

Mohgaon, Wardha Road, Nagpur - 441 108 An Autonomous Institute



DEPARTMENT OFELECTRONICS & COMMUNICATION ENGINEERING

B.Tech. Electronics & Communication Engineering

Syllabus

From

Academic Year 2022-23

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

(An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur) Programme: Electronics & Communication Engineering

Scheme of Instructions: Fourth Year B.Tech. in Electronics & Communication Engineering

Sr.	Course	Course	Course Title	T	т	D	Contact	Course	EXAM SCHEME				
No.	Category	Code	Course The	L	1	r	Hrs/Wk	Credits	CT-1	CT-2	TA/CA	ESE	TOTAL
1	PCC	BEC4701	Computer Communication Network	3	-	-	3	3	15	15	10	60	100
2	PCC	BEC4702	CMOS VLSI Design	3	1	-	4	4	15	15	10	60	100
3	PEC	BEC4703- 5	Program ElectiveV		-	-	3	3	15	15	10	60	100
4	OEC	B\$\$XX01- 16	Open Elective-III	3	-	-	3	3	15	15	10	60	100
5	OEC	B\$\$XX01- 16	Open Elective-IV	3	-	-	3	3	15	15	10	60	100
6	OEC	B\$\$XX01- 16	Open Elective-V	3	-	-	3	3	15	15	10	60	100
7	PCC	BEC4706	Computer Communication Network Lab	-	-	2	2	1	-	-	25	25	50
8	PCC	BEC4707	CMOS VLSI Design Lab	-	-	2	2	1	-	-	25	25	50
9	PROJ	BEC4708	Seminar	-	-	2	2	1	-	-	25	25	50
10	MCC	BAU4710	Innovations and Society	2	-	-	2	Audit	-	-	-	-	-
			Total	20	1	6	27	22	90	90	135	435	750

Semester – VII

L- Lecture

T-Tutorial

P-Practical

TA/CA- Teacher Assessment/Continuous Assessment

CT1- Class Test 1 CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	OEC (Open Elective courses from other discipline)	Project / Seminar /Industrial Training	MCC (Mandatory Courses)
Credits	-			9	03	09	01	Yes
Cumulative Sum	05	24	24	47	12	06	04	-

PROGRESSIVE TOTAL CREDITS : 123+22 =145

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Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

(An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur) Programme: Electronics & Communication Engineering

Scheme of Instructions: Second Year B.Tech. in Electronics & Communication Engineering

Semester – VIII

Sr.	Course	Course	Course Title	т	т	р	Contact	Course	EXAM SCHEME				
No.	Category	Code	Course rue		I	Г	Hrs/Wk	Credits	CT-1	CT-2	TA/CA	ESE	TOTAL
1	PROJ	BEC4801	Industry Based Project /Internship	-	-	26	26	13	-	-	75	75	150
2	PROJ	BEC4802	Comprehensive Viva-voce	-	-	-	-	4	-	-	-	100	100
3	HSMC2	BEC4803	Extra-Curricular Activities / Competitive Exam/Co-Curricular activities	-	-	4	4	2	-	-	100	-	100
4	MCC	BAU4808	Project Based Science, Technology Social Design and Innovation	2	-	-	2	Audit	-	-	-	-	-
			Total	2	-	30	32	19	-	-	175	175	350

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	OEC (Open Elective courses from other discipline)	Project / Seminar /Industrial Training	MCC (Mandatory Courses)
Credits	02						17	Yes
Cumulative Sum	05	24	24	56	15	15	05	-

PROGRESSIVE TOTAL CREDITS : 145+19 = 164

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Tulsiramji Galkwad-Patil College Of Engineering and Technology, Nagpur

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Program Elective- I	Program Elective- II	Program Elective- III
Semester V	Semester V	Semester VI
BEC3506 Digital System Design	BEC3509 Introduction to MEMS	BEC3603 Antenna and Microwave Engineering
BEC3507 Embedded Systems	BEC3510 Information Theory and Coding	BEC3604 Optical Communication
BEC3508 Power Electronics	BEC3511 Biomedical Instrumentation	BEC3605 Mechatronics
Program Elective-IV	Program Elective-V	
Semester VI	Semester VII	
BEC3606 PLC SCADA	BEC4703 Robotics & Automation	
BEC3607 Wireless & Sensor Network	BEC4704 Machine learning	
BEC3608 Speech Processing	BEC4705 Satellite Communication	

	List of Open Elective											
Sr. No.	Course Code	Course Title	Sr. No.	Course Code	Course Title							
1	BCSXX01	Cyber Law and Ethics	9	BMEXX09	Nanotechnology and Surface Engineering							
2	BCSXX02	Block chain Technology	10	BMEXX10	Automobile Engineering							
3	BITXX03	Cyber Security	11	BEEXX11	Power Plant System							
4	BITXX04	Artificial Intelligence	12	BEEXX12	Electrical Materials							
5	BECXX05	Internet of Things	13	BAEXX13	Avionics							
6	BECXX06	Embedded Systems	14	BAEXX14	Unmanned Aerial Vehicles							
7	BCEXX07	Introduction to Art and Aesthetics	15	BBTXX15	Biomaterials							
8	BCEXX08	Metro Systems and Engineering	16	BBTXX16	Food and Nutrition Technology							

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Tourth V	Veer	An Auton	VII) B Tooh Flootnomics	LO KI MINU Na	igpur					
Fourth	rear	DEC470	1 Computer Community		cation Engineering					
—		BEC4/0.	1: Computer Communi	cation Netwo	Jrk					
Teaching Se	cheme			Examinat	tion Scheme					
Lectures		3Hrs/week		CT-1	15 Marks					
Total Credi	4	OHrs/week			15 Marks					
1 otal Creat	ιτ	3		IA ESE	10 Marks					
				ESE	100 Morks					
				Total	of ESE:02Hrs00Min					
Course Out	teomo			Duration						
Students wil	ll be al	$\frac{1}{100}$								
1.Explain th	e funda	umentals of Con	nnuter Network and Network for	nologies						
2.Apply flow	v contro	ol & Error contr	col protocols of Data Link Layer	with ARQ .						
3.Illustrate t	he con	cept of IP Addr	essing techniques and Routing p	rotocols of Netw	ork Layer.					
4.Analyze th	he trans	sport layer servi	ices, protocol Headers and conge	estion control pro	otocols.					
5.Determine	the fu	nction of Appli	cation Layer and Presentation la	yer protocols.						
			Course Contents							
Unit I	Unit I Introduction to Networks, Network Topology, Network Devices Types of communication: - simplex, half duplex, full duplex, Network Classification:- LAN,MAN,WAN, Network Architecture, Protocols, OSI Reference Model, TCP/IP Reference Model. Transmission Media:-Guided Media, Unguided									
Unit II	De Sli HI	esign Issues, Fra ding-window f DLC, MAC sub	aming methods, Flow Control an low control, Stop-and-wait AR layer: ALOHA	nd Error Control, Q, Go-back-N A	, Stop-and-wait flow control, .RQ, Selective- repeat ARQ,					
Unit III	Ne Ma Fo	twork layer dut ask and Subnet, rd Algorithm, D	ties, Routers, IP addressing and , Routing algorithms like Shorte Distance Vector Routing, Dynam	its classification, est path routing, l ic Routing. Rout	, IPv4 address, IPv6 address, Djkstra's algorithm, Bellman ing protocols					
Unit IV	Tr mo co: alg	ansport layer se odel, TCP:- TC ntrol, Principal gorithm	ervices, Connection oriented & C P header format, comparison b of congestion, Quality of Serv	Connectionless, T between UDP and vice (QoS), Tok	hree-way handshaking, UDP d TCP, Need of Congestion en bucket and leaky bucket					
Unit V	Ap Int En	pplication Layer roduction to Cr terprise networ	r: DNS, Electronic Mail, File Tr ryptography, Secret key algorit k security:DMZ,NAT	ransfer (FTP), W hm, public key a	WW, HTTP, SNMP, SMTP. algorithm, Digital Signature,					
Text Books	5									
	¹ C	Computer Netwo	orks: Andrew Tanenbaum, 4th E	dition, PHI.						
	² C	Computer Comm	nunication Networks : Frouzan, 4	4th Edition, Tata	Mc-Graw Hill					
	3 V	Villiam Stalling	s, "computer Networks and Cry	ptography", 3rd e	dition, Pearson Education					
Reference	Books									
	1 -	alacommunicat	ion Switching systems & Notwo	rke. Vishuanath	an 3rd Edition DUI					
	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2									
	<u>~ C</u>	computer Comm	nunication: W. Stanlling							
	³ Communication Networks: Leon-Gracia									

Useful Links	
1 <u>h</u>	ittps://nptel.ac.in/courses/106/105/106105080/
2 <u>h</u>	ittps://nptel.ac.in/courses/117/105/117105076/
3 <u>h</u>	ittp://nptel.ac.in/courses/117103064

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TulsiramjiGaikwad-PatilCollegeofEngineeringandTechnology WardhaRoad,Nagpur-441108 Image: CollegeofEngineeringandTechnology WardhaRoad,Nagpur-441108 NAACAccredited(A+Grade) Image: CollegeofEngineeringandTechnology Image: CollegeofEngineeringandTechnology AnAutonomousInstituteaffiliatedtoRTMNUNagpur Image: CollegeofEngineeringandTechnology Image: CollegeofEngineeringandTechnology										
Fourth Y	Fourth Year (Semester-VII) B. Tech. Electronics & Communication Engineering BEC4702: CMOS VI SI DESIGN									
ToophingSo	homo	D.	EC4702: CIVIOS VLS	I DESIGN Evominatio	nSahama					
I eachingSc	neme	2 Ure/wool		CT 1	15 Mar	ke				
Tutorial		5 1115/ WEEK		CT-2	15 Mar	15 Marks				
TotalCredit	-	3			10 Marks					
				ESE	60 Mar	ks				
				Total	al 100 Marks					
				DurationofE	irationofESE:03Hrs00Min.					
Course Out	comes	(CO)								
Students wil	l be ab	leto								
Analyze the P	MOS a	nd NMOS Trar	nsistor							
Illustrate the	CMOS	Inverter								
Examine the (CMOS	logic								
Infer the chara	acteristi	ics of CMOS tr	ansistor.							
Design layout	for var	ious circuits	Course Content	<i>a</i>						
	Course Contents									
TT . •4 T	Μ	IOS TRANSI	ISTORS							
Unit I	nl bo tra	nMOS enhancement and pMOS enhancement transistor, threshold voltage, bodyeffect, MOS effect, MOS device equations, small signal model for MOS transistor.								
	C	CMOS INVERTER								
Unit II	P	Principle of operation dc characteristics transient characteristics $\beta_{\rm p}/\beta_{\rm p}$ ration								
	n	noisemargin, static load MOS inverter transmission gate introduction to Bi-CMOS								
	in	verter.		anomission gave, me						
	S	TUDY OF C	MOS LOGIC							
Unit III	St el	tudy of combined of combined of combined of combined of the co	inational logic, gates, con CMOS technology.	pound gates, multi	plexers, and r	nemory				
	C	IRCUIT CH	ARACTERIZATION AN	D PERFORMANC	CE ESTIMAT	ION				
Unit IV	R cł	esistance and hargesharing.	capacitance estimation, sw	itching characteristic	cs, power dissi	pation,				
	V	LSI DESIGN	1							
Unit V	V re fa st	LSI processin presentationla n-in, fan-out ructures and o	ng integration, layout design atch up, CMOS circuits a and physical design of sin clockingstrategies.	n rules, and stick d nd logic design: tra nple logic gates, Cl	iagram ansistor sizing MOS logic	.,				
Text Books										
T.1	P V	Principal of CMOS VLSI design", Neil H. E. Weste, K. Eshraghian, Addison Wesley VLSISeries.								
T.2	"] C	Digital Interro Thandrakasan,	pgated circuits, A Design l and B. Nikolic., PHI Pub	Perspective", J. M. I	Rabaey, A.					
Т.3	"	"CMOS VLSI Design", Pucknell & K. Eshraghain, PHI Publications								

Reference Book	Reference Books								
R.1	"VLSI Technology", S.M. Sze, McGraw Hill Publications								
R.2	"VLSI Design Technologies for Analog & Digital Circuits", Randall L Gei, McGraw HillPublications								
R.3	Communication Networks: Leon-Gracia								
Useful Links									
1	http://nptel.ac.in/courses/Webcoursecontents/IITBombay/VLSI%20Design/TOC.htm								
2	http://nptel.ac.in/courses/117106092/1								

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	An Autonomous Institute affiliated to RTMNU Nagpur										
Four	th Yea	ar (Semester	-VII) B.Tech. Electronic	cs & Con	nmunication l	Engineering					
		E	EC4703: Robotics and	Automat	tion						
Г	eachin	g Scheme			Examinati	ion Scheme					
Lectu	res	3 Hrs/week			CT-1	15 Marks					
Tutor	ial	-			СТ-2	15 Marks					
Total Cre	edit	3			CA	10 Marks					
	-				ESE	60 Marks					
					Total	100 Marks					
					Duration of ESE: 03 Hrs 00 Mi						
Course C	ontents	5									
Unit I	Jnit I Introduction to Robotics: Types and components of a robot, Classification of robots, closed loop and open-loop control systems, Kinematics systems, Definition of mechanisms and manipulators, Social issues and safety.										
Unit II	Robot Kinematics and Dynamics: Kinematic Modelling: Translation and Rotation Representation, Coordinate transformation, DH parameters, Jacobian, Singularity, and Statics Dynamic Modelling: Equations of motion: Euler-Lagrange formulation										
Unit III	Sensors and Vision System: Sensor: Contact and Proximity, Position, Velocity, Force, Tactile etc.,IIntroduction to Cameras, Camera calibration, Geometry of Image formation,Euclidean/Similarity/Affine/Projective transformations, Vision applications in robotics										
Unit IV	Robot advand Transi	Control: Basic ced controls, I mission: Gears,	s of control: Transfer function Robot Actuation Systems: Act Fiming Belts and Bearings, Para	ns, Control tuators: Ele ameters for	laws: P, PD, PID ectric, Hydraulic selection of actuat	Non-linear and and Pneumatic; fors.					
Unit V	Contro actuat	ol Hardware and ors, components	l Interfacing: Embedded system , Programming for Robot Appli	ns: Archite	cture and integrati	ion with sensors,					
Text Boo	ks										
T.1	Saha, S	.K., "Introductio	n to Robotics, 2nd Edition, McG	Graw-Hill H	igher Education, N	lew Delhi, 2014.					
T.2	Mittal F	R.K. and Nagratl	I.J., "Robotics and Control", Ta	ata McGraw	/ Hill.						
T.3	Mukher	rjee S., "Robotic	and Automation", Khanna Pub	lishing Hou	se, Delhi.						
Referenc	e Books	S									
R.1	Craig, J	J.J., "Introductio	n to Robotics: Mechanics and Co	ontrol", Pear	rson, New Delhi, 2	2009					
R.2	Steve H	Ieath, "Embedde	d System Design", 2 nd Edition,	Newnes, B	urlington, 2003						
R.3	Ghosal	, A., "Robotics"	Oxford, New Delhi, 2006								
Useful Li	nks										
1	https://i	nptel.ac.in/cours	es/112/101/112101098/								
2	https://i	nptel.ac.in/cours	es/112/105/112105249/								

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		An Autor	nomous Institute affiliate	ed to RTM	NU Nagpur				
Fourth	Yea	r (Semester-	VII) B.Tech. Electroni	cs & Con	nmunicatio	n Engii	neering		
			BEC4704: Machine I	Learning					
Teaching So	chem	e		Exa	amination Sc	heme			
Lectures		3 Hrs/week		СТ	-1	15 Mar	ks		
Tutorial		-		СТ	-2	15 Mar	ks		
Total Credi	t	3		ТА		10 Marks			
				ESI	E	60 Mar	ks		
				Tot	tal	100 Ma	arks		
				Du	ration of ESE:	03 Hrs (	)0 Min.		
<b>Course Out</b>	come	es (CO)							
Students wil	l be a	ble to							
Explain the co	oncept	t of probability in	n Machine Learning.						
<b>Explain</b> funda	ment	als of Machine L	earning.						
Apply the mad	chine	Learning Algorit	thm to classify data sets.						
Apply cluster	ing teo	chniques of Macl	hine Learning to segment data	and pattern	•				
Analyze case	study	of Machine Lear	rning Applications.	e e					
		Introduction	to Probability Probabil	ities of a	wants rando	m vorio	bles joint		
T		distribution &	densities moments of rando	om variable	es estimation	of parar	neters from		
Unit I		samples, minim	num risk estimators.	om vanaon	es, estimation	or purur	neters nom		
		Overview of N	Aachina laarning concents	s • Introdu	uction to Bay	es Theor	rem Linear		
<b>T</b> T <b>' T</b>		Regression- mo	odel assumptions, regulariza	tion. Over	fitting and tra	ain/test si	plits. Types		
Unit II		of Machine lear	rning - Supervised, Unsuper	rvised, Rei	nforced learni	ng.	pines, Types		
		Classification and Regression Algorithms : Naïve Bayes, K-Nearest Neighbors,							
Unit III		logistic regression, support vector machines (SVM), decision trees, and random forest							
		and their classification Errors.							
		Clustering :Sequential clustering, hierarchical clustering, probabilistic clustering,							
Unit IV		partitional clustering, clustering for region segmentation, Introduction to Neural							
		Networks, back- propagation algorithm, Overview of Deep Learning.							
		Case Studies	of Machine Learning An	nlication ·	Weather fore	casting	Stock		
Unit V		market predicti	on. Object Detection and re	cognition.	Real Time Ar	oblication	IS.		
			, <b>.</b>		r	<b>F</b>			
<b>Text Books</b>	5								
	1	Aurélien Géro	on, "Hands-On Machine L	earning w	ith Scikit -	Learn ar	nd Tensor		
		Flow: Concep	ts, Tools, and Techniques to	o Build Inte	elligent Syster	ns", 1st I	Edition,		
	2	O'Reilly Medi	la. Jaching Learning" - Khanna	Dubliching	House Delhi				
	2	jeevajuse, IV							
	3	Learning by Su	ubramanian Chandramouli,	Saikat Dut	t, Amit Kuma	r Das.			
Reference	Book	S							
	1	Ian Good fello	w, Yoshua Bengio and Aaro	on Courville	e, "Deep Lear	ning". M	IT Press		
	•	http://www.de	eplearningbook.org.		, <u>r</u>	0,11			
	2	Chopra Rajiv,	"Machine Learning", Khann	na Publishi	ng House, De	lhi.			
	3	JoelGrus, "Da	ta Science from Scratch: Fin	rst Principle	es with Pythor	n", O'Rei	lly Media.		
Useful Linl	KS	,		1	2		-		
	1	https://nptel.ac	; in/courses/106106139						
	-								

2	https://www.youtube.com/watch?v=fC7V8QsPBec
3	https://www.digimat.in/nptel/courses/video/106105152/L01.html

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Four	th Ye	ear (Semester	-VII) B.Tech. Electro	nics & Co	mmunication E	ngineering	
		]	BEC4705 : Satellite Co	ommunica	tion		
<b>Teaching Scheme</b>		ng Scheme			Examination Scheme		
Lectures 3 Hrs/week		3 Hrs/week	-		CT-1	15 Marks	
Tutorial		-	-		CT-2	15 Marks	
Total Credit 3		3			CA	10 Marks	
					ESE	60 Marks	
					Total	100 Marks	
					Duration of ESE:	03 Hrs 00 Min.	
Course Co	ontent	S			·		
Unit I	sate in t dete Syst	llite communicat he orbit, Locati ermination, Orbita em performance.	ions, Orbital mechanics, Kep ng the Satellite with resp al perturbations, launches an	lers laws of pl ect to the e d launch vehi	lanetary motion, Loc earth, Orbital eleme cles, Orbital effects in	ating the satellite ents, Look angle n communication	
Unit II	<b>SATELLITE SUB SYSTEMS:</b> Introduction, attitude and orbit control system, Telemetry, tracking, command and monitoring, Power Systems, Communication Subsystems, Satellite antennas.						
Unit III	<b>SATELLITE LINK DESIGN:</b> Introduction, Basic transmission theory, System noise temperature and G / T ratio. Design of uplink and down link models, Design of satellite links for specified C / N ratio. <b>EARTH STATIONS:</b> Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface. Primary power, test methods.						
Unit IV	<b>LOW EARTH ORBIT AND NON-GEO STATIONARY SATELLITE SYSTEMS</b> : Introduction, Orbit consideration, coverage and frequency considerations, Delay and Throughput considerations, System considerations. Operational NGSO constellation Designs						
Unit V	SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM : Introduction, Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite signal acquisition, GPS Navigation Message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, Differential GPS						
Text Boo	ks						
T.1	TPra	tt and W Bostiain	- Satellite Communications, 2	nd Edition, Jo	hn Wiley, 2003.		
T.2	Wilbur L. Pritchard, Henri G.Suyderhoud and Robert A Nelson - Satellite Communication Systems Engineering, 2nd Edition, Pearson Publications, 2003.					on Systems	
T.3	Satel By <u>G</u> e	lite Communicatio erard Maral, <u>Mich</u>	ons SystemsSystems, Techniqu <u>nel Bousquet</u> , <u>Zhili Sun</u> · 2020	ues and Techn	ology		
Referenc	e Boo	ks					
R.1	Denn	is Roddy, Satellit	e communications, McGraw H	Hill, 4 th Editio	on,2009.		
R.2	DC A	garwal, Satellite	Communications, Khanna Pul	blishers, 2003	Robert M Gagliard, S	Satellite	

	Communications			
R.3	Satellite Communications Systems Systems, Techniques and Technology By <u>Gerard Maral, Michel Bousquet, Zhili Sun</u> · 2020			
Useful Li	nks			
1	http://nptel.iitm.ac.in/courses/			
2	https://archive.nptel.ac.in/courses/117/105/117105131/			
3	https://encryptedtbn2.gstatic.com/faviconV2?url=https://www.digimat.in&client=ABOUT_THIS_RE SULT&size=32&type=FAVICON&fallback_opts=TYPE,SIZE,URL			

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Tulsirami Salewad-Patil College Of Engineering & Toutmotogy, Nagpur

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Fourth Year (Semester-VII) B.Tech. Electronics & Communication Engineering						
	<b>BEC4706:</b>	Computer Communication Network Lab				
Teaching Scheme Examination Scheme			-			
Practical	2Hrs/week	CA 25 Ma	25 Marks			
Total Credit	1	ESE 25 Ma	'KS			
		Duration of ESE:02Hrs0	Min			
Course Outcon	nes (CO)	Duration of LSL.0211300	14111.			
Students will be	able to					
1 <b>Examine</b> the	e fundamentals o	f Computer Network devices & Network.				
2 Analyze dat	a link layer & HI	DLC in packet tracer.				
3 <b>Determine</b> t	he routing algori	ithm in the Computer Network.				
4 <b>Examine</b> the	e structure of trai	nsmission Control Protocol (TCP) & User Datagram Protoco	l (UDP).			
5 Demonstrat	e FTP server and	d DNS server on Packet Tracer.				
Sr.No.		List of Experiment	CO			
1	Examine the operation of Network Devices.					
2	Implement computers within a Local Area Network (LAN).					
3	Analyze data linl	k layer traffic simulation using packet tracer.				
4	Demonstrate Hig	gh Level Data Link Control on packet tracer	CO2			
5	Implement IP sta	atic routing on packet tracer.	CO3			
6	Execute OSPF R	Routing Protocol using Cisco Packet Tracer(Link State Routi	ng). CO3			
7 Implement TCP		UDP Protocol on Packet Tracer.	CO4			
8 Execute TCP/IP		protocol in windows/LINUX.	CO4			
9 Execute FTP Ser		rver Using CISCO Packet Tracer.	CO5			
10	Implement DNS	server in cisco packet tracer.	CO5			
Text Books						
¹ Co.	mputer Networks:	Andrew Tanenbaum, 4th Edition, PHI.				
² Computer Communication Networks : Frouzan, 4th Edition, Tata Mc-Graw Hill						
3						
Reference Books						
¹ Telecommunication Switching systems & Networks: <i>Vishwanathan</i> , 3 rd Edition, PHI.						
² Computer Communication: W. Stanlling						
Useful Links						
1 https://archive.nptel.ac.in/courses/106/105/106105183/						
2 <u>http</u>	2 <u>https://onlinecourses.nptel.ac.in/noc22_ee61/preview</u>					

How Arow. BOS Chairman

Department of Electronics & Comm Tuterranji Galiwad - Pari College of Engineering & Technology, Nagura

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Tulsiramji Galkwad-Patil College Of Engineering and Technology, Nagpur

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Tulsiramii Gaikwad-Pati Collego Of Engineering & Technology, Nagpur

<b>y</b>	Tulsiramji Gai	kwad-Patil Colle	ge of Engineer	ring and	Technology	
	Wardha Road, Nagpur-441108					
	An Autor	nomous Institute	affiliated to R	) FMNU Na	gpur	
Fourth	Year (Semester-	VII) B.Tech. Ele	ectronics & C	Commun	ication Engine	ering
	BE	C4707: CMOS	VLSI DESIG	N LAB	0	0
Teaching S	cheme			Examination Scheme		
Practical	2Hrs/week	-		CA 25 Marks		8
Total Credi	it 1	-		ESE	25 Marks	8
		-		Total	50 Marks	5
				Durationo	fESE:02Hrs00Mi	n.
Course Out	tcomes(CO)					
Students wi	ll be able to					
1 Describ	e and interpret the ba	asic concepts of MC	OS transistors			
2 Constru	ict the ability to desi	gn a system, compo	onent or process	as per nee	ds and specificati	ons.
3 Analyze	e inverter design, cha	aracteristics and app	olications and per	rformance	parameters of CN	MOS
4 Evaluat	e circuits using CMC	OS styles				
5 Analyze	e performance of the	complex logic struc	ctures			
Sr.No.	F	List	of Experiment			CO
1	Demonstrate to	VLSI Design				CO1
2	Demonstrate N	Aicrowind Tool	ficrowind Tool			C01
3	Design of CMC	OS inverter				CO2
4	Design of NOR	Gate				CO2
5	Design of NAN	ID Gate				CO3
6	Design of AND	O Gate & OR Gate				CO3
7	Design of Excl	usive Gates				CO4
8	Design of Half	Adder				CO4
9	Design of Full	Adder			CO5	
10	Design of D Fli	ip flop				CO5
<b>Text Books</b>						
T.1	Principal of CMOS Series.	VLSI design", Nei	ll H. E. Weste, K	K. Eshragh	ian, Addison Wes	sley VLSI
T.2	"Digital Interrogate Chandrakasan, and	ed circuits, A Desig B. Nikolic., PHI P	gn Perspective", Publications .	J. M. Ra	baey, A.	
T.3	"CMOS VLSI Desi	ign", Pucknell & H	K. Eshraghain, I	PHI Public	ations	
<b>Reference</b> I	Books					
R.1	R.1 "VLSI Technology", S.M. Sze, McGraw Hill Publications					
R.2	"VLSI Design Tech Publications	nnologies for Analo	g & Digital Circ	uits", Rar	dall L Gei , McG	raw Hill
Useful Link	KS					
1	http://nptel.ac.in/cou	urses/Webcourseconte	ents/IITBombay/	VLSI%20E	esign/TOC.htm	
2	http://nptel.ac.in/courses/117106092/1					
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