS Dept.of ECE - ESEC

ONE CREDIT COURSE

Department	ELECTRONICS AND COMMUNICAT	ERING	R 2019	Semester	-			
Course Code	Course Name	Hours / Week		Credit	Total	Maximum	0.0.0	
	SIMULATION TECHNOLOGIES FOR	L	T	Ρ	С	Hours	Marks	
19ECZ01		1	0	0	1	15	100	

Course Objective (s): The student will be tested for his understanding of the basic principles of the core engineering subjects.

To simulate the real time communication networks

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Simulate the real time communication networks

INTRODUCTION: Communication Network Modeling –simulation technologies, strategies and toolslanguages-monte-carlo-– Queueing Models –Comparisons – Flexibility

SIMULATION & MODELING: Propagation Models – OSI Layer Modeling – Physical & MAC Layers – Higher Layer Protocols – Data Visualization and Interpretations – Simulation Parameters and Techniques – Protocols – Network Planning and Design – Model Output Analysis – Real Time Network Traffic Modeling

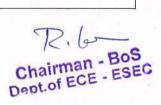
HANDS-ON TRAINING: Modeling and Simulation of Communication Networks: Construction, Parameter Settings, Analysis, Result Interpretation, Failure Analysis-Simulation using OPNET Riverbed Modeler 17.5 & QUALNET.

REFERENCE(S):

1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
1	Mohammad S. Obaidat, Faouzi Zarai, Petros Nicopolitidis, Modeling and Simulation of Computer Networks and Systems: Methodologies and Applicationsll, Morgan Kaufmann, 2015
2	Al-Sakib Khan Pathan, Muhammad Mostafa Monowar, Shafiullah Khan, Simulation Technologies in Networking and Communications: Selecting the Best Tool for the Testll, CRC Press, 2014
3	Klaus Wehrle, Mesut Günes, James Gross, —Modeling and Tools for Network SimulationII, Springer, 2010
4	Jack L. Burbank, An Introduction to Network Modeling and Simulation for the Practicing Engineer, Wiley-IEEE Press, 2011

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Department	ELECTRONICS AND COMMUN	CATION	ENC	GINE	ERING	R 2019	Semester
Course Code	Course Name	Hours	s /We	eek	Credit	Total	Maximum
19ECZ02	HANDS ON COURSE IN	L	Т	Ρ	С	Hours	Marks
	EMBEDDED SYSTEMS	1	0	0	1	15	100
	ve (s): The student will be tested f				ng of the	basic prin	ciples of the co
	jects. To train the hands on in emb				10000		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
	nes: At the end of this course, learn				10000		
	, prepare and present technologica		omer	its			
	he hands on in embedded systems	3	1.1				and the second
INTRODUCTIO		Disala		_		an Islandifia	ation of main
	temsintroductionOutline view-						
	-actuators-controlling unit-Power su						
	controller vs Microprocessor-defin						
	ntage and Disadvantage. Introd	iuction t	0 G	PIU	, ADC,	Counter,	nmer, Sena
INPUT/ OUTPL							
	n GPIO- Explanation-framing code	Soquene	o inr			trol	
	D blinking control (output)	oequenc	e-inp	ui o	uipui coi		
	D Blinking pattern Development (or	(tout)					
	but Controlled LED Blinking	acputy				6.12	
	TAL DATA PROCESING						
	ital- Definition -Difference -Applic	ation-Me	chan	ism	of ADC-	Reaisters-	identification -
	ding sequence of ADC)	J	i i i i i i i i i i i i i i i i i i i
	plementing ADC through POT						
Hands on 5: PC	T controlled LED Blinking pattern I	Developm	nent				
ACTUATOR CO	ONTROL						
	ose- types of actuator -method of e		-pro	s an	d cons c	f various a	actuators- need
	need for driver -mechanism behind						
	motor control through Micro contro	oller					
	tion Development with Motor						
	T controlled Motion Development						
SERIAL COMM			~				
	cation -Introduction -Working Me	cnanism-	- Col	ncep	t of Intel	rrupt- Nee	a for Interrupt-
	of sending – Coding Sequence	mmunico	tion				
	D blinking control through serial cor ontrolling through keyboard	ninunica	uon				
SENSOR INTER							
ह्यु संचयन व स्वतः अन्त्रभू हर्न्य । वतः व – वृत्यत्वन व	tion –classification – analog and dig	nital sens	ors-i	nterf	acing wit	h microco	ntroller
	terfacing Ultrasonic sensor with mid			ncon	aoing mi		
	ontrolling through keyboard	orecontro	nor.				
CD DISPLAY							
_CD display- wo	orking Mechanism-types of display-	connectio	on P	roce	dure- Co	ding seque	ence Hands or
	ames on the LCD Display						
Hands on 14: vie	ewing and monitoring various parar	neter like	e tem	pera	iture.		
EFERENCE(S)				1			- 17 D
Programmin	g Embedded Systems: With C an	d GNU E	Deve	lopm	ent Tool	s, 2nd Ed	ition, by Michae
	thony Massa.					anna a' na chaona a' chanlaigh.	
	mbedded Hardware, 2nd Edition (li	nk is exte	rnal	by	John Ca	tsoulis	
	rduino Michael McRoberts	IN IS CAL	and a	, <i>by</i>	John Oa		the state of the
<u> </u>							
4 Arduino Coo	kbook by Michael Margolis						
	ed with Arduino Massimo Banzi						



Department	ELECTRONICS AND COMMUNI	ECTRONICS AND COMMUNICATION ENGINEERIN						
Course Code	Course Name	Hours /Week Credit		Total	Maximu	um		
19ECZ03	INTERNET OF THINGS (IoT)	L	Τ	Ρ	С	Hours	Marks	
	USING CC3200	1	0	0	1	15	100	

• To gain the knowledge on IoT using CC3200

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Gain the knowledge on IoT using CC3200

OVERVIEW

Introduction to Internet of Things (IoT). Review of CC3200 core and its architecture, Introduction to advanced ARM Cortex M4 architecture, Peripherals overview, User API, Power challenges with IoT, CC3200 Simplelink applications, Starting with Code Composer Studio V6.

SIMPLELINK WI-FI CPU

Introduction to CC3200 Simplelink Wi-Fi MCU, hardware Functional Block Diagram, Embedded Software Overview, TI-RTOS support for CC3200 Simplelink, TI-RTOS configuration for CC3200 Simplelink, Simplelink Wi-Fi certification, Power Modes.

WLAN CONNECTION

Introduction to WLAN, WLAN parameters, AP/STATION modes and its Security types, Socket connection, Typical commends and event flow, WLAN AP and WLAN STATION configuration settings.

SOFTWARES

Introduction to Pin-Mux Tool, Configuration with Pin-Mux Tools, Introduction to Uniflash, Debugging with Uniflash Tools, HTML page Download.

HANDS-ON WITH CC3200

Brief introduction to CC3200 Peripherals, OUT OF BOX demo, Home and Industrial automation and control, Creating project0, programming with ADC, Programming with GPIO, enabling interrupt, Introduction to serial interface, Overview of sensor interface with CC3200, TI RTOS configuration in CCS workspace, Client severer model basics, Simple Email application, Emailing an sensor (ADC) value.

REFER	ENCE(S):
1	Jonathan W Valvano, Introduction to ARM(r) Cortex -M Microcontrollers, 2012.
2	Andrew Sloss, Dominic Symes, Chris Wright, ARM System Developer's Guide, 2004.
3	Datasheet, Technical Documents and Application Notes http://www.ti.com/product/CC3200

Department	ELECTRONICS AND COMMUNICATI	LECTRONICS AND COMMUNICATION ENGINEERING						-		
Course Code	Course Name	Hours / Week				Credit		Total Hours	Maximum	
	ADVANCED MOTOR CONTROL	L	Т	Ρ	С	Hours	Marks			
19ECZ04	APPLICATION USING 32 BIT REAL TIME CONTROLLERS	1	0	0	1	15	100	1		

• To study the advanced motor control application using 32 bit real time controllers

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Study the advanced motor control application using 32 bit real time controllers

OVERVIEW

Over view of INSTASPIN, Advantages of using INTASPIN, Architecture of INSTASPIN, Introduction to MotorWare, Types of MotorWare, Advantages of using MotorWare, Implementation of INSTASPIN in Microcontrollers, overview of INSTASPIN based microcontrollers

BLDC MOTOR

Introduction to Motors, Various Types of Motors, Introduction to BLDC Motors, Commutation of BLDC motors, Sensor less BLDC Motors, Control of BLDC motors.

MOTOR CONTROL DRIVER

Introduction to motor drivers, Types of Motor Drivers, Advantages of using Motor Drivers, Implementation of Motor Drives, Design consideration for motor drivers usage of Digital Signal Controllers in motor control.

REAL TIME IMPLEMENTATION

Design Consideration for implementing Motor Control Application, Hardware Flow, Software Flow, and Implementation of INSTASPIN in software, Coding Standards, Real time control of BLDC Motors.

REFERENCE(S):

REFE	(ENCE(5).
1	Hamid Toliyat and Steven Campbell, DSP BASED ELECTROMECHANICAL MOTION CONTROL, CRC Press.
2	Sen M. Kuo and Woon-Seng Gan , DIGITAL SIGNAL PROCESSORS - ARCHITECTURES, IMPLEMENTATIONS, AND APPLICATIONS, Prentice Hall.
3	Chang-liang Xia, Permanent Magnet Brushless DC Motor Drives and Controls, WILEY Publications.
4	C2000 Teaching ROM CD.
5	Datasheet, Technical Documents and Application Notes: http://www.ti.com/product/tms320f28335.
6	User Guide and Software Codes: http://www.ti.com/tool/tmdsprex28335
7	Code Composer Studio v6:
.8	http://processors.wiki.ti.com/index.php/Category:Code_Composer_Studio_v6

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Department	ELECTRONICS AND COMMUNICATIO	ELECTRONICS AND COMMUNICATION ENGINEERING				R 2019	Semester	Т	
Course Code	Course Name	0.554	Week		Credit		Total Hours	Maximum Marks	
	ADVANCE SYSTEM DESIGN USING	L	Т	Ρ	С	nours	Marks	1	
19ECZ05	16BIT ULTRA LOW POWER MICROCONTROLLERS	1	0	0	1	15	100		

• To design the advance systems using 16bit ultra low power microcontrollers

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Design the advance systems using 16bit ultra low power microcontrollers

OVERVIEW

Review of 16Bit Ultra Low Power Microcontrollers, Introduction to Advanced architecture of 16Bit Ultra Low Power Microcontrollers, clock module configuration, various frequency settings, Introduction to IDE, compiler and linker file configuration, interfacing the IDE and HW development board.

DISPLAY INTERFACE

Types of LCD Display, Advantages of LCD Display, and Introduction to Dot matrix display, Character Formation, Pixel density, Implementation for 102x64 dot-matrixes LCD Interface.

SENSOR

Introduction to sensors, Types of Sensors, Need for Integration of sensors, Analog Front end Introduction, Introduction to Temperature Sensor, Implementation of Temperature Sensors, Introduction to Capacitive Touch Sense, Advantages of using capacitive touch sensors. Interfacing with 16Bit Ultra Low Power Microcontrollers.

MEMORY

Introduction to memory, various types of memory, Introduction to SD Card, Advantages of using SD card, Types of SD Cards, Interfacing SD Card with 16bit ultra low power controller

SERIAL INTERFACE

Types of Serial Interface, Advantages of using serial interface, Comparisons between various serial communication standards, Introduction to USB, Types of USB Interfacing Standards, Modes of Interfacing.

<i>REFEL</i>	RENCE(S):					the standard
1			ontroller Basics, 201		addition to a block	
2	Chris Nagy, En	nbedded Systems	Design Using the TI	MSP430 Se	eries, 2013.	
3	MSP430 Teach	n ROM CD.			difference and the second second	and the second
4	Datasheet, http://www.ti.co	Technical pm/product/msp43	Documents 0F5529.	and	Application	Notes

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING					R 2019	Semester	-						
Course Code	Course Name	Hours / Week								Week t Total		Total Hours	Maximum Marks	
	ADVANCED ANALOG SYSTEM	< L;	T	Ρ	С	Hours	Warks							
19ECZ06	DESIGN	1	0	0	1	1 5	100							

• To study the advanced analog system design

Course Outcomes: At the end of this course, learners will be able to:

- · Review, prepare and present technological developments
- Study the advanced analog system design

AUTOMATIC VOLUME CONTROL (AVC):

Introduction -Circuit and Description-Need for AVC-Applications-Benefits.

DC-DC CONVERTER

Introduction-conversion methods- Circuit and Description-Applications.

LOW DROPOUT REGULATOR (LDO):

Brief theory and description-Need for LDO- Comparison-Specifications-Applications- Introduction to webench.

LAB EXPERIMENTS

DESIGN OF AUTOMATIC VOLUME CONTROL

Obtain transfer characteristics

DESIGN OF DC-DC CONVERTERS

Simulation

Obtain time response Obtain transfer function

Implementation

Obtain time response using hardware Obtain transfer function using hardware

DESIGN OF LOW DROPOUT REGULATOR

Simulation

Obtain output characteristics Transfer characteristics Measure rippled rejection Design of LDO using webench

Implementation

Obtain output characteristics using hardware Transfer characteristics Measure rippled rejection

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Department	ELECTRONICS AND COMMUNICATIO	ERING	R 2019	Semester	-										
Course Code	Course Name		Hours / Week		Cro		Crodit		Cra				Total Hours	Maximu	m
V . Ster	HANDS ON COURSE IN PCB	L	T	Ρ	С	Hours	Marks								
19ECZ07	DESIGNING USING PROTEL (ALTIUM DESIGNER), PADS TOOL	1	0	0	1	15	100								

• To train the hands on in PCB designing using protel (Altium Designer), PADS tool

Course Outcomes: At the end of this course, learners will be able to:

• Review, prepare and present technological developments

• Train the hands on in PCB designing using protel (Altium Designer), PADS tool

1. Introduction

- 2. PCB Design Flow
- 3. Understanding the Make-Up of a PCB Design
 - Board Outline
 - Creating Copper Routes
 - Drilling Holes
 - Components on a PCB Design
 - Gerber Files

High speed, multi-layer digital PCB designs, Low-level analog PCB designs, Printed antenna designs, Complete assembly drawings, In-Circuit Test data generation, Pick and place data generation, Drill, panel, and cutout drawings, Professional fabrication documents, Autorouting for dense PCB designs

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING				R 2019	Semester	-		
Course Code	Course Name	1935	Hours / Week		Credit		Total	Maximum	
19ECZ08	FOUNDATION COURSE IN	L	Τ	Ρ	С	Hours	Marks		
	COMMUNITY RADIO TECHNOLOGY	1	0	0	1	15	100		

To gain the knowledge on foundation course in community radio technology

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Gain the knowledge on foundation course in community radio technology

INTRODUCTION TO COMMUNITY RADIO

Evolution of Community Radio (CR) in India- principles behind setting up of CR- policy guidelines and their impact on technology and content of a CR station- fundamental principles behind deciding the technology for a CR station.

STUDIO TECHNOLOGY

Properties and components of sound-difference between analogue and digital audio-hardware required for field recording and setting up a studio-fundamental principles for setting up an audio studio.

AUDIO PRODUCTION

Concept of recording and storing audio-hardware related to audio recording-open source software solutions for audio production- telephony interfaces for radio- audio Post Production.

STUDIO OPERATIONS

Wiring, fixing of connectors, soldering and use of tools and equipment- preventive and corrective maintenance of studio and equipment.

RADIO TRANSMISSION TECHNOLOGY

Components of the FM transmission chain- FM transmitter-different types of FM antenna - coaxial cable propagation and coverage of RF signals-FM transmitter setup

REFERENCE(S):

1	UNESCO (2001). Community Radio Handbook.
2	Vinod Pavarala, Kanchan K Malik, "Other Voices: The Struggle for Community Radio in India", SAGE Publications India, 2007.
3	Steve Buckley, Mark Raboy, Toby Mendel, Kreszentia Duer, Monroe E. Price, Seán Ó Siochrú, "Broadcasting, Voice, and Accountability: A Public Interest Approach to Policy, Law, and Regulation", University of Michigan Press, 2008.

R. lo Chairman - BoS Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNICATION ENGINEERING		R 2019	Semester	-			
Course Code	Course Name		lour Wee		Credit	Total Hours	Maximum	
19ECZ09	LTE AND THE EVOLUTION TO 4G	L	Т	Ρ	С	Hours	Marks	
	WIRELESS COMMUNICATIONS		0	0	1	15	100	

• To gain the knowledge on LTE and the evolution to 4G wireless communications

Course Outcomes: At the end of this course, learners will be able to:

• Review, prepare and present technological developments

• Gain the knowledge on LTE and the evolution to 4G wireless communications

LTE: Motivation to LTE.- Evolution of Architecture –3GPP with Non-3GPP Architecture- EPC - eNB, HeNB and Relay Nodes -LTE-Advanced LTE Protocol Stacks Summary- Protocol architecture - S1 and X2 Interface, Other interfaces- Security Architecture -MBMS Architecture -CS FallBack, SRVCC, VoLTE –Advantages of LTE.

PHYSICAL LAYER: Uplink Physical Layer Design - Downlink physical layer design

CONTROL PLANE AND USER PLANE PROTOCOLS: MAC architecture- DL-SCH data transfer-HARQ operation- Multiplexing and assembly- Scheduling Request - RLC architecture - PDCP architecture. Radio Resource Controller – PLMN and cell selection, Paging.

CALL PROCESSING PROCEDURES: Idle Mode Processing - Cell Reselection- Paging- RRC Connection and Release- SON- Handover - Intra RAT and Inter-RAT

REFERENCE(S):

33 - ECE - SS

1 Stefania Sesia, Issam Toufik and Matthew Baker, LTE – The UMTS Long Term Evolution: From Theory to Practicell, Second Edition, John Wiley & Sons,2011.

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING				R 2019	Semester	-	
Course Code	Course Name	1999	lour Wee		Credit	Total	rotal Maximun ours Marks	
19ECZ10	MILLIMETER WAVE	L	Т	Ρ	C	Hours	Marks	
	COMMUNICATION NETWORKS		0	0	1	15	100	

To gain the knowledge on millimeter wave communication networks

Course Outcomes: At the end of this course, learners will be able to:

· Review, prepare and present technological developments

Gain the knowledge on millimeter wave communication networks

INTRODUCTION TO MULTI-GIGABIT: 60-Ghz Millimeter wave radios-Millimeter wave characteristics-Channel performance at 60GHz, Gigabit wireless communication, Standards-Wi -Gig, IEEE 802.11ad, IEEE 802.15.3c, WirelessHD, ECMA-387/ISO/IEC 13156-Millimeter wave applications.

MILLIMETER WAVE ANTENNAS: Path loss and antenna directivity-Antenna beamwidth-Maximum possible gain to Q-Polarization, Beam steering antenna-Millimetre wave design consideration

MILLIMETER WAVE TRANSCEIVERS: Millimeter wave link budget-Transceiver architecture-Receiver without local oscillator, Millimeter wave calibration

MILLIMETER WAVE MIMO: Spatial diversity of antenna arrays-Multiple antennas, Multiple transceivers-Noise coupling in MIMO system.

	Kao-Cheng Huang, Zhaocheng Wang, Millimeter wave communication systems, John Wiley 8
1	Sons, Hoboken, New Jersey, 2011.
2	Jonathan Wells, Multi-Gigabit Microwave and Millimeter-Wave Wireless Communications, Artech House, 2010.
3 °	Su-Khiong Yong, Pengfei Xia and Alberto Valdes-Garcia, 60GHz Technology for Gbps WLAN and WPAN: From Theory to Practicell, Wiley 2010.

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING		R 2019	Semester	-			
Course Code	Course Name		lour Wee		Credit	Total Hours	Maximur Marks	
19ECZ11	FIBER OPTIC CABLE INSTALLATION	L	Т	Ρ	С	Hours	Warks	
	AND OTDR TESTING		0	0	1	15	100	

To learn the fiber optic cable installation and OTDR testing

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Learn the fiber optic cable installation and OTDR testing

FIBER CABLE CHARACTERISTICS:

Structure-OFC Components-Strength Member-Outer and Inner Jacket-Loose Tube- Tight Buffer ADSS- Ariel-Cable-Direct- Burried Cable-Indoor-Outdoor-Cable-Types - Cable marking and packaging requirements

OPTICAL FIBER CABLE LAYING PROCEDURE:

Polyvinyl chloride/ High Density Polyethylene- type of pipes; Horizontal Directional Drilling (HDD), Route Index Diagram; Brick Chamber Type Hand Hole; Technical Specifications. Duct Laying; High Density Poly Ethylene (HDPE) telecom ducts- 140-40-15-Manhole Design Aspects;190-130-30-RCC-manhole.

FIBER TESTING:

Optical Time Domain Reflectometer -OTDR-light Source- power meter- Fiber continuity-Attenuation-Fiber length- preparation of a mechanical splice – evaluation of spice joints by EIA/TIA 568B3 standard using an OTDR - Thermo shrinking.

REFE	RENCE(S):
1.	Palais J.C, "Fiber optic Communications" Fifth Edition, Pearson Education, 2011
2.	Gerd Keiser, "Optical Fiber Communication", 4th Edition, Tata McGraw Hill, 2010.

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Department	ELECTRONICS AND COMMUNICATION ENGINEERING				R 2019	Semester	-	
Course Code	Course Name		lour Wee		Credit	Total	Maximun Marks	m
19ECZ12	RTOS AND ITS APPLICATIONS	L	Τ	Ρ	С	Hours	IVIARKS	
		1	0	0	1	15	100	

To gain the knowledge on RTOS and its applications

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Gain the knowledge on RTOS and its applications

INTRODUCTION: Real Time System Concepts. Comparison between conventional OS and RTOS. Introduction to MQX RTOS. When to use which OS, RTOS, RTS and Standalone, Different Modules of RTOS. Process management details.

RTOS Lab#1: Code Warrior of Free-scale, Hardware board environment, BSP, PSP, Application differentiations, host machine setups, project configurations for RTOS. Task creations. Priority settings, working with different scheduler algorithms. To understand different states of a job.

INTER PROCESS COMMUNICATION BASICS: Semaphores, Messages.

RTOS Lab#2: IPC Basics hands on sessions

INTER PROCESS COMMUNICATION ADVANCED: Priority inversion, Priority inheritance, Dead Lock, Mail box, Events, Mutex

RTOS Lab#3: Priority Inversion, Priority inheritance, Dead lock

DEVICE DRIVERS: Device Driver basics, MQX Device Drivers, MQX Device Driver Application Programming,

(ELEI	RENCE(S):	
1	Operating Systems By Silberschatz, Galvin, Gagne	
2	Micro C/OS-II The Real-Time Kernel, By Jean J. Labrosse	1 1 1 1 ² "
3	Freescale MQX RTOS Manual.	

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Department	ELECTRONICS AND COMMUNI	ICATION ENGINEERING				R 2019	Semester	-
Course Code	Course Name		lour Wee		Credit	Total	Maximum	
19ECZ13	TELEMATICS	L	Т	Ρ	C	Hours	Marks	
	TELEMATICS	1	0	0	1	15	100	

To impart the knowledge telematics

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Impart the knowledge telematics

INTRODUCTION: Introduction to 16Bit Ultra Low Power Microcontroller - CPU Architecture, Basic Block Diagram, Clock Module Overview, clock module configuration, various frequency settings, Introduction to IDE, compiler and linker file configuration, Interfacing the IDE and HW development board.

PERIPHERALS INTERFACING: Introduction to digital peripherals - Introduction to Input / Output Ports - Configuration of Digital ports as Input and Output - Introduction to Low Power Modes - Various Low power mode of operations and settings.

Communication Peripherals – Universal Asynchronous Serial Transmission (UART) – Baud rate – Register Configuration – Transmission and Reception of Data between MCU and PC

TELEMATICS APPLICATIONS: Overview of Global System for Mobile Communication – Operation – Introduction to AT commands – Send Message using Serial Terminal. Overview of Global Positioning System – Introduction to NMEA Protocol – GPS Co-Ordinates – Monitoring GPS Data over Serial Terminal

INTERFACING GSM WITH LOW POWER MCU: MCU – Configuration of UART - Hardware Interfacing of GSM with MCU –Send Message using AT commands

INTERFACING GPS WITH LOW POWER MCU: MCU – Configuration of UART – Hardware Interfacing of GPS with MCU – GPS Position Fix with Indication in LED. Send Alert SMS with observed GPS Position Change.

REFE	RENCE(S):
1	John H. Davies, MSP430 Microcontroller Basics, Newnes Publication, 2010.
2	Chris Nagy, Embedded Systems Design Using the TI MSP430 Seriesll, 2013, MSP430 Teaching ROM CD.
3	Sim900 AT COMMANDS, SIMCOM Ltd.
4	Klaus Betke, The NMEA 0183 Protocolli, May 2000.

Department	ELECTRONICS AND COMMUNICATION ENGINEERING				R 2019	Semester	-				
Course Code	Course Name	Section.	Hours / Week		Cre		Credit		Total		Maximum
19ECZ14	ADVANCED VERIFICATION	L	Т	Ρ	С	Hours	Marks				
	METHODOLOGIES		0	0	1	15	100				

• To gain the knowledge on advance verification methodologies

Course Outcomes: At the end of this course, learners will be able to:

Review, prepare and present technological developments

Gain the knowledge on advance verification methodologies

SYSTEM VERILOG FOR VERIFICATION: Data types – Function and task - Basic OOP – Class Methods – Handling objects – Public and local variables.

SYSTEM LEVEL VERIFICATION ENVIROMENT AND COMPONENTS: Basic component in Verification -- Driver -- Stimulus generator -- Monitor -- Scoreboard -- Checker -- Creating test bench.

STIMULUS – **COVERAGE AND ASSERTIONS:** Generating different type of stimulus – Constrained Random Stimulus generation – Directed stimulus Generation – Coverage Driven Simulation – Assertion based Simulation.

INTRODUCTION TO OVM: Introduction to OVM - OVM class and its hierarchy – OVM test bench and environment – Basics of Transaction-Level Modeling (TLM) – OVM components – Developing Reusable OVM Components

CASE STUDY: Sample architecture – Creating verification environment – Creating the test plan – Creating test case – Reusable - Transaction Level Models - Managing Simulations - Regression.

REFE	RENCE(S):
1	Janick Bergeron, Writing Test Benches Using System Verilog, Springer, 2009.
2	Mark Glasser, "Open Verification Methodology Cookbook", Springer, 2009.
3	Chris Spear and Greg Tumbush, "System Verilog for Verification - A Guide to Learning the Test bench Language Features" Springer, 2012.
4	OVM System Verilog User Guidell, Cadence Design Systems and Mentor Graphics, Version 2.0.2, June 2009.

Chairman - BoS Dept.of ECE - ESEC

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Department	ELECTRONICS AND COMMUNICA	IUNICATION ENGINEERING				R 2019	Semester	
Course Code	Course Name		lour Wee		Credit	Total Hours	Maximur Marks	
19ECZ15	E-COMMERCE SECURITY	L	Т	Ρ	С	Hours	Warks	
		1	0	0	1	15	100	

To learn the E-Commerce security

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Learn the E-Commerce security

INTRODUCTION: Introduction to e-Commerce - Infrastructure – Benefits, limitations - Security Threats, Vulnerabilities – Standards-IEEE.

SECURITY MECHANISMS: Legal issues – Cyber Crimes - key management and certificates - payment security services - communication network and network access layer security - Internet layer security and transport layer security - application layer security - hypertext transfer protocol - web server security - web client security, mobile code security - mobile agent security - mobile commerce security, digital signature certificates – eCards Security – mobile payment technology –Payment Card Industry Data Security Standard PCI / DSS.

HANDS-ON TRAINING: Modeling and design of a secure Web/Mobile based e-commerce application, securing internal network, and providing secure employee/user authentication.

	Yun Zhao Chwan-Hwa (John) Wu and J. David Irwin, Introduction to Computer Networks and
1	Cybersecurity, CRC Press; 1 edition, February 4, 2013.
2	
	Ghosh, Anup K., E-Commerce Security and Privacy, Kluwer Academic Publishers, 2001

Dept.of ECE - ESEC

Department	ELECTRONICS AND COMMUNICAT	ION	ENC	GINE	ERING	R 2019	Semester	-
Course Code	Course Name	1.000	lour Wee		Credit	Total	Maximu	in the set
19ECZ16	ROUTING ARCHITECTURE AND	L	T	Ρ	С	Hours	Marks	
1920210	DESIGN	1	0	0	1	15	100	

• To design the routing architecture

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Design the routing architecture

OVERVIEW:OSI and TCP/IP Models, explanation of each layer along with real time example, IP Addressing schemes, IPV4 and IPV6 evolution, LAN, WAN, MAN, Networking devices.

NETWORKING INFRASTRUCTURES AND DESIGNS: Discovering Network Design Basics, Network design overview, Benefits of hierarchical network design, Network design methodology.

ROUTING ARCHITECTURE: Cisco Routers and its types, Types of Routing protocols, Static Routing, Dynamic routing, RIP, OSPF, EIGRP, BGP, Routing Technologies– MPLS, L2VPN, L3VPN, IPSEC VPN.

NETWORKING PHASES: Planning & Design, Testing and Validation, Implementation and Deployment, Maintenance and change.

DEMO: Quick Demo with simulators on building Simple Network Topology-VLAN configurations, Static Routing, Any one routing protocol implementation.

REFE	RENCE(S):
1	Kevin Wallace, Cisco press, Routing and Switching Route 300 - 101 Official Cert Guide.
2	David Hucaby, Cisco press, Ccnp Routing and Switching Switch 300 - 115 Official Cert Guide.
3	3.http://www.cisco.com/c/en/us/td/docs/routers/crs/software/crs_r4- 1/lxvpn/configuration/guide/vc41crs /vc41v2.pdf
4	http://www.ciscopress.com/articles/article.asp?p=2180210&seqNum=7

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Chairman - BoS Dept.of ECE - ESEG

Department	ELECTRONICS AND COMMUNICA	TION	ENC	SINE	ERING	R 2019	Semester	
Course Code	Course Name		lour Wee		Credit	Total	Maximu	m
4050747	EMBEDDED PROTOCOLS	L	T	Ρ	С	Hours	Marks	
19ECZ17	EMBEDDED PROTOCOLS	1	0	0	1	15	100	

• To gain the knowledge on embedded protocols

Course Outcomes: At the end of this course, learners will be able to:

- Review, prepare and present technological developments
- Gain the knowledge on embedded protocols

COMMUNICATION PROTOCOLS

Serial & Parallel Communication, I2C Bus characteristics, Data Transfer, Interfacing & Programming I2C based EEPROM, Introduction to SPI protocol, Interfacing SPI based Graphic LCD Display Interface, Interfacing SPI based Touch Screen with Controller. Introduction to Serial Communication using UART, The Physical Layer Standards, Programming UART in MCU to Communicate with PC, UART based Password Authentication System, Introduction to CAN, CAN Frame Formats, CAN Frame Formats, Establishing CAN Communication network between two controllers, Introduction to Bluetooth, AT Commands for Bluetooth Communication, Introduction to ZigBee Protocol, Understanding the X-CTU Terminal & Configurations of ZigBee Nodes, ZigBee Based Home Automation.

REFERENCE(S):

1 Reference manual will be provided by the industry

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LANGUAGE ELECTIVES

Department	ELECTRONICS AND COMMUN	ICATI	ONE	NGIN	IEERING	R 2019	Semester II	В
Course Code	Course Name	Hou	ırs / V	Veek	Credit	Total Hours	Maximu Marks	
19HX201	ENGLISH FOR ENGINEERS	3	0	0	3	45	100	
Course Object Acquire Develop texts. Enhanc Improve Develop Course Outcol Improve Develop Acquire Enhanc Commu Init I LAN Voice(Active & Further Ubstitution - Physical Init I LIST	ive (s): The purpose of learning the usage of grammar in English labele to listening skills which will enable to be the reading skill to comprehend to writing skills to express thoughts for speaking skills to speak fluently in mes: At the end of this course, lear their language usage in LSRW ske be listening skills to understand senter the ability to understand different we the writing skills to express the idenicate fluently in pair / team. IGUAGE FOCUS Passive) - Reported speech - Condarasal verbs - Error identification ENING ecific information – Identifying senter	is cou angua b listen echnic reely. n real o reely. n real o rees v ills. ence s written leas of	rse is ge. lectu cal wri contex vill be stress texts f the l s - Co	to tings. able and i earne	nd compre to: ntonations rs. tions - Dis	ehend diff	erent types of	9
eading graphs e structure of a nit IV WRI	TING		i.					9
eview (book an	Letter and Resume - Recommendation d movie) - Transcoding (interpreting					ident and	survey) - Writ	ting
	AKING			-				9
anguage Funct nd opinions EXT BOOK(S) Communica Revised Ed EFERENCE(S	tive English by KN Shoba ,Lourde tion 2018	contras es Joav	sting - vani F	- Exp Rayen	ressing - f	inding out	facts, attitude	
- Jeremy Co		lish (amb	idae.	Cambridg	e Univers	sity Press, 200)2.
2 Eric H. Gle	g Speaking Skills for Business Eng endinning and Beverly Holmstrom, United Kingdom: Cambridge Unive	Study	Read	ling: A			g for Academi	ic
2 Eric H. Gle Purposes. 3 Murphy, R Intermedia	endinning and Beverly Holmstrom, United Kingdom: Cambridge Unive aymond. English Grammar in Use	Study ersity I – A Se	Read Press elf-Stu	ling: / , 2004 udy R	4. eference a	In Readin		ic

Department	ELECTRONICS AND COMM	UNICATION	IENC	GINE	ERING	R 2019	Semeste	r II B
Course Code	Course Name	Hour	rs / W	Veek	Credit	Total Hours	Maxin Mar	
19HX202	HINDI	3	0	0	3	45	10	0
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• Commu	nicate effectively with: (a) Improv li language (c) Proper vocabulary	ed fluency i				on the ba	sic sounds	
Unit I HINI	DIALPHABET							- 1
3indu&Visarg -	owels - Consonants - Plosives - Table of Alphabet -Vocabulary.	Fricatives -	Nasa	al sou	inds - Vo	owel Signs	s - Chandra	a
Unit II NOU	INS IN HINDI		4,		8			5
1. A A A A A A A A A A A A A A A A A A A	uline & Feminine Nouns ending	in a ,e,i,o, u,	, <i>)</i> - IVIa	ascui			Ceaung	
Exercises. Jnit III PRO Categories of F pronouns - Re	NOUNS AND TENSES Pronouns - Personal Pronouns - lative pronouns - Present tens errogative Sentences.	Second pe	erson	(you	I & hond	orific) - De	efinite & In	
Exercises. Unit III PRO Categories of F pronouns - Re Sentences - Int	NOUNS AND TENSES Pronouns - Personal Pronouns - lative pronouns - Present tens	Second pe	erson	(you	I & hond	orific) - De	efinite & In	defini
Exercises. Unit III PRC Categories of F pronouns - Re Sentences - Int Unit IV CLA Parts of body -	NOUNS AND TENSES Pronouns - Personal Pronouns - lative pronouns - Present tens errogative Sentences.	· Second pe e - Past te	erson	(you - Fut	i & honc ture ten	orific) - De se - Asse	efinite & In ertive & N	defini egativ
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Department E	ELECTRONICS AND COMMUN	Hours				Total	Semeste Maxin	
Course Code	Course Name	Hours	T	P	Creat	Hours	Maxin	
19HX203	JAPANESE	3	0	0	3	45	10	Charles and
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and the second sec	m how to converse in Japanese i	1.75	1277-2	cione	a la galas			
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 Proper voc 				_	- Aller			
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Japanese Vocabulary (25 Numbers)

TEXT BOOK(S):

1. <u>Modern Japanese Vocabulary: A Guide for 21st Century Students | Edward P. Trimnell</u> Publisher: Beechmont Crest Publishing .

2 Japanese Verbs & Essentials of Grammar" | Rita Lampkin Passport Books , 2013

REFERENCE(S):

1 Japanese for Everyone: Elementary Main Textbook1-1 and 1-2, Goyal Publishers and Distributors Pvt. Ltd., Delhi, 2007.

Chairman - BoS

Dad!

De	partment	ELECTRONICS AND COMMU	NICAT	TION	ENGI	NEERING	R 2019	Semester II	BS
Cou	rse Code	Course Name	Но	urs /	Week	Credit	Total	Maximun	n
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- 1	19HX204	FRENCH	3	0	0	3	45	100	
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