



Curriculum and Syllabi



BACHELOR OF TECHNOLOGY IN ELECTRONICS & COMMUNICATION ENGINEERING

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING FACULTY OF ENGINEERING AND TECHNOLOGY 2019 onwards

Curriculum & Syllabus

B.Tech. in ECE (General Branch)

2019 onwards

B.Tech 1st Year 2019-20 Onwards

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020 B. Tech.-ECE – I Semester

Sr.	Subject		Schedule				Mark			
No.	Code	Course une	L	Т	Р	С	Int.	Ext.	Total	
1	130401 01	Engineering Mathematics-I	3	1	0	4	40	60	100	
2	130401 02	Engineering Physics	3	1	0	4	40	60	100	
3	130401 03	Basics of Electronics Engineering	3	0	0	3	40	60	100	
4	130401 04	Fundamental of Computer Programming	3	0	0	3	40	60	100	
5	130401 06	Engineering Graphics and Design	1	0	0	1	40	60	100	
6	130401 07	Engineering Physics Lab	0	0	2	1	20	30	50	
7	130401 08	Basic Electronics Engineering Lab	0	0	2	1	20	30	50	
8	130401 09	Fundamental of Computer Programming Lab	0	0	2	1	20	30	50	
9	130401 10	Engineering Graphics and Design Lab	0	0	4	2	20	30	50	
10	1 <u>3040</u> 1 12	Engineering Lab	0	0	4	2	20	30	50	
Total Contact Hours		13	2	14	22	300	450	750		
10 130401 12 Engineering Lab Total Contact Hours			0 13	0 2 29	4 14	2 22	20 300	30 450	75	

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING** CURRICULUM-ECE- 2019-2020 B. Tech. – II Semester

Sr.	Subject	Course title		Sche	edule	Mark			
No.	Code		L	Т	Р	С	Int.	Ext.	Total
1	1304020 1	Engineering Mathematics-II	3	1	0	4	40	60	100
2	1304020 2	Industrial Chemistry	3	1	0	4	40	60	100
3	1304020 3	Communication Skills	2	0	0	2	40	60	100
4	1304020 6	Workshop Technology	1	0	0	1	40	60	100
5	1304020 4	Basics of Electrical Engineering	3	0	0	3	40	60	100
6	1304021 2	Environment science	0	0	0	0	40	60	100
7	1304020 7	Industrial Chemistry Lab	0	0	2	1	20	30	50
8	1304020 8	Communication Skills Lab	0	0	2	1	20	30	50
9	1304021 1	Workshop Technology Lab	0	0	4	2	20	30	50
10	1304020 9	Basics of Electrical Engineering Lab	0	0	2	1	20	30	50
			12	2	10	10	220	400	000
	Total			24		19	320	480	800

FACULTY OF ENGINEERING & TECHNOLOGY **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020**

Sr.	Subject	Course title		Sche	dule		Mark				
No.	Code	Course the	L	Т	Р	С	Int.	Ext.	Total		
1	13040301	Digital Electronics & Computer Organization	3	0	0	3	40	60	100		
2	13040302	Signals & Systems	3	0	0	3	40	60	100		
3	13040303	Network Theory	3	0	0	3	40	60	100		
4	13040304	Micro Electronics	3	0	0	3	40	60	100		
5	13040305	Engineering Mathematics III	3	1	0	4	40	60	100		
6	13040306	Industrial Economics and Management	2	0	0	2	40	60	100		
7	13040307	Constitution of India	2	0	0	0	40	60	100		
8	13040310	Digital Electronics & Computer Organization Lab	0	0	2	1	20	30	50		
9	13040311	Network Theory Lab	0	0	2	1	20	30	50		
10	13040312	Circuit Simulation with PCB design Lab	0	0	4	2	20	30	50		
11	13040315	Minor Project phase-I	0	0	2	1	20	30	50		
12	13040316	Industrial Training –I	0	0	0	1	20	30	50		
T ()			19	1	10	24	200	570	050		
	lotal			30		24	380	5/0	930		

B. Tech.-ECE – III Semester

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020**

Sr.	Subject	Course title		Sche	dule		Mark			
No.	Code	Course the	L	Т	Р	С	Int.	Ext.	Total	
1	1304040 1	Analog Integrated Circuit	3	0	0	3	40	60	100	
2	1304040 2	Electromagnetic Theory	3	0	0	3	40	60	100	
3	1304040 3	Analog Communication	3	0	0	3	40	60	100	
4	1304040 4	Interfacing with $\mu P \& \mu C$	3	0	0	3	40	60	100	
5	1304040 5	Numerical Method	3	1	0	4	40	60	100	
6		VA Course-I	2	0	0	0	40	60	100	
7	1304040 9	Integrated Circuit Lab	0	0	2	1	20	30	50	
8	1304041 0	Analog Communication Lab	0	0	2	1	20	30	50	
9	1304041 1	Interfacing with $\mu P \& \mu C Lab$	0	0	2	1	20	30	50	
10	1304041 3	Major Project phase- I	0	0	4	2	20	30	50	
Total Contract House			17	1	10	21	320	480	800	
	Total Contact Hours			28			320	400	000	

B. Tech. -ECE– IV Semester

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

CURRICULUM- 2019-2020
B. TechECE- V Semester

Sr.	Subject	Course title		Sche	dule	Mark			k
No.	Code	Course the	L	Τ	Р	С	Int.	Ext.	Total
1	13040501	Antenna Wave propagation	3	0	0	3	40	60	100
2	13040502	Digital Communication	3	0	0	3	40	60	100
3	13040503	DSP with simulation	3	0	0	3	40	60	100
4		Program Elective-I	3	0	0	3	40	60	100
6		Open Elective -I	3	0	0	3	40	60	100
7	13040514	Essence of Indian knowledge Traditional	2	0	0	0	40	60	100
8	13040517	Antenna Design & Simulation Lab	0	0	2	1	20	30	50
9	13040518	Digital Communication Lab	0	0	2	1	20	30	50
10	13040519	DSP with Simulation	0	0	2	1	20	30	50
11	13040520	Manor Project phase -II	0	0	2	1	20	30	50
12	13040521	Industrial Training-II	0	0	0	1	20	30	50
13	13040522	General Lab -I	0	0	2	1	20	30	50
Total			17	0	10	21	360	540	000
	1 0tai			27			300	340	200

Program Elective 1:							
13040504	Instrumentation & Measurement						
13040505	Embedded system						
13040506	Power Electronics						
13040507	Sensor & Architecture Interfacing						

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Sr.	Subject	Course title		Sche	dule			Mar	k
No.	Code	Course title	L	Т	Р	С	Int.	Ext.	Total
5		Microwave & Radar	3	0	0	3	40	60	100
6		VLSI Design	3	0	0	3	40	60	100
7		Program Elective-II	3	0	0	3	40	60	100
8		Program Elective-III	3	0	0	3	40	60	100
5		Open Elective- II	3	0	0	3	40	60	100
6		VA Course-II	2	0	0	0	40	60	100
7		Microwave & Radar Lab	0	0	2	1	20	30	50
8		VLSI Design Lab	0	0	2	1	20	30	50
9		Major Project phase -II	0	0	4	2	20	30	50
10		GL-II	0	0	2	1	20	30	50
11		GL-III	0	0	2	1	20	30	50
			17	0	12	01	240	510	950
	Total			29			340	510	830

CURRICULUM- 2019-2020 B. Tech. –ECE- VI Semester

Program Elec	tive II	Program Elective III				
	Bio-Medical Instrumentation		Control System			
	Digital Processor		ARM Processor			
	Scientific Computing		Speech processing & Recognition			
	Information Theory & Coding Wireless sensor Netwo					
			DSD with programmable logic			

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020 B. Tech. -ECE– VII Semester

Sr.	Subject	Course title		Sche	dule		Mark			
No.	Code	Course title	L	Т	Р	С	Int.	Ext.	Total	
1		Wireless Communication	3	0	0	3	40	60	100	

2		Program Elective-IV	3	0	0	3	40	60	100
3		Open Elective III	3	0	0	3	40	60	100
4		Open Elective IV	3	0	0	3	40	60	100
5		Professional Ethics for Electronics Engineers	2	0	0	2	40	60	100
6		Review Article Phase-I	0	0	6	3	20	30	50
7		Wireless Communication Lab	0	0	2	1	20	30	50
9		Industrial Training – III	0	0	0	1	20	30	50
10		GL-IV	0	0	2	1	20	30	50
Total Contact Hours			14	0	10	20	280	120	700
1 otal Contact Hours			24			200	420	700	

Program Elective-IV							
	Computational Electromagnetic						
	DIP with simulation						
	IoT Architecture						
	RF VLSI						

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020 B. Tech. -ECE- VIII Semester

Sr.	Subject	Course title	Schedule			Mark			
No.	Code	Course the	L	Т	Р	С	Int.	Ext.	Total
1		Program Elective-V	3	0	0	3	40	60	100

2	Program Elective-VI	3	0	0	3	40	60	100
3	Review Article phase-II	0	0	6	3	20	30	50
4	General Lab-V	0	0	2	1	20	30	50
5	General Lab-VI	0	0	2	1	20	30	50
	Total Contact Hours	6	0	10	11	140	210	350
	Total Contact Hours		16		11	140	210	550

Program Elec	tive-V
	Microwave in MIC's
	Optical Communication
	Arduino Programming & Introduction to Raspberry Pi
	Verilog Programming

Program Elect	Program Elective-VI							
	Satellite communication							
	RF component Design: Simulator Approved							
	Modern Comm. Technologies							
	High Speed Electronics							

1.	Name of the Depar	rtment- B.Tech 1st	Year						
2.	Course Name	Engineering Mat	hematics ·	·I	L	Т		Р	
3.	Course Code	CE,ME,ECE	3			1		0	
4.	Type of Course (us	se tick mark)	Core ()	BSC	(✔)	PE ()		OE ()	
5. any)	Pre-requisite (if	Mathematics at +2 Level	6. Fi (use tick	requen marks	су)	Even ()	Odd (✔)	Either Sem ()	Every Sem ()

7. Tota	l Number of Lectures, Tutorial	s, Practical (assuming 14	weeks of one semester)
Lectures = 4	12 T	utorials = 14	Practical = 0
9 Drie	Syllobus		
The purpose	of this module is to provide par	ticinants with the skills k	mowledge and attitudes required to
perform fur	damental mathematical procedu	ures and processes for s	solution of engineering problems
particularly	the use of calculus vector analys	is and infinite series. The	subject aims to show the relevance
of mathemat	tics to engineering and applied	sciences. This module als	so facilitates articulation to Degree
courses in al	l streams of Engineering and form	ns a basis for more special	ist branches of mathematics
9 Lear	ning objectives.		
The goal of	the Engineering Math sequence	is to master the basic tool	s for the study of science, business
and engineer	ing and become skilled in its use	for solving problems in so	cience and engineering.
10. Cour	rse Outcomes (COs):	1	
1) To ap	oply differential and integral calculations that will have a	ulus to notions of curvatur	e and to improper integrals. Apart
ii) The f	allouts of Rolle's Theorem that is	s fundamental to application	eta and Gamma functions.
problems.	anouts of Rome's Theorem that h	s fundamentar to appreativ	on of analysis to Engineering
iii) The t	ool of power series and Fourier s	eries for learning advance	d Engineering Mathematics.
iv) To de	eal with functions of several varia	ables that are essential in n	nost branches of engineering.
v) The e	essential tool of matrices and line	ar algebra in a comprehen	sive manner.
11. Unit	wise detailed content		
Unit-1	Number of lectures = 06	Calculus	
Evolutes and	l involutes; Evaluation of definite	e and improper integrals; E	Beta and Gamma functions and their
properties; A	pplications of definite integrals t	o evaluate surface areas ar	nd volumes of revolutions.
Unit – 2	Number of lectures = 06	Calculus	
Rolle's Theo	brem, Mean value theorems, Tay Hospital's rule: Maxima and min	lor's and Maclaurin theore	ems with remainders; indeterminate
Init - 3	Number of lectures $= 10$	Sequences and se	ries
om 5		Sequences and se	
Convergence	e of sequence and series, tests	for convergence; Power	series, Taylor's series, series for
exponential,	trigonometric and logarithm fu	inctions; Fourier series: 1	Half range sine and cosine series,
Parseval's th	eorem.		
Unit - 4	Number of lectures $= 08$	Multivariable Ca	liculus (Differentiation)
Limit, contir	uity and partial derivatives, direc	ctional derivatives, total de	rivative; Tangent plane and normal
line; Maxim	a, minima and saddle points; Met	hod of Lagrange multiplie	rs; Gradient, curl and divergence
Unit - 5	Number of lectures = 10	Matrices	
Inverse and	rank of a matrix rank-nullity the	orem: System of linear equ	ations: Symmetric skewsymmetric
and orthogo	nal matrices: Determinants: Fi	igenvalues and eigenvect	tors: Diagonalization of matrices:
Cavley-Ham	ilton Theorem, and Orthogonal tr	ransformation.	tors, Diagonalization of matrices,
12. Brief	Description of self-learning / R	E-learning component	
The students	will be encouraged to learn using	g the SGT ELearning port	al and choose the relevant lectures
delivered by	subject experts of SGT Universit	ty.	
The link to t	he E-Learning portal.	-	
https://elearr	ning.sgtuniversity.ac.in/course-ca	tegory/Journal papers; Pat	ents in the respective field.
13. Book	s Recommended		-
Text Book:			
• Rama	ana B.V., Higher Engineering Ma	athematics, Tata McGraw	Hill New Delhi, 11th Reprint, 2010
Reference B	books:		
• G.B.	Thomas and R.L. Finney, Calcul	us and Analytic geometry,	9th Edition, Pearson, Reprint,

2002.	
•	Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
•	

1.	Name of the Depar	tment: B.Tech.	1 st	lear				
2.	Course Name	Engineering Ph	ysic	S		L	Т	P
3.	Course Code			1		3	1	0
4.	Type of Course (us	se tick mark)	Co	re (√)	DSE ()	<u>AEC ()</u>	SEC ()	OE ()
5.	Pre-requisite	Intermediate	6.	Frequency	Even $()$	Odd $()$	Either	Every
(if a	ny)	courses	(us	e tick marks)			Sem ()	Sem ()
7.	Total Number of I	ectures, Tutori	als,	Practical (assumi	ing 14 weeks	s of one sen	nester)	
Lectu	ares = 42		Τ	utorials = 14	Pract	tical = 0		
8.	Course Description	n:						
Engin apply also e	neering physics course these concepts in too emphasizes the solid for	e provide an opp lay's rapidly cha oundations of mo	ortu ingin oder	nity to students to ng and highly tech n scientific princip) learn funda inical/engine oles.	mental con- ering enviro	cepts of phy onment. Thi	vsics and is course
9.	Course Objectives	S:		• •				
 i) To cours ii)To practi 10. 	b give students a b es that will be taken la make students lea ical engineering proble Course Outcomes	asic exposure ater on. rn and unders ems and apply it (COs):	to F stand s sol	Physics that will basic concepts utions effectively	better prep and princ and meaning	pare them iples of <u>p</u> gfully.	for more physics to	rigorous analyze
At the i) Deci ii) A band iii)Un lectur	e completion of this conscribe the behavior of pply fundamental provident of solids, quant	ourse, students w and make predic rinciples of phy tum physics and rtance of reco	vill b ction ysics spec ord-k	be able to: s regarding the ph s to solve problicial theory of relative eeping and hav	enomena of ems relating ivity. re practiced	the physica g to waves its use	l world. s, crystal s during lał	structure, os and/or
11.	Unit wise detailed	content		1		_		
Unit-	1 Number of lec	tures $= 13$		Title of the unit	: Wave Opti	ics		
Inter Bipri	ference: Coherent so sm, Division of Ampl	urces, condition itude- Newton's	is fo Ring	r sustained interfo gs, applications.	erence. Divis	sion of Wa	ve-Front - 1	Fresnel's
Diffr diffra of gra	action: Difference be action through a single ating.	tween interferen slit, Plane trans	ce and smiss	nd diffraction, Fra sion diffraction gra	aunhofer and ating, dispers	Fresnel dif	fraction. Fra and resolvin	aunhofer 1g power
Pola Half	rization: Polarized an wave plates, Detection	d unpolarised li and production	ght, of d	uniaxial crystal, o lifferent types of p	double refrac oolarized ligh	ction, Nicol t.	prism, Qua	arter and
Unit	- 2 Number of lec	tures = 13		Crystal Structu	re and Band	l theory of	solids	
Crys Bragg	tal Structure: Space g's law, defect in solid	lattice, unit cel s.	l an	d translation vect	or, Miller in	dices, simp	ble crystal s	tructure,
Free condu	Electron Theory : Election, quantum theologic	lements of clas ory of free elec	sical ctron	free electron the s, Fermi level, c	eory and its lensity of st	limitations tates, Ferm	. Drude's th i-Dirac dis	heory of tribution
Band Conc effect	Theory of solids: (ept of effective mass and its applications.	Drigin of energy and holes, Classi	/ bar ifica	nds, Kroning-Penn tion of solids into	ney model ,I metals, semi	E-K diagram	ns, Brilloui and insulat	n zones, ors, Hall
Unit	- 3 Number of lec	tures $= 13$		Special Theory	of Kelativity	Laser and	Quantum	Physics
Spect Cons equiv	ial Theory of Rela equences of LT (leng alence.	tivity: Postula th contraction a	tes ind t	of special theor ime dilation). Var	y of relativ riation of ma	vity, Loren ass with ve	tz transfor locity, Mas	mations. s energy
Ouar	ntum Physics: Inadec	uacies of classic	cal r	hysics, introducti	on to quantu	im mechan	ics-simple o	concepts.

Black body radiations Discovery of Planck's constant, wave particle duality, phase velocity and group velocity. Schrodinger wave equations-time dependent and time independent, Expectation value, particle in a one-dimensional box.

Unit - 4Number of lectures = 13Title of the unit: LASER and Electromagnetic theory

LASER: Spontaneous and Stimulated emission, characteristics of laser beam, principle of laser, lasing action, three level laser, four level laser, He-Ne laser, applications.

Fiber Optics: Propagation of light in optical fibers, numerical aperture, V-number, single and multimode fibers, attenuation, dispersion, applications.

Electromagnetic theory: Gradient, divergence and curl, stokes theorem, gauss- divergence theorem, gauss law, faraday law, ampere circuital law, displacement current, Maxwell's equation.

12. Brief Description of self-learning / E-learning component

To understand basic concepts in detail, students may get study materials on following links. <u>https://onlinecourses.nptel.ac.in/noc18_ph02</u> https://ocw.mit.edu/courses/physics/

13. Books Recommended

Text Books:

• Modern Physics for Engineers – S.P.Taneja (R. Chand)

Reference Books:

- Engineering Physics SatyaPrakash (PragatiPrakashan)
- Modern Engineering Physics A.S.Vasudeva (S. Chand)
- Perspectives of Modern Physics Arthur Beiser (TMH)
- Optics AjoyGhatak (TMH)
- Fundamentals of Physics Resnick & Halliday (Asian Book)
- Introduction to Electrodynamics- <u>David J. Griffiths (PEARSON)</u>

1.	Name of the	Department: B.T	ech. 1 st Year				
2.	Course	Engineering	L	T		Р	
Name 2	Commo	Physics Lab	0	0		2	
s. Code	Course		0	0		2	
<u>4.</u>	Type of Cou	rse (use tick	Core $()$	DSE ()	AEC ()	SEC	OE ()
mark)	- 5 F					$\tilde{0}$	
5.	Pre-		6. Frequency	Even	Odd $()$	Either	Every Sem ()
requis	ite		(use tick ments)	(√)		Sem ()	
(if any	V)		(use lick marks)				
(ii an <u>)</u> 7.	<u>y)</u> Total Numbe	er of Lectures. Tr		uming 14 y	weeks of o	ne semes	ter)
Lectur	res = 0		Tutorials = 0	Practi	cal = 28		/
8.	Course Desc	ription:					
Evnari	ments include	the fundamental o	f interference diffract	ion notarize	ation of lig	ht calcul	ation of e/m
ratio b	v different met	thods study of cha	racteristics of a n-n di	ode and sole	ation of fig. ar cell	int, calcul	
0	Course Obj	notivos:	indeteristies of a p-if div				
<i>.</i>	Course Obje						
i)	To impart pra	ctical knowledge	about some of the pher	nomena they	v have stud	lied in the	e Engineering
Physic	s course like in	nterference, diffrac	tion and polarization.	· · · · · ·	,		8 6
ii)	To develop th	ne experimental sk	ills of the students and				
iii)	To implement	t them into practic	ally working equipmen	nt which are	e helpful in	our daily	v life.
10	Course Outc	omes (COs).					
10. A f4 am /		emletion of the ex		abla ta			
Atters	successiul con	npletion of the co	urse, students will be	able to			
i)	Apply the cor	ncents of basic ont	ical devices to design	various equi	inment		
ii)	Understand or	peration of Carev	Fosterbridge, solar cell	l. p-n diode	etc.		
iii)	Apply the cor	ncepts of electricit	y and magnetism to de	sign various	s equipmen	ıt.	
iv)	Analyze elect	tronic circuits de	sign for various pract	ical application	ations		
11.	List of Expen	riments					
1.	To find the w	avelength of sodiu	m light by Newton's ri	ngs experir	nent.		
2.	To find the w	avelength of vario	us colors of white ligh	t with the h	elp of a pla	ine transr	nission
diffrac	tion grating.	č	C				
3.	To find the w	avelength of a He	Ne laser beam.				
4.	To study the p	photo conducting	cell and hence to verify	the inverse	e square lav	W.	
5.	To find the lo	w resistance by C	arey- Foster's bridge.				
6.	To study the o	characteristics of a	solar cell and to find t	the fill facto	or.		
7.	To find the va	alue of e/m for ele	ctrons by helical metho	od.			
8.	To find the io	nization potential	ot Argon/Mercury usin	ng a thyratro	on tube.	c ••••	C.
9.	To study the	variation of magne	etic field with distance	and to find	the radius	of coil by	Stewart and
Gee's a	apparatus.						

- 10. To study the V-I characteristics of a p-n diode.
- 11. To find the value of e/m for electrons by Thomson method.
- 12. To calculate the value of 'g' using bar pendulum.
- 13. Measurement of Specific rotation of sugar solution using polarimeter.

14. To determine value of Boltzmann constant using V-I characteristic of PN diode.

12. Book Recommended

- 1. Advanced Practical Physics B.L. Worshnop and H.T. Flint (KPH)
- 2. Practical Physics S.L.Gupta&V.Kumar (PragatiPrakashan).
- 3. Advanced Practical Physics Vol.I& II Chauhan & Singh (PragatiPrakashan)

1. Name of the Department: B.Tech 1st Year

2.	Course Nan	e Basic of Elect	onics Engineering		L		Т		Р
3.	Course Cod	e		3			0		0
4.	Type of Cou	rse (use tick mark)	Core (✓)		PE()			OE ()	
5.	Pre-	Physics and	6. Frequency (use		Even	Odd	1	Either	Every Sem
requi	site (if any)	Mathematics at +2 or Equivalent Level	tick marks)		(✔)	(✔)		Sem ()	0
7.	Total Numb	er of Lectures, Tuto	rials, Practical (assuming	14	weeks	of on	le s	emester)	
Lectu	res = 42		Tutorials = 0		Practic	cal =	0		

8. Brief Syllabus

The course intends to introduce students to the fundamental concepts of Analog and Digital electronics. The physical structure, working principle and characteristics of widely used components such as diodes, transistors and measuring instruments such as voltmeter, ammeter and oscilloscopes is covered. The working theory of basic digital components such as logic gates and flip flops is also included.

9. Learning objectives:

• To explain the origins of semiconductor device physics.

• To explain the physical structure and I-V characteristics of the standard p-n junction diode and other special types of diodes.

- To explain the construction and working principle of meters and displays.
- To explain the application of logic gates and flip flops.

10. Course Outcomes (COs):

On completion of this course, the student should be able to:

- Explain the structure and working of various types of diodes.
- Demonstrate the different applications of diodes and transistors.
- Explain the working principle and limitations of various measuring instruments.
- Explain the process of minimizing Boolean functions & differentiate between different types of Flip Flops.

11. Unit wise detailed content Unit-1 Number of lectures = 10 Semiconductor Physics P-N junction diode: theory, depletion region, biasing, I-V characteristics, temperature dependence, equivalent circuit and capacitance. IVINIA CAPACITIC CONSTRUCTION, Working principle and I-V characteristics of Zener diode, Photodiode, LED, Schottky diode, Tunnel diode and Varactor diode. Unit - 2 Number of lectures = 11 Application of Diodes and Transistor Basics Application of Diodes: Rectifiers (types and performance), Clippers & Clampers (series, parallel and

biased), Voltage Regulators.

Transistor Basics: Schematic Diagrams and Working of Bipolar Junction Transistors (BJT), Configuration of BJT, UJT, Fundamentals of JFET and MOSFET.

Unit - 3Number of lectures = 11Instrumentation & Digital Electronics

Instrumentation: Construction & Operation of Voltmeter, Ammeter, Multimeter, CRT, CRO, DSO, Function Generator and Regulated Power Supply.

Digital Electronics: Logic gates, Realization of Logic operations using Universal Gates, Application of Boolean Laws in Minimizing logic functions, Number Systems and their inter conversion, Flip Flops (S-R, J-K, D and T).

Unit - 4Number of lectures = 10Fundamentals Of Communication System

Block Diagram of Communication System, Classification of signals-Periodic & Non-periodic, even & odd, deterministic & random, exponential/sinusoidal, representation of unit step, unit impulse & unit ramp function, reversal, time shifting, time scaling.

12. Brief Description of self-learning / E-learning component

The students can utilize following resources for further learning and practice <u>http://nptel.ac.in/courses/117103063/</u>

https://www.circuitglobe.com

13. Books Recommended (3 Text Books + 2-3 Reference Books)

Text Books:

• Robert L. Boylestad & Louis Nashelsky "Electronic Devices and Circuit Theory", 10th Ed. Pearson Education

Reference Books:

- Basics of Electronics Engineering, Vijay Baruet. al., Wiley India Private Limited.
- Electronic Fundamentals and Application, J. D. Ryder, Prentice Hall India.
- Electronic Instrumentation, H. S. Kalsi, Tata McGraw Hills India, 3rd Edition.
- Integrated Electronics, Millman & Halkias, Tata McGraw Hills India, 2007.

1.	Name of the Depa	rtment: B.Tech (1st Yea	ur)				
2.	Course Name	Basics of Electronics Lab	L (0)	T(0)		P (2)	
3.	Course Code						
4.	Type of Course (u	ise tick mark)	Core (✓)	PE()		OE ()	
5. any)	Pre-requisite (if	Physics and Mathematics at +2 or Equivalent Level	6. Frequency (use tick marks)	Even (✓)	Odd (✔)	Either Sem ()	Every Sem ()
7.	Total Number of	Lectures, Tutorials, Pra	actical (assuming 14 v	veeks of	one sen	nester)	
Lectur	res = 00		Tutorials = 00		Practic	al = 28	
8.	Brief Syllabus						
The co	urse intends to intr	oduce students to the fur	ndamental concepts of	Analog	and Dig	gital electr	onics. The
physica	al structure, worki	ing principle and chara	cteristics of widely	used co	mponer	nts such	as diodes,
transist	ors and measurin	ng instruments such as	voltmeter, ammeter	r and c	oscillosc	copes wo	rking and
applica	tions. The working	g theory of basic digita	l components such as	s logic g	gates ar	nd flip flo	ps is also
include	ed.						
9.	Learning objectiv	'es:	C 1:00	c c	1. 1		
•	To study the I-V cl	naracteristics and other pa	arameters of different	types of	diodes.		
•	To study the constr	ruction and working prine	ciple of different meas	uring ins	trument	t and displ	ays.
•	To study the applic	cation of logic gates and i	lip flops.				
10. On	completion of this	(CUS): course, the student should	l be able to:				
•	Use verious types	of diadas for Industrial at	n de adie 10.				
•	Use various types (ring instruments	opilications.				
•	Explain the proces	s of minimizing Boolean	functions & differenti	oto hotvu	oon diff	arant tuna	of Flin
Flops	Explain the proces	s of minimizing boolean	runctions & unreferiti			erent type:	sorrip
11.	Lab Experiment						
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1						ereu	
1	10 study the I-V	characteristics of a p-n j	unction diode.				
2	To study the app	plication of a Zener diode	e as a voltage regulator	•			
3	To study the wo	rking of a Light Emitting	g Diode.				
4	To study the app	plication of a diode as a r	ectifier.				

5	To study th	e application of a dio	de as a	a clipper and a cl	amper				
6	To study th	e working of a CRO	and a]	DSO.					
7	To study th	e working of a Funct	ion Ge	enerator.					
8	To study th	e working of a Regul	ated P	ower Supply.					
9	To study di	fferent types of logic	gates.						
10	To study th gates.	e application of NOF	R & N.	AND gates as Ui	niversal logi	c			
11	To study th	e working of differen	t Flip	Flops (S-R, J-K,	D and T)				
12	To study th & CC confi	e I-V characteristics guration.	of a bi	polar junction tra	ansistor in C	В			
1. N	ame of the l	Department: B.Tech	n (1 st Y	'ear)					
2. C	Course Name	Fundamentals of C	Compu	iter Programming	5	L (3)	T (0)	P (0)
3. C	Course Code				ſ		1		
4. T	Sype of Cour	se (use tick mark)	Cor	e (✔)	PE()		OE()	
5. P	re- B	asic Knowledge of	6.	Frequency	Even (Ddd	Eithe	er Eve	ry Sem ()
requisite	e (if any) C	omputers	(use	tick marks)	(✔) (√)	Sem	0	
			· I D		- 14 - 1	C		()	
7. T	<u>Cotal Numbe</u>	r of Lectures, Tutor	rials, P	Practical (assumi	ing 14 week	s of or	ne sen	nester)	
7. T Lectures	$\frac{1}{5} = 42$	r of Lectures, Tutor	rials, P Tuto	Practical (assum) prials = 0	ing 14 week Practio	s of or cal = 0	ne sen	nester)	
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variables and sco	pe, operators,	expressions,	decision	control	structure,	selection	statements,	loops	control;
case controls; Arr	ays and String	s.							

case co	case controls; Arrays and Strings.							
Unit - 4 Number of lectures = 11 C Language: Advanced								
Advanced features of C Language: Functions, Parameter passing in functions, call by value, call by								
reference, Passing arrays to functions, Recursive functions, Defining structures, declaring variables,								
Accessing structure members, structure initialization, unions, Accessing union members. Idea of pointers,								
use of	use of pointers.							
12.	Brief Dese	criptio	on of self-learning /]	E-learning compone	ent			
13.	Books Re	comm	ended (1 Text Book	s + 3 Reference Boo	ks)			
Text B	Books:		· ·					
•	Fundamen	tals of	f Computers by P K	Sinha BPB Publicati	ons Ren	rint Editio	n 2018	
Refere	nce Rooks	•	Computers by T.R.	Sinna, DI D I doncadi			<i>m</i> , 2010	
•	Let Us C b	• w Va	hwant Kanetkar BP	PR Publications 16 th F	dition '	2017		
•		<i>y</i> 1 as	Silwant Kancikar, DI	D I uoncations.10		2017		
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I. INA	me of the L	Jepar	linent: D. Lech (1. 1	ear)				
2. Co	urse Name		Fundamentals of Co	mputer Programming	g Lab	L	Т	P
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4.	Type of C	ourse	(use tick mark)	Core (✓)	PE()		OE ()	
5.	Pre-	Basi	c Knowledge of	6. Frequenc	Even (✓) Odd	Either	Every
requis	ite (if	Com	puters	v (use tick	,	(√)	Sem ()	Sem ()
any)	(F	marks)			~ ()	~ ()
7.	Total Nur	nber (of Lectures. Tutoria	ls. Practical (assumi	ing 14 w	veeks of o	ne semeste	er)
Lectur	res = 0		,	Tutorials = 0	8	Practica	l = 28	,
8.	Brief Syll	abus					_	
The co	ourse has in	troduc	ction to computer. op	erating system and c	omputei	r networks	and how	to troubleshoot
compu	ter hardwar	e and	software. This also in	ncludes programs in	C langua	age.		
0	Loorning	obioo	tivos.	r o	0	0		
<i>.</i>	To be oble	to do	uves.	sing C programming	longuag			
•	To be able		velop the programs u	sing C programming	languag	je.		
•	To prepare		low chart for any logi	ical kind of problem.				
10.	Course O	utcon	nes (COS):	11 1 1 1				
At the	completion	of thi	is course, students will	If be able to:				
•	Design pro	ogram	s using C language.	~				
•	Develop li	ve sot	tware projects using	C programming lang	uages			
11.	Detailed c	onten	it in a second	~				
1.	Assembly	and d	isassembly of a Desk	top Computer with co	onnectio	ons.		
2.	Operating	Syste	m Installation-Format	tting, Partitioning				
3.	Additional	Hard	ware Installation like	printer, mobile, scan	iner.			
4.	Applicatio	n Soft	tware Installation-MS	S Office and CD/DVI) Writin	g		
5.	To connec	t two	PC's using the interco	onnecting devices and	d transfe	er the data	between the	hem.
6.	To study v	various	s connections and por	ts used in computer of	commun	ication. P	S/2 port an	d its
specifi	cation, VG.	A Por	t and its specification	, Serial port and its sp	pecificat	tion and a	oplications	, Parallel Ports
and its	specificatio	on, US	SB Port and its specifi	ication, RJ45 connec	tor, DV	I Monitor	port.	
7.	To study v	various	s cards used in a Com	puter System. (Ether	net Caro	l, Sound C	Card, Video	o/Graphics
Card, l	Network In	terface	e card ,TV Tuner Car	d, Accelerator card)				
8.	Write a C	progra	am to print a message					
9.	Write a pro	ogram	to find the largest of	three numbers. (if-th	en-else))		
10.	Write a pro	ogram	to find the largest nu	umber out of ten num	bers (for	r-statemer	t)	
11.	Write a pro	ogram	to find a number is e	even or odd				
12	2. Write a program to find a number is prime or not							

- 13. Write a program using arrays to find the largest and second largest no. out of given 50 nos.
- 14. Write a program to find sum of 2 matrices
- 15. Write a program to find multiplication of 2 matrices
- 16. Write a program to find factorial of a number using function
- 17. Write a program to check that the input string is a palindrome or not.
- 18. Write a program to implement concept of while and do while loop
- 19. Write a program to print a pattern
- 20. Write a program which manipulates structures (write, read, and update records).

1.	. Name of the Department: B.Tech. (1 st Year)							
2.	Course Name	Engineering Graph	Engineering Graphics and Design				Т	Р
3.	Course Code							0
4. Type of Course (use tick mark)			Core ()	EAS (\checkmark)		PE()	OE()	
5.	Pre-requisite	Geometry and	6. Frequency	Even	Odd	Ei	ither	EverySem
(if an	y)	Drawing at +2 Level	(use tick marks)	(•	(✔)	Se	em ()	0
7.	Total Number	of Lectures, Tutorials, P	ractical (assuming 14	4 weeks	of one s	sem	ester)	
Lectu	res =14		Tutorials = 0	Prac	ctical = ()		

8. Brief Syllabus

Engineering Drawing is considered as language of engineers. This course is thus introduced to provide basic understanding of fundamentals of engineering drawing, visualization, standards and conventions of drawing, the tools of drawing and use of drawing in engineering applications. The topics are covered in a sequence and starts from the basic concepts of geometrical constructions and progress to the principles of projection techniques in engineering drawing. Towards the end of the course it is expected that students would be matured to visualize the engineering components from any drawing sheet, followed by the projection techniques. A number of chosen problems will be solved to illustrate the concepts clearly.

9. Learning objectives:

- i) To understand the basic concepts of drawing and projection techniques.
- ii) To enhance the knowledge of reading the layouts.
- iii) To develop engineering imagination which is essential for creation of successful designs.

10.	Course	Outcomes	(COs):

- i) Clarity in Drawing
- ii) Can read shop layout and industrial layouts
- iii) Design any layout by using projection techniques.
- iv) Basic knowledge about CAD.
- 11.Unit wise detailed contentUnit-1Number of lectures = 2

Title of the unit:Introduction to Drawing

Introduction and importance of engineering drawing, drawing instruments, drawing standards and conventions. Geometrical constructions and scales. Lettering, Classification of lines. Sheet layouts.

	r	· · · · · · · · · · · · · · · · · · ·				
Unit – 2	Number of lectures = 3	Title of the unit: Principle of Projection				
Dringinlag of Orthogray	phia Projections Matheda of r	projection. 1st angle and 2rd angle projections with				
Finicipies of Orthographic Projections. Methods of projection. Ist angle and 5rd angle projections with						
conventions. Projection of points: including Points in all four quadrants. Projection of lines: Parallel,						
perpendicular inclined to one plan and inclined to both planes. True length and true angle of a line. Traces of						
a line. Projection of pla	ains: Plane parallel, perpendicul	ar and inclined to one reference plane. Plane inclined				
to both the reference pla	anes. Traces of plane.					
Unit – 3	Number of lectures = 3	Title of the unit: Projection of solids				
Types of solids. Projec	tion of solids like cylinder, co	ne, prisms, pyramid with axes parallel, perpendicular				
and inclined to both re	eference planes. Projections of	regular solids, cube, prisms, pyramids, tetrahedron,				
cylinder and cone. axis	inclined to both planes.					
Sections and Sectional	Views: Right Regular Solids	– Prism Cylinder, Pyramid, Cone – use of Auxiliary				
views.						
Unit – 4	Number of lectures = 3	Title of the unit: Development of surfaces				
		_				
Definitions and signific	cance. Methods of development	. Development of Surfaces of Right, Regular Solids –				
Prisms, Cylinder, Pyramids, Cone and their parts. Frustum of solids.						
Thisms, Cynneer, Tyrun	inds, cone and then parts. I fust	uni or somus.				
Unit – 5	Number of lectures = 3	Isometric and perspective projection				
Unit – 5 Isometric Projections:	Number of lectures = 3 Principles of Isometric Projection	Isometric and perspective projection				
Unit – 5 Isometric Projections: – Plane Figures, Simple	Number of lectures = 3 Principles of Isometric Projectic and Compound Solids – Isome	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines.				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection	Number of lectures = 3 Principles of Isometric Projection e and Compound Solids – Isometric ws: Perspective View, Points, Ling	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection 12. Brief Description	Number of lectures = 3 Principles of Isometric Projective and Compound Solids – Isometric is: Perspective View, Points, Line on of self-learning / E-learning	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods component				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection 12. Brief Description The students will be end	Number of lectures = 3 Principles of Isometric Projective and Compound Solids – Isometrics: Perspective View, Points, Ling on of self-learning / E-learning couraged to learn using the SGT	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods g component `E-Learning portal and choose the relevant lectures				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection 12. Brief Description The students will be end delivered by subject extra	Number of lectures = 3Principles of Isometric Projectivee and Compound Solids – Isometrice and compound Solids – Isometric	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods g component `E-Learning portal and choose the relevant lectures ak to the E-Learning portal.				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection 12. Brief Description The students will be end delivered by subject exp https://elearning.sgtuniy	Number of lectures = 3 Principles of Isometric Projective and Compound Solids – Isometric Projective s: Perspective View, Points, Ling on of self-learning / E-learning couraged to learn using the SGT perts of SGT University. The ling versity.ac.in/	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods g component `E-Learning portal and choose the relevant lectures ok to the E-Learning portal.				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection 12. Brief Description The students will be end delivered by subject exp https://elearning.sgtuniv	Number of lectures = 3 Principles of Isometric Projective and Compound Solids – Isometric Perspective View, Points, Ling on of self-learning / E-learning couraged to learn using the SGT perts of SGT University. The ling versity.ac.in/	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods g component `E-Learning portal and choose the relevant lectures ak to the E-Learning portal.				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection 12. Brief Description The students will be end delivered by subject exp https://elearning.sgtuniv 13. Books Recomm	Number of lectures = 3 Principles of Isometric Projective and Compound Solids – Isometrics Perspective View, Points, Lint on of self-learning / E-learning couraged to learn using the SGT perts of SGT University. The lint versity.ac.in/	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods g component `E-Learning portal and choose the relevant lectures ik to the E-Learning portal.				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection 12. Brief Description The students will be end delivered by subject exp https://elearning.sgtuniv 13. Books Recomm Text Book:	Number of lectures = 3 Principles of Isometric Projective e and Compound Solids – Isometric es: Perspective View, Points, Lincon of self-learning / E-learning couraged to learn using the SGT perts of SGT University. The lincoversity.ac.in/	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods g component `E-Learning portal and choose the relevant lectures ik to the E-Learning portal.				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection 12. Brief Description The students will be end delivered by subject exp https://elearning.sgtuniv 13. Books Recomm Text Book: 1. Engineering Drawing 53 rd Edition 2014 edition	Number of lectures = 3 Principles of Isometric Projective e and Compound Solids – Isome es: Perspective View, Points, Lincon of self-learning / E-learning couraged to learn using the SGT perts of SGT University. The lincoversity.ac.in/ mended g plane and solid geometry: N D on, ISBN-10: 9380358962	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods g component ' E-Learning portal and choose the relevant lectures ik to the E-Learning portal.				
Unit – 5 Isometric Projections: – Plane Figures, Simple Perspective Projection 12. Brief Description The students will be end delivered by subject exp https://elearning.sgtuniv 13. Books Recomm Text Book: 1. Engineering Drawing 53 rd Edition 2014 edition Reference Books:	Number of lectures = 3 Principles of Isometric Projective e and Compound Solids – Isometric is: Perspective View, Points, Lincon of self-learning / E-learning couraged to learn using the SGT perts of SGT University. The lincorresity.ac.in/ mended g plane and solid geometry: N D on, ISBN-10: 9380358962	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods g component `E-Learning portal and choose the relevant lectures ak to the E-Learning portal.				
 Unit – 5 Isometric Projections: Plane Figures, Simple Perspective Projection 12. Brief Description The students will be ended delivered by subject explicition https://elearning.sgtuniv 13. Books Recommendation Text Book: Engineering Drawing 53rd Edition 2014 edition Reference Books: Engineering Drawing Engineering Drawing Engineering Drawing 	Number of lectures = 3 Principles of Isometric Projective and Compound Solids – Isometric Projective and Compound Solids – Isometric Perspective View, Points, Lincon of self-learning / E-learning couraged to learn using the SGT perts of SGT University. The lincorresity.ac.in/ nended g plane and solid geometry: N Don, ISBN-10: 9380358962 g by K.VenuGopal&V.Prabu Rag by John. PHI Learning Publish	Isometric and perspective projection ion – Isometric Scale – Isometric Views– Conventions tric Projection of objects having non- isometric lines. nes and Plane Figures, Vanishing Point Methods g component `E-Learning portal and choose the relevant lectures ik to the E-Learning portal. • Bhatt and V M Panchal, Charotar publishing House, ja New Age Publications. 2009, ISBN 8122421091 ter, ISBN: 978812033788				

1.	1.Name of the Department: B.Tech. (1st Year)							
2. Name	Course	Engineering Graphics and Design Lab	L (0)	L (0) T (0)		P (4)		
3.	Course							
Code								
4.	Type of Cour	rse (use tick mark)	Core ()	EAS (\checkmark)	PE()		OE ()	
5.	Pre-	Geometry and	6. F	requency	Even	Odd	Either	Every Sem ()
requis	ite (if any)	Drawing at +2 Level	(use tick	marks)	(✔)	(✔)	Sem	-
		0			× /		0	
							\sim	
7.	7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)							
Lectures =0			Tutoria	$\mathbf{s} = 0$	Practical = 56			
8.	Brief Syllabu	IS						
Engine	eering Drawing	is considered as language	of engine	ers. This cou	rse is th	us intro	duced to	provide basic
unders	tanding of fund	damentals of engineering of	łrawing, v	isualization,	standard	s and co	onventior	ns of drawing,
the too	ols of drawing a	and use of drawing in engi	neering ap	plications. T	The topics	s are co	vered in a	a sequence and
starts f	from the basic of	concepts of geometrical co	onstruction	is and progre	ss to the	princip	les of pro	ojection
technie	ques in enginee	ring drawing. Towards the	e end of th	e course it is	expecte	d that s	tudents w	ould be
mature	ed to visualize t	the engineering componen	ts from an	y drawing sh	ieet, follo	owed by	the proj	ection
technie	ques. A numbe	r of chosen problems will	be solved	to illustrate t	he conce	epts clea	arly.	
9.	Learning obj	ectives:						
i)	To understand	l the basic concepts of dra	wing and	projection teo	chniques	•		
ii)	To enhance th	e knowledge of reading th	ne layouts.					
<u>11)</u>	To develop en	igineering imagination wh	ich is esse	ential for crea	ation of s	uccessf	ul design	S.
10.	Course Outco	omes (COs):						
1.	Clarity in Dra	Wing						
11. ;;;	Can read snop	y nayout and industrial layo	outs					
<u> </u>	Unit wise det	your by using projection a	chinques					
11. C. M								

II. UI	1. Unit wise detailed content						
Sr. No.	Title	CO Covered					
1	Different types of lines with illustration and application.						
2	Draw sheet layout with dimensioning and lettering.						

3	Projection of points in four quadrants.	
4	Draw conventions of first angle and third angle projection method.	
5	Projection of straight lines in parallel, perpendicular and inclined planes.	
6	Projection of plane in perpendicular positions.	
7	Projection of cones and solid cylinders with axes parallel, perpendicular and inclined to both reference planes.	
8	Projection of prisms and pyramid.	
10	Draw Orthographic projection of simple machine elements.	
11	Draw Isometric projection of simple machine elements.	

1.	Name of the Dep	artment- B.Tech 1st Y	lear					
2.	Course Name	Engineering Lab	L (0)		T (0)		P (4)	
3.	Course Code							
4.	Type of Course (use tick mark)	Core ()	EAS (\checkmark)	PE()		OE()	
5.	Pre-requisite (if	Physics at +2	6. Fr	equency	Even Odd ()		Either	Every
any)		Level	(use tick	marks)	() Sem ()			Sem()
7.	Total Number of	Lectures, Tutorials,	 Practical (a	assuming 14	weeks of	f one sen	nester)	
Lectu	res =0		Tutorials	= 0	P	ractical	= 56	
8	Brief Syllabus							
Studer	nts belonging to al	l branches of Enginee	ering are ma	ade to learn	certain f	undamen	tal topics	related to
civil e	engineering so that	they will have basic u	nderstandir	g of the desi	gn. cons	truction.	and mainte	enance of
the ph	vsical and naturall	v built environment.	including p	ublic works s	such as 1	oads, bri	dges. cana	ls. dams.
airpor	ts, sewerage syst	ems, pipelines, struc	ctural com	ponents of	building	s, and	railways.a	ndcertain
funda	mental topics related	ed to mechanical engi	ineeringso 1	hat they will	l have a	minimu	m understa	anding of
mecha	anical systems, equi	pment and process.	C	-				U
9.	Learning objecti	ves:						
i)	To understand the	fundamentals ofbasic	environmen	nt related asp	ects by u	se of civi	l engineeri	ng.
ii)	To understand the	fundamentals of mech	nanical system	ems and mate	rial testi	ng.		
iii)	To understand and	d appreciate significant	ce of civil a	nd mechanica	al engine	ering in c	lifferent fie	elds of
engine	eering.							
10.	10. Course Outcomes (COs):							
i)	Understand about	the working, function	s and applic	ations of equ	ipments	used in d	aily life.	
ii)	Understand the as	pects of environment;	sources of v	vater, water q	uality, si	upply and	treatment	of water;
roads,	traffic regulations	and structural design.			4	-1 .1 4 .	11-	
III)	Understand the ba	A los un denotor d immo	ii engineerii	ig componen	ts, gener	al day to	day involv	ement of
proble	mgineering in me.	Also understand impo	mance of C	ivii engineen	ing in so	iving env	Ironnent	and other
iv)	Identify the broad	d context of Mechani	cal enginee	ring problem	s inclu	ting desc	rihing the	problem
condit	tions and identifying	g possible contributing	factors	ing problem	is, meru	ung dese	moning the	problem
v)	Understand the fu	undamental elements	of Mechani	cal engineeri	ng syste	ms. svste	em compoi	nents and
proces	sses, with a good un	derstanding of associa	ited safety,	quality, sched	lule and	cost cons	iderations.	
11.	Books Recomme	nded	,					
i)	Elements of Mech	nanical Engineering, S.	M. Bhatt, H	I.G. Katariya	, Books l	ndia pub	lication	
ii)	Introduction to C	Civil Engineering Sys	tems: A Sy	stems Persp	ective to	the De	velopment	of Civil
Engin	eering Facilities 1st	Edition.	1		.		~ 11 1	
iii)	Fundamental of N	Iechanical Engineering	g by G.S. Sa	whney, PHI	Publicati	on New I	Delhi	D 11 1
IV)	Thermal Science	and Engineering by Dr	<u>. D.S. Kum</u>	ar, S.K. Kata	ria& son	s, Publica	ation New	Delhi
v) 12.	Lab components	nanical Engineering, D	esai & Soni	, AtulPrakasi	nan			
Sr. No	b. Title						CO	covered
	(Part I)Mac	hine Studies:						
1	To study the	Cochran and Babcock	& Wilcox b	oilers.				
2	To study the	working and function of	of mounting	s and accesso	ories inbo	oilers.		
3	To study varie	ous types of Internal C	ombustion	Engines.				
	•						•	

4	To study various types of gears and gear boxes.	
5	To study various types of Transmission systems.	
6	To study functioning of Hybrid Vehicles / Electric Vehicles.	
7	To study Psychometric chart.	
8	To Study the vapor compression Refrigeration System and determination of its C.O.P.	
9	To study the functioning of Window Room Air Conditioner.	
10	To study various vapor power cycles.	
11	To study various air standard cycles.	
12	To study the constructional features and working of different types of Hydraulic machines.	
13	Determine Mechanical Advantage, Velocity Ratio and Efficiency of Single Start, Double Start and Triple Start Worm & Worm Wheel.	
14	Determine Mechanical Advantage, Velocity Ratio and Efficiency of Single purchase and Double purchase winch crab.	
(Part II)	Basic Studies in Civil engineering:	
Sr. No	Title	CO covered
1	Determination of pH value of given water samples	
1	Determination of pri value of given water samples.	
2	Determination of total Dissolved solid in a given water sample.	
2 3	Determination of pri value of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter.	
2 3 4	Determination of private of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle.	
1 2 3 4 5	Determination of private of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model.	
1 2 3 4 5 6	Determination of pri value of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model. To conduct a study on Aquifers, groundwater and permeability of soils.	
1 2 3 4 5 6 7	Determination of private of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model. To conduct a study on Aquifers, groundwater and permeability of soils. To study the concept of Meta-centric height of a body.	
1 2 3 4 5 6 7 8	Determination of private of given water samples.Determination of total Dissolved solid in a given water sample.Measurement of environmental noise by noise level meter.To conduct a study on rock formation and rock cycle.To conduct a study on interior of earth on the basis of seismic model.To conduct a study on Aquifers, groundwater and permeability of soils.To study the concept of Meta-centric height of a body.Conducting experiments to verify Bernoulli's theorem.	
2 3 4 5 6 7 8 9	Determination of private of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model. To conduct a study on Aquifers, groundwater and permeability of soils. To study the concept of Meta-centric height of a body. Conducting experiments to verify Bernoulli's theorem. To study the properties of fluid flow.	
1 2 3 4 5 6 7 8 9 10	Determination of privatule of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model. To conduct a study on Aquifers, groundwater and permeability of soils. To study the concept of Meta-centric height of a body. Conducting experiments to verify Bernoulli's theorem. To study the properties of fluid flow. To study the physical properties of soil.	
1 2 3 4 5 6 7 8 9 10 11	Determination of private of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model. To conduct a study on Aquifers, groundwater and permeability of soils. To study the concept of Meta-centric height of a body. Conducting experiments to verify Bernoulli's theorem. To study the properties of fluid flow. To study the physical properties of soil. To study the physical properties of soil.	
1 2 3 4 5 6 7 8 9 10 11 12	Determination of private of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model. To conduct a study on Aquifers, groundwater and permeability of soils. To study the concept of Meta-centric height of a body. Conducting experiments to verify Bernoulli's theorem. To study the properties of fluid flow. To study the physical properties of soil. To study the photogrammetric surveying. To study the geometric design of highway.	
1 2 3 4 5 6 7 8 9 10 11 12 13	Determination of pri value of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model. To conduct a study on Aquifers, groundwater and permeability of soils. To study the concept of Meta-centric height of a body. Conducting experiments to verify Bernoulli's theorem. To study the properties of fluid flow. To study the physical properties of soil. To study the physical properties of soil. To study the photogrammetric surveying. To study the geometric design of highway. To study the Traffic Regulations and Management.	
1 2 3 4 5 6 7 8 9 10 11 12 13 14	Determination of private of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model. To conduct a study on Aquifers, groundwater and permeability of soils. To study the concept of Meta-centric height of a body. Conducting experiments to verify Bernoulli's theorem. To study the properties of fluid flow. To study the physical properties of soil. To study the photogrammetric surveying. To study the geometric design of highway. To study the Traffic Regulations and Management. To study the different elements of building structure.	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	Determination of private of given water samples. Determination of total Dissolved solid in a given water sample. Measurement of environmental noise by noise level meter. To conduct a study on rock formation and rock cycle. To conduct a study on interior of earth on the basis of seismic model. To conduct a study on Aquifers, groundwater and permeability of soils. To study the concept of Meta-centric height of a body. Conducting experiments to verify Bernoulli's theorem. To study the properties of fluid flow. To study the physical properties of soil. To study the physical properties of soil. To study the geometric design of highway. To study the Traffic Regulations and Management. To study the different elements of building structure. To conduct the study on air quality index of ambient atmosphere.	

1. Name	of the	e Department: B.Tech. 1 st Y	ear					
2. Cours	se	Engineering	L (3)		T (1)		P (0)	
Name		Mathematics - II						
3. Cours	se	ME,CE,ECE						
Code								
4. Type	of Cou	ırse (use tick mark)	Core ()	$BSC(\checkmark)$	PE () OE ()			
5. Pre-		Engineering	6. Fi	requency (use	Even Odd Either Every			
requisite (if a	any)	Mathematics - I	tick mar	ks)	(✓) () Sem Se			Sem ()
					0			
7. Total	Numb	er of Lectures, Tutorials, P	ractical (a	ssuming 14 we	eks of or	ne seme	ster)	
Lectures $= 4$	2		Tutorials	s = 14	Pra	ctical =	0	
8. Brief	Svllab	us						
The purpose	of this	module is to provide partic	cipants wit	h the skills, kn	owledge	and att	itudes re	quired to
perform fun	dament	al mathematical procedure	s and pro	ocesses for so	lution o	f engin	neering p	problems,
particularly the	he use	of, calculus, complex variable	les and dif	ferential equati	on. The	subject	aims to	show the
relevance of	mather	matics to engineering and ap	pplied scie	nces. This mod	lule also	facilita	tes articu	ilation to
Degree cours	es in al	I streams of Engineering and	forms a ba	isis for more sp	ecialist b	ranches	of mathe	ematics.
9. Learning objectives:								
engineering a	nd bec	ome skilled in its use for solv	ving proble	ms in science a	nd engine	y of seri	ence, bus	iness and
10. Cours	se Out	comes (COs):		ins in science u	na engine	cornig.		
i) Upon	compl	etion of this course, students	will be abl	e to solve field	problems	s in eng	ineering	involving
PDEs.	1				1	U	U	U
ii) They for analysing	can als	o formulate and solve proble mental data.	ms involvi	ng random vari	ables and	l apply s	statistical	methods
11. Unit	wise de	etailed content						
Unit-1		Number of lectures = 10	M	ultivariable Ca	lculus (l	integrat	tion)	
Multiple Inte	gration	: Double integrals (Cartesian), change o	of order of integ	pration in	double	integrals	. Change
of variables (Cartesi	ian to polar), Applications: an	reas and vo	olumes, Center	of mass a	and Gra	vity (con	stant and
variable dens	sities);	Triple integrals (Cartesian)), orthogoi	nal curvilinear	coordina	ates, Si	mple app	olications
involving cul	bes, sp	here and rectangular paralle	elepipeds; S	Scalar line inte	grals, ve	ctor lin	e integra	ls, scalar
surface integr	als, ve	ctor surface integrals, Theore	ems of Gree	en, Gauss and S	tokes.			
Unit - 2	Num	ber of lectures = 06	Fi	rst order ordi	nary diff	erentia	l equatio	ns
Exact, linear	and Be	rnoulli's equations, Euler's e	quations, E	Equations not of	first deg	gree: equ	ations so	olvable
for p, equatio	ns solv	able for y, equations solvable	e for x and	Clairaut's type.				
Unit - 3	Num	ber of lectures $= 08$	O	rdinary differe	ential equ	ations	of highe	r orders
Second order	· linea	r differential equations with	variable	coefficients, m	ethod of	variati	on of pa	rameters,
Cauchy-Euler	equat	ion; Power series solutions; I	Legendre p	olynomials, Be	ssel func	tions of	the first	kind and
their propertie	es.							
Unit - 4	Num	ber of lectures = 08	C	omplex Variab	le – Diff	erentiat	tion	
Differentiation	n, Ca	uchy-Riemann equations. a	nalytic fu	nctions, harmo	nic fund	ctions.	finding	harmonic
conjugate; el	lement	ary analytic functions (exp	onential,	trigonometric,	logarith	n) and	their p	roperties;
Conformal m	apping	s, Mobius transformations an	d their pro	perties.	-		1	- ´
Unit - 5		Number of lectures = 08	Ti	tle of the unit:	Comple	x Varia	ble – Int	egration

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour.

12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning

portal.<u>https://elearning.sgtuniversity.ac.in/course-category/</u>Journal papers; Patents in the respective field.

13. Books Recommended

i) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

ii) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

iii) P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).

iv) S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

1.	Name of the l	Department: B.Tech. (1st	Year)				
2.	Course	Industrial Chemistry	L (3)	T (1)		P (0)	
Name		-					
3.	Course						
Code							
4.	Type of Coun	rse (use tick mark)	Core (✓)	PE()		OE ()	
5.	Pre-	Chemistry at +2 or	6. Freque	Even (🗸) Odd	Either	Every Sem
requis	ite (if any)	Equivalent Level	ncy (use tick		(✔)	Sem ()	0
			marks)				
7.	7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)						
Lectur	res = 42		Tutorials = 14]	Practical =	0	

8. Brief Syllabus

This course intends to introduce students the basic concept of chemistry with atomic and molecular structures. The students will learn about the stereochemistry and organic principles involved in various reactions. They will also be made aware of different intermolecular forces, fuel/ water chemistry, corrosion phenomenon's and kinetics of reactions. The students will understand the spectroscopic techniques and its applications.

9. Learning objectives:

• To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.

• To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.

• To acquire the knowledge of chemical kinetics, corrosion and water treatment which are essential for the Engineers and in industry.

• To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

• To impart the knowledge of stereo-chemistry and structural aspects useful for understanding reaction pathways.

10. Course Outcomes (COs):

The basic concepts included in this course will help the student to gain:

1. The knowledge of atomic, molecular and electronic changes, chemical interactions, band theory related to conductivity.

2. The required principles and concepts of chemical kinetics, corrosion and in understanding the problem of water and its treatments.

3. The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.

4. The knowledge of structural analysis of molecules and reaction mechanisms.

11. Unit wise detailed content

Unit-1	Number of lectures = 14	Title of the unit: Atomic, molecular structure&Periodic
		properties

Schrodinger equation (Introduction). Forms of the hydrogen atom wave functions. Molecular Orbital theory and its applications in MO energy level diagrams of diatomic molecules (N₂, O₂ and F₂). Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal Field Theory (CFT): Salient Features of CFT-Crystal Field

Splitting of transition metal ion d-orbitals in Tetrahedral, Octahedral and square planar geometries and its applications. Band structure of solids and effect of doping on conductance.

Solid state chemistry: Radius ratio rule, Type of unit cell and Bragg's Law. Graphite as two dimensional solid and its conducting properties. Fullerene and its applications.

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, oxidation states, coordination numbers and molecular geometries.

Unit - 2Number of lectures = 8Title of the unit: Stereochemistry & Organic PrinciplesRepresentations of 3-dimensional structures, structural isomers and stereoisomers, configurations and

chirality, enantiomers, diastereomers, optical activity. Isomerism in transitional metal compounds. Inductive, mesomeric and hyperconjugative effects. Stability of reaction intermediates e.g. carbocation and free radicals. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Structure of medicinal drugs, Paracetamol and Aspirin

Unit - 3Number of lectures = 8Intermolecular forces, Fuel Chemistry & Chemical Kinetics

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena. Classification of fuels, Coal and Biogas. Octane number & Cetane number and their significance. Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Cell potentials, the Nernst equation and applications. Order and molecularity of reactions. Energy of activation. Order and molecularity of reactions, Zero order, first order and second order reactions.

Unit - 4 Number of lectures = 8 Water Chemistry and Corrosion

Hardness of water-Introduction. Causes of Hardness. Types of hardness: temporary and permanent. Expression and units of hardness. Measurement of hardness of water by EDTA method. Method of water softening (Lime Soda process & Zeolite process). Chemical treatment of water- Disinfection of water by chlorination and Ozonization. Demineralization. Desalination of water-Reverse osmosis.

Corrosion: Introduction and types of corrosion (dry and wet corrosion), protective measures against corrosion.

Unit - 5Number of lectures = 4Spectroscopic techniques and applications

Basic principles of spectroscopic methods and selection rules. Applications of UV-Vis, IR, ¹H &¹³C Nuclear Magnetic resonance spectroscopy in the determination of structure of simple organic compounds. Introduction to Magnetic resonance imaging.

12. Brief Description of self-learning / E-learning component

This will involve the NPTEL and SWAYAM portal system for the holistic knowledge. Power Point Presentation will be used and assist in the pictorial based learning and enhance the knowledge in a planned way. Lecture series on the online platform will be beneficial for the students. Online assignment will be designated to students at large.

13. Books Recommended (5 Text Books + 3 Reference Books)

TEXT BOOKS:

• Advanced Inorganic Chemistry, by Cotton, F.A., Wilkinson G., Murrillo, C.A. and Bochmann, Wiley, ehichester, 1999.

REFERENCE BOOKS:

• March's Advanced Organic Chemistry: Reactions, Mechanisms and Structure Smith, Michael B./March, Jerry, John Willey & sons, 6th Edition, 2007.

- Elements of Physical Chemistry, Glasstonne, Samuel B. ELBS, 2005.
- Organic Chemistry, Finar, I.L.: Addision Wesley Longman, Limited, 2004.
- Applied Chemistry (Latest ed.), By H.D. Gesser.

1. Name of the Dep	partment: B.Tech. (1 st Year	r)					
2. Course Name	Industrial Chemistry Lab	L (0)		T (0)		P (2)	
3. Course Code							
4. Type of Course	(use tick mark)	Core (√)	PE()		OE ()	
5. Pre-requisite	Chemistry at +2 or	6.	Freque	Even	Odd	Either Sem	Every
(if any)	Equivalent Level	ncy (u marks	se tick)	(✔)	(•	0	Sem ()
7. Total Number o	f Lectures, Tutorials, Prac	tical (as	suming 14	weeks	of one s	emester)	
Lectures = 0			Tutoria ls = 0	Praction	cal = 28		
8. Brief Syllabus							
This practical course in	tends to enhance thestudent	s' know	ledge relat	ted to th	e basic	concept of ch	nemistry
through experimentation	n. The students will learn	about t	he chemic	alpheno	mena'sa	and proper la	boratory
safetytechniques.This w	ill help them in better und	lerstandi	ing of the	informa	ation ob	tained from o	lifferent
scientific instrumentatio	ns. •						
9. Learning object	ives:	oratoria	han	includin	a nU m	accurament o	aid/basa
• 10 Impart practic	ectroscopy conductometer a	oratory i and Visc	ometer	menuan	ig pri il	leasurement, a	ciu/base
• To provide exp	osure of the scientific tech	niques r	nentioned	above	to have	better knowl	edge of
chemical phenomena.		inques i	ine include a	uee, e,			cage of
• To engage in sa	fe laboratory practices by h	andling	laboratory	glasswa	are, equ	ipment, and c	hemical
reagents appropriately.		-		-	-	-	
• Learn about how	to maintain a detailed scient	ific note	book.				
10. Course Outcom	es (COs): The basic concept	s includ	ed in this c	ourse wi	ill help:		
1. Students to carry	out scientific experiments as	s well as	accurately	record	& analy	ze the results	of such
experiments.							
2. Students will be skilled in handling of various scientific instruments.							
5. Students will lea	n me amerent synthetic met ctical Datails	nouolog	gies and che	ennear p	nenome	na.	
1. Determination of surf	ace tension of given liquid by	y drop n	umber met	hod.			
2. Determine the Viscosi	ty of given liquid by using U	stwald's	s viscomete	er / Keav	vood vis	scometer.	
4 Removal of Ca^{2+} and	Mg ²⁺ hardness from given w	ater sam	nle using i	on exch	ange col	lumn	
5. Determination of chlo	ride content in given water s	ample.	ipie using i	on exem			
6. Calculate the strength	of strong acid by titrating it	with stro	ong base us	sing con	ductome	eter.	
7. To prepare the of urea	formaldehyde and phenol for	ormaldel	nyde resin.	-			
8. To Prepare iodoform.							
9. Calculate the saponification value / acid value of given oil sample.							
10. Chemical analysis of two anions and two cations in given sample of salt.							
11. To determine the total hardness of given water sample by EDTA method.							
11. To determine the tota 12 Study the adsorption	phenomena using acetic acid	mple by d and ch	eDIA me	liiou.			
11. To determine the tota 12. Study the adsorption 12. Brief Description	phenomena using acetic acian of self-learning / E-learning	mple by d and ch ing com	arcoal.				
 11. To determine the total 12. Study the adsorption 12. Brief Description This will involve the use 	phenomena using acetic acie n of self-learning / E-learni of NPTEL and SWAYAM	mple by <u>d and ch</u> ing com portal sy	arcoal. ponent ystem. Pow	er Point	Present	ation will be u	sed and
 11. To determine the total 12. Study the adsorption 12. Brief Description This will involve the use assist in the pictorial base 	phenomena using acetic acid n of self-learning / E-learning of NPTEL and SWAYAM j ed learning and enhance the	mple by <u>d and ch</u> ing com portal sy knowled	arcoal. ponent stem. Pow lge in a pla	er Point	Present	ation will be u	sed and
 To determine the total 12. Study the adsorption Brief Description This will involve the use assist in the pictorial base Books Recommendation 	phenomena using acetic acie n of self-learning / E-learni of NPTEL and SWAYAM <u>ed learning and enhance the</u> ended (1 Text Books + 2 Re	imple by d and ch ing com portal sy knowled ference	arcoal. ponent ystem. Pow lge in a pla Books)	er Point	Present ay.	ation will be u	sed and
 11. To determine the total 12. Study the adsorption 12. Brief Description This will involve the use assist in the pictorial base 13. Books Recommendation TEXT BOOKS: 	phenomena using acetic acid n of self-learning / E-learning of NPTEL and SWAYAM ed learning and enhance the ended (1 Text Books + 2 Re	mple by d and ch ing com portal sy knowlec eference	arcoal. ponent ystem. Pow lge in a pla Books)	er Point unned wa	Present ay.	ation will be u	sed and
 11. To determine the total 12. Study the adsorption 12. Brief Description This will involve the use assist in the pictorial base 13. Books Recommendation TEXT BOOKS: Practical Chemis 	phenomena using acetic acid n of self-learning / E-learning of NPTEL and SWAYAM j ed learning and enhance the ended (1 Text Books + 2 Re try by Dr. O.P Pandey, D. N	mple by d and ch ing com portal sy knowled eference	arcoal. ponent ystem. Pow dge in a pla Books) Dr. S. Gir	er Point inned wa	Present ay. nd; Edit	ation will be u	sed and
 11. To determine the total 12. Study the adsorption 12. Brief Description This will involve the use assist in the pictorial base 13. Books Recommendation TEXT BOOKS: Practical Chemise REFERENCE BOOKS 	phenomena using acetic acid n of self-learning / E-learni of NPTEL and SWAYAM p ed learning and enhance the ended (1 Text Books + 2 Re try by Dr. O.P Pandey, D. N S:	mple by d and ch ing com portal sy knowlec eference	arcoal. ponent ystem. Pow lge in a pla Books) Dr. S. Gir	er Point inned wa	Present ay. nd; Edit	ation will be u	sed and
 11. To determine the total 12. Study the adsorption 12. Brief Description 12. Brief Description This will involve the used assist in the pictorial base 13. Books Recommendation TEXT BOOKS: Practical Chemis REFERENCE BOOKS Modern Textboo 	phenomena using acetic acid n of self-learning / E-learning of NPTEL and SWAYAM j ed learning and enhance the ended (1 Text Books + 2 Re try by Dr. O.P Pandey, D. N S: k of Chemistry Practical by S	Imple by d and ch ing com portal sy knowlec eference . Bajpai, S. N. La	arcoal. ponent stem. Pow dge in a pla Books) Dr. S. Gir l, Swastik l	er Point inned wa	Present ay. nd; Edit rs & Di	ation will be u ion-2010. stributors (200	sed and

1. Name of the Department: B.Tech. (1 st Year)								
2. Course	Communication Skills	L (2)	T (0)		P (0)			
Name								
3. Course								
Code								
4. Type of C	ourse (use tick mark)	Core (√)	PE()	r	OE ()			
5. Pre-	English at +2 level	6. Frequency (use	Even (\vee)	Odd	Either	Every Sem ()		
requisite		tick marks)		(٧)	Sem ()			
(II any) 7 Total Number of Leastures Tutarials Duratical (communication of the second								
$\frac{7.101a1}{1000}$ Number $\frac{7.101a1}{1000}$	er of Lectures, Tutorials	Tutorials – 0	Practical	$\frac{0}{-0}$	mester)			
8 Brief Syllar	NIIG•	1 utorials $= 0$	Tactical	- 0				
Unit I: Effecti	ve Communication							
Introduction to	Communication: Types o	f Communication. Proc	ess of Com	munica	tion			
Barriers to Con	mmunication and ways to	overcome the barriers	to communi	ication				
Unit II: Conv	ersation Skills:							
Greetings and	introducing oneself, Frami	ng questions and answe	ers, Role pla	ıy, Buy	ving: askin	ng details etc.		
Word formatic	on strategies, vocabulary bu	uilding, One word subst	itution, Ant	onyms	, Synony	ms, Homophones,		
Homonyms								
Unit III: Rea	ding Comprehension and	Pronunciation:						
Simple narration	on and Stories, Simple Pas	sages, Newspaper and a	articles clipp	pings, l	Pronuncia	tion: Syllable and		
Stress.			1 17 1			• • • • •		
Sentences: 1 y	bes , Tenses, Phrases and	Clauses, Parts of speech	n. Formal g	ramma	tical cate	gories, Articles,		
Prepositional p	onrases, Phrasal veros	rohansian						
Speeches Inte	rviews, audio video clippi	renension as followed by evercis	90					
Types of Read	ing Regular reading session	n: Newspaper Articles	and Storie	s etc				
Speaking Skills Errors in use of grammatical categories Practice of Skills for Reading and Writing								
Comprehension Using Text from selected Stories/ Newspapers and Handouts								
Unit V: Writing Comprehension:								
Correct the sentences, Note Making, Letter Writing, Brief introduction to Types of Letter. Format of Letter.								
Précis Writing, Paragraph Writing, Report Writing, Difference between Report and Proposal								
9. Learning objectives:								
i) To enhance	the communication skills in	n a effective manner						
ii) To develop	communication skills as w	ell as positive personal	ity traits					
iii) To enhance	e usage of English vocabul	ary and grammar						
iv) To make students competent in professional and technical communication								
i) A hlo to	tcomes (CUS):	the knowledge of acres	munication					
i) Able to	 Able to communicate and expand the knowledge of communication. Able to communicate in English coefficiently. 							
iii) Able to improve pronunciation and accent								
iv) Able to	improve listening and sne	aking skills						
 v) Able to improve reading and writing skills 								
11.Unit wise course details:								
Unit-1Number of lectures = 5Title of the unit: Effective Communication								
Introduction to	Communication, Importa	nce of Communication.	Process of	comm	unication.	Barriers to		
communication and ways to overcome the barriers to communication, Interviews clipping followed by								
exercises.								
Unit - 2	Number of Lectures=5	Title of the unit:	: Conversat	tion Sk	aills			
Greetings and	introducing oneself, Frami	ng questions and answe	ers, Role pla	ıy, Buy	ving: askin	ng details etc.		
Word formation strategies, vocabulary building, One word substitution, Antonyms, Synonyms, Homophones,								
Homonyms								
Unit - 3	Number of lectures = 6	Title of the unit:	Reading (Compr	ehension	and		

Pronunciation				
Simple narration and stories, Simple Passages, Newspaper and articles clippings, Pronunciation: Syllable,				
Stress, Intonation and Modulation				
Sentences types, Tenses, Phrases and Clauses, Parts of speech, Formal grammatical categories, Articles,				
Prepositional phrases, Phrasal verbs				
Unit - 4 Number of fectures = 6 The of the unit: Listening and Reading Comprehension				
Introduction of Listening, Types of Listening, Difference between Listening & Hearing				
Speeches, audio-video clippings followed by exercises.				
Types of Reading, Regular reading session: Newspaper, Articles, and Stories etc.				
Unit-5 Number of lectures = 6 Title of the unit: Writing Comprehension				
The of the unit. Writing comprehension				
Writing Comprehension Using Text from selected Stories/ Newspapers and Handouts.				
Correct the sentences, Note Making, Letter Writing, Brief introduction to Types of Letter, Format of Letter, Précis Writing, Paragraph Writing, Papart Writing, Difference between Papart and Proposal				
Precis writing, Paragraph writing, Report writing, Difference between Report and Proposal				
12. Brief Description of self learning / E-learning component The students will be encouraged to learn using the SCT E Learning portal and choose the relevant leature				
delivered by subject experts of SGT University				
The link to the E-Learning portal:				
https://elearning.sgtuniversity.ac.in/course-category/general/				
13. Books Recommended (3 Text Books + 2-3 Reference Books)				
i) Improve your Writing, V.N. Arora, Lakshmi Chandra, Oxford University Press, New Delhi 2014				
ii) Fluency In English II, Promodini Varma, Mukti Sanyal, OUP India 2006				
iii) Communication Skills in English, D. G. Saxena and Kuntal Tamang, Top Quark, 2011				
iv) Complete Course in English, Robert J. Dixson PHI Private Limited 2009				
v) Effective Technical Communication M Asharaf Rizvi Tata McGraw Hill Education Private Limite 2005				
vi) English Grammar in Context, R K Agnihotri and A L Khanna Ratna Sagar 1996				
vii) Professional Communication, Malti Agrawal Krishna Educational Publishers 2013				

1. Name of	1. Name of the Department: B.Tech. (1 st Year)							
2. Course	Name	Communication Skills	L (0)	T (0)		P (2)		
		Lab						
3. Course	Code							
4. Type of	Course	e (use tick mark)	Core $()$	PE()		OE ()		
5. Pre-requ	uisite	English at +2 level	6. Frequency	Even C)dd	Either	Every	
(if any)		_	(use tick marks)	(√) (*		Sem ()	Sem ()	
7.Total Numbe	r of Le	ctures, Tutorials, Practica	d (assuming 14 week	s of one ser	meste	er)		
Lectures = 0	Lectures = 0 Tutorials = 0 Practical = 28							
8.Brief Syllabus	:							
Module I:								
Introduction to	Words	worth Level-1						
Meeting People,	My Fa	mily, Asking Questions, Co	olours around you, He	oliday Gatev	ways,	, Home Sy	weet Home,	
It's my Life, Fo	od for T	Thought, Making Friends, E	Buying Things, At The	e Park, Who	o's Tł	nis? Home	3	
Improvement, T	he Cale	endar, Time Gone By, Knov	w your Planet, What I	Did you do?	Goir	ng Places,	Do's and	
Don'ts, Parts of	the Boo	ly, Better than the Best, Le	isure Time, A Look ii	nto The Futi	ure, F	How do yo	ou Feel?	
Module II:								
Introduction to (Consona	ant Sounds, Sounds in the H	English Language, Vo	wel Sounds	s, Pro	nunciatio	n and Voice	
Modulation, Pro	nunciat	ion & Voice Modulation, 7	Tenses, Apply for lear	ning, Active	e List	tening, Ne	ews Report	
one, E-Mail Etic	quette, I	Effective Writing						
Module III :								
Pronunciation, I	ntonatio	on, Modulation, Consonant	sounds, Syllable, Sy	llable Stress	s, Pro	onunciatio	n Grammar	
(Adjective), Pro	nunciat	ion Grammar(Prepositions)), Pronunciation Gram	ımar (Subje	ct Ve	erb Agreen	ment),	
Pronunciation G	ramma	r (The Simple Present Tens	se, Present Continuou	s Tense), Pr	onun	ciation G	rammar	
(The Simple Pas	t Tense	e), Pronunciation Grammar	(The Simple Future T	ense)				
9. Learning objectives:								
i) To enha	i) To enhance usage of English vocabulary and grammar							
ii) To devel	ii) To develop communication skills as well as positive personality traits							
iii) To make students competent in professional and technical communication								
10. Course Out	comes	(COs):						
i) Students	will be	able to improve their lister	ning skills					
ii) They will	l be abl	e to communicate in Englis	sh confidently.					
iii) Their pr	onuncia	ation and accent will be imp	proved					
iv) Their wr	iting sk	ills will be enhanced						
v) Reading	skills w	vill be also improved.						
11.Unit wise co	urse de	tails:						
Module-1	Num	oer of practical =10	Title of the unit: L	istening Co	ompi	rehension	1	
Introduction to	Words	worth Level-1	·					
Meeting People,	My Fa	mily, Asking Questions, an	nd Colours around you	ı, Holiday C	Gatew	vays, Hon	ne Sweet	
Home, It's my L	life, Fo	od for Thought, Making Fri	iends, Buying Things	, At The Par	rk, W	ho's This	? Home	
Improvement, T	Improvement, The Calendar, Time Gone By, Know your Planet, What Did you do? Going Places. Do's and							
Don'ts, Parts of the Body, Better than the Best, Leisure Time, A Look into The Future, How do you Feel?								
Module- 2 Number of practical =4 Title of the unit: Conversation Skills								
Introduction to Consonant Sounds, Sounds in the English Language, Vowel Sounds, Pronunciation and Voice								
Modulation, Pronunciation & Voice Modulation, Tenses, Apply for learning, Active Listening, News Report								
one, E-Mail Etiquette, Effective Writing.								
Module- 3	Numl	per of practical =10	Title of the unit: R	leading Co	mpre	ehension	and	
D		M 11 C	Pronunciation	1 0 11 1 1	C 11			
Pronunciation, Intonation, Modulation, Consonant sounds, Vowel Sounds, Syllable, Syllable Stress,								
Pronunciation G	ramma	r (Adjective), Pronunciation	n Grammar (Prepositi	ons), Pronu	nciat	10n Gram	mar	
(Subject Verb Agreement), Pronunciation Grammar (The Simple Present Tense, Present Continuous Tense),								
Pronunciation Grammar (The Simple Past Tense), Pronunciation Grammar(The Simple Future Tense)								

12. Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/general

13. Books Recommended (3 Text Books + 2-3 Reference Books)

i) Words Worth Communication Three Modules

ii) Spoken English with CD, Jayashree Balan, Tata McGraw Hill 2010

1.	1.Name of the Department: B.Tech (1 st Year)						
2.	Со	Basic Electrical Engineering	asic Electrical Engineering L (3)		T (0) P (2)		
urse	e Name			, , ,			
3.	Со						
urse	e Code						
4.	4. Type of Course (use tick mark)		Core (✓)	PE()		OE ()	
5.	Pre	Physics and Mathematics at	6. Frequency	Even	Even Odd		Every Sem ()
-req	uisite	+2 or Equivalent Level	(use tick marks)	(✔)	(🗸)	Sem	
(if a	ny)					0	
7.	Tota	l Number of Lectures, Tutoria	als, Practical (assumin	ng 14 we	eeks of	one seme	ester)
Lectures = 42 Tutorials = 0 Practical = 0							
8.	8. Brief Syllabus						
Electrical Technology is a field of engineering that deals with the study and applications of electrical laws							
and theorems in electrical and electronic systems. The course covers the analysis of basics of electrical							
engineering, electrical parameters measurement and introduction of electrical machines. Upon completion,							
stud	students should be able to deal with the various devices and able to construct the circuits for given						

9. Learning objectives:

basics.

This course gives an idea to students about analyzing and solving different electrical and electronic circuits by applying different laws and theorems. The objectives are:

specification, also able to analyze and study construction and working of electrical machine using electrical

• To prepare students to know the characteristics of different electrical circuits and devices.

• Explain the fundamental principles necessary for the analysis and design of electrical circuits and machines.

10. Course Outcomes (COs):

On completion of this course, the student should be able to:

- Understanding various theorems and applying them to solve different electrical circuits.
- Verifying the characteristics of DC machine, Induction Machine and Synchronous Machine.
- Identify different electrical devices, apply subject knowledge and solve electrical circuit and device problems.

11. Unit wise detailed content

Unit-1	Number of lectures = 11	Title of the unit: DC Network Laws and Theorems

D.C. Network Laws And Theorems: (a). Concepts of network, Active and passive elements, Ohm's law and its limitations, Kirchhoff's laws, Nodal and Loop methods of analysis, Star to Delta & Delta to Star transformation.

(b).Thevenin's theorem, Norton's theorem, Superposition theorem, maximum power transfer theorem, Millman's theorem.

Unit - 2Number of lectures = 9Title of the unit: Single Phase AC Circuits

Single Phase A.C. Circuits: (a). Sinusoidal signal, Instantaneous and peak values, RMS and average values, crest and peak factor, Concept of phase, representation-polar & rectangular, exponential and trigonometric forms, behaviors of R, L and C components in A. C. circuits.

(b). Series and parallel A.C. circuits, Concept of active and reactive power, power factor, series and parallel resonance, Q factor, cut-off frequencies and bandwidth.

Unit - 3	Number of lectures = 12	Title of the unit: 3-Phase Circuits, Magnetic Circuits &
		Single Phase Transformers.

Three Phase A.C. Circuits, Magnetic Circuits & Transformer: Three phase system and its necessity and advantages, Balanced supply and balanced load, Line and phase voltage/current relations, Three-phase power and its measurement by two Wattmeter method.

Magnetic Circuits: Magnetic Effects of Electric Current; Magnetization Characteristics; Electromagnetic, Induction and Self and Mutual Inductance; Hysteresis and Eddy Current Losses.
Introduction to different Electrical measuring Instruments i.e. Wattmeter, Ammeter, voltmeter and Energy meter

Single Phase Transformers: Construction, Ideal Transformer, Transformer under No-Load and Loading Conditions, Phasor diagram under different Load conditions, Equivalent Circuit of Transformer, O.C and S.C test on transformer, Voltage Regulation Efficiency of a transformer.

Unit - 4Number of lectures = 10Title of the unit: DC Machines, 3-Phase induction Motor
and Synchronous Machines

DC machines: Construction, EMF Equation, Torque Equation, Circuit Model – Generating and Motoring Modes. Armature Reaction, Methods of Excitation, Characteristics of DC Motors, Speed Control of Shunt Motor (Field and Armature Control), DC Motor Starting, Application of DC Motors.

Three Phase Induction Motor: Types, Principle of operation, Slip-torque characteristics, Applications **Synchronous Machines**: Construction, Three Phase Synchronous Machines: Principle of operation of alternator and synchronous motor with applications.

12. Brief Description of self-learning / E-learning component

The students can utilize following resources for further learning and practice <u>http://nptel.ac.in/courses/108108076/</u>

https://www.circuitglobe.com

13. Books Recommended (3 Text Books + 2-3 Reference Books)

TEXT BOOKS:

• Basic Electrical Engineering (2nd Edition), Kothari, TMH.

REFERENCE BOOKS:

- Basic Electrical Engineering", S N Singh; Prentice Hall International.
- Electrical and Electronics Technology, Edward Hughes; Pearson Education.
- Electrical technology, (Volume I, II), B L Theraja& A K Theraja, S. Chand & Company.
- Electric Machines, I.J. Nagrath and D.P. Kothari, Tata McGraw-Hill Publishing Company Limited.

1. Name of the Department: B.Tech (1 st Year)									
2.	Sub	Basic Electrical Engineering	L (0)	T (0)		P (2)			
ject N	ame	Lab							
3.	Sub								
ject C	ode								
4.	Туре	of Course (use tick mark)	Core (✓)	PE()		OE ()			
5.	Pre	Physics at +12 Level	6. Frequency	Even	Odd	Either	Every Sem ()		
-requi	isite		(use tick marks)	(•	(✔)	Sem			
(if any	y)					0			
7.	Total	Number of Lectures, Tutorial	s, Practical (assuming	g 14 weel	ks of on	e semest	er)		
Lectu	res = 0		Tutorials = 0	Practi	cal = 28				

8. Brief Syllabus

Electrical Technology is a field of engineering that deals with the study and applications of electrical laws and theorems in electrical and electronic systems. The course covers the analysis of basics of electrical engineering, electrical parameters measurement and introduction of electrical machines. Upon completion, students should be able to perform the experiments based on various circuits and machines. Students able to construct the circuits for given specification, also able to determine the different parameters construction and working of electrical machine using electrical basics.

9. Learning objectives:

This course gives an idea to students about analyzing and solving different electrical and electronic circuits by applying different laws and theorems. The objectives are:

- To prepare students to know the characteristics of different electrical circuits and devices.
- Explain the fundamental principles necessary for the analysis & design of electrical circuits & machines.

10. Course Outcomes (COs):

On completion of this course, the student should be able to:

- Understanding various theorems and applying them to solve different electrical circuits.
- Verifying the characteristics of DC machine, Induction Machine and Synchronous Machine.
- Identify different electrical devices, apply subject knowledge and solve electrical circuit and device problems.

11. Tutorial / Extended Tutorial /presentation/Case study components:

List of Experiments:

- **1.** To study and verify Kirchhoff's Voltage and Current Laws.
- 2. To study and verify Thevenin's theorem.
- **3.** To study and verify Nortons's theorem.
- **4.** To study and verify Superposition theorem.
- 5. To study and verify Maximum power transfer theorem.

6. To study frequency response of RLC series circuit and find out its quality factor and resonance frequency.

7. To study frequency response of RLC parallel circuit and find out its quality factor and resonance frequency.

- **8.** To study O.C and S.C tests on transformer.
- 9. To study various type of measuring instruments meters.
- **10.** To perform direct load test of a transformer and plot efficiency v/s load characteristics.
- **11.** To perform direct load test of a DC shunt generator and plot load voltage v/s load current curve.
- **12.** To study the working of DC machines.

12. Brief Description of self-learning / E-learning component The students can utilize following resources for further learning and practice <u>http://nptel.ac.in/courses/108108076/</u> <u>https://www.circuitglobe.com</u>

1. Name of the De	epartment: B.Tec	h. (1 st Yea	ar)							
2. Course Name	Workshop Technology	L (1)		Τ	(0)			P (0)		
3. Course Code										
4. Type of Course mark)	e (use tick	Core ()	EAS (✓)	PH	EO			OE ()		
5. Pre-requisite (if any)	Physics at +2 Level	6. Frequency Eve (use tick marks)			ren (✔)	Odd (√)	Either Sem ()	Every Sem ()	
7. Total Number	of Lectures, Tuto	rials, Pra	ctical (as	<u>sumin</u>	g 14 we	eks of o	one s	semester)		
Lectures = 14			Tutorial	$\mathbf{s} = 0$			Prac	ctical = 0		
8. Brief Syllabus: Workshop technology lab deals with different processes by which component of a machine or equipments are made. The subject aims at imparting knowledge and skill components in the field of basic workshop technology. It deals with different hand and machine tools required for manufacturing simple metal components and articles.										
 9. Learning objectives: i) As the need of hand on practice for the engineers this course has special weightage. ii) To be industry ready a student must have the knowledge of various welding processes, should have knowledge about the foundry and various machine tools. So, this course fulfills all these needs. 10. Course Outcomes (COs): After the completion of the course, the student shell he she to 										
 i) Practice workshop safety rules effectively 										
ii) Acquire knowledge and use simple measuring and gauging instruments.										
iii) Acquire knowle	dge and use simpl	e hand too	ols							
iv) Operate simple	drilling machines	for produc	ing small	holes		. 1		1		
v) Operate various	machine tools for	producing	g simple i	netal c	ompone	ents and	artic	cles		
11. Unit wise detai	led content	fir foundiry	, iorging		Juing					
Unit-1	Number of lectur	res = 2			Title	of the u	init:	Introductio	on	
Introduction to Manufa Safety; Introduction, Ty Electric Safety Measure	cturing Processes a ypes of Accidents, es, First Aid.	and their C Causes an	Classifica nd Comm	tion, au on Sou	itomation trces of	on in ma Accider	anufa nts, N	acturing, Ind Methods of S	lustrial Safety,	
Unit - 2	Number of lectur	res = 3			Title	of the u	init:	Welding		
Introduction to Welding, Classification of Welding Processes, Gas Welding: Oxy-Acetylene Welding, Resistance Welding; Spot and Seam Welding, Arc Welding: Metal Arc, TIG & MIG Welding, Welding Defects and Remedies, Soldering & Brazing, Comparisons among Welding, Brazing and Soldering.										
Unit - 3	Number of lectur	res = 3	T	tle of	the unit	t: Cold	and	Hot Worki	ng	
Sheet Metal Operations, Measuring, Layout Marking, Shearing, Punching, Blanking, Piercing, Forming, Bending and Joining - Advantages and Limitations. Hot Working Processes: Introduction to Hot Working, Principles of Hot Working Processes, Forging, Rolling, Extrusion, WireDrawing.										
Unit - 4	Number of lect	ures = 3	Tit	e of th	ne unit:	Introd	uctio	on to Machi	ine Tools	

Specifications and Uses of commonly used Machine Tools in a Workshop such as Lathe, Shaper, Planer, Milling, Drilling, Slotter, Introduction to Metal Cutting. Nomenclature of a Single Points Cutting Tool and Tool Wear, Mechanics of Chips Formation, Type of Chips, Use of Coolants in machining.

Unit - 5	Number of lectures = 3	Title of the unit: Foundry

Introduction to Casting Processes, Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern allowances, Risers, Runners, Gates, Molding Sand and its composition, Sand Preparation, Molding Methods, Core Sands and Core Making, Core Assembly, Mold Assembly, Melting (Cupola) and Pouring, Fettling, Casting Defects and Remedies. Testing of Castings

12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. https://elearning.sgtuniversity.ac.in/

13. Books Recommended

Text Book:

1. Workshop Technology (Manufacturing Process) – S K Garg, Laxmi Publications; Fourth edition (2018), ISBN-10: 8131806979

Reference Books:

1. Process and Materials of Manufacture -- Lindberg, R.A. Prentice Hall of India, New Delhi, Fourth Edition, ISBN-10: 9788120306639

2. Principles of Manufacturing Materials and Processes - Campbell, J.S. - McGraw- Hill, New Edition, ISBN-10: 0070992525

3. Manufacturing Science - Amitabha Ghosh & Ashok Kumar Malik, - East-West Press, PEARSON India, Second Edition (2010), ISBN-10: 8176710636

1. N	ame of the De	partment: B.Tech.	(1 st Year	•)					
2. (Course Name	Workshop Technology Lab	L (0)		T (0)		P (4)		
3. (Course Code								
4. Т	Type of Course	(use tick mark)	Core 0	EAS ()	PE()		OE ()		
5. P (if any)	re-requisite	Physics at +2 Level	6. y (use t marks)	Frequenc tick	Even (✔)	Odd (🖌)	Either Sem ()	Every Sem ()	
7. T	<u>otal Number o</u>	of Lectures, Tutoria	als, Pract	tical (assum	ing 14 v	weeks o	f one sem	ester)	
Lecture	$\mathbf{s} = 0$		Tutori	als = 0	Practi	cal = 56			
8. E Worksho made.Th technolo compone	8. Brief Syllabus: Workshop technology deals with different processes by which component of a machine or equipments are made. The subject aims at imparting knowledge and skill components in the field of basic workshop technology. It deals with different hand and machine tools required for manufacturing simple metal components and articles.								
 9. Learning objectives: i) As the need of hand on practice for the engineers this course has special weightage. ii) To be industry ready a student must have the knowledge of various welding processes, should have knowledge about the foundry and various machine tools. So this course fulfills all these needs. 10. Course Outcomes (COs): After the completion of the course, the student shall be able to 									
1) P ii) A	ractice worksho	op safety rules effect	ively.	and gaugir	a instru	monte			
ii) F	cquire knowled	dge and use simple h	and tools	<u>g and gaugn</u> S	ig msu u	ments.			
iv) C	Operate simple d	rilling machines for	produci	ng small hol	es				
v) C	Derate various	machine tools for pr	oducing	simple meta	l compo	nents a	nd articles		
vi) A	cquire knowled	dge and practice on f	foundry,	forging and	welding				
11. 1	ab component	t.S							
S. No.	Title						COC	overed	
1	To perform m etc. on the La	achining operations the.	like turn	ing, step tur	ning, thi	reading	v		
2	To make slot	on work piece by us	ing Milli	ng Machine	•		iv		
3	To prepare gro	oves on work piece	by using	Shaper Mac	hine.		v		
4	To perform su	urface finishing oper	ation on	Surface Grin	nder.		iv, v		
5	To perform drilling operations.								
6	To make cross lap joint.						iii, iv		
7	To make butt	join					i, ii, v	i	
8	To make Lap	joint by using Electr	ric Arc W	velding.			i, ii, v	i	
9	To make butt	joint by using Electr	ric Arc W	Velding			i, ii, v	i	

1. Name of the Department: B.Tech. (1 st Year)									
2. Co	Environment Scien	ce	L (0)	T (0)		P (0)			
urse									
Name									
urse Code									
4. Type	e of Course (use	Cor	e (✔)	PE()		OE ()			
tick mark)	1								
5. Pre	Basic knowledge	6.	Frequency (use	Even	Odd	Either	Every Sem ()		
-requisite	of environment	tick	marks)	(✔)	(✔)	Sem ()			
(II any)	 Number of Lectur		utaniala Practical A						
1.101a	n Number of Lectur	es, 1	Tutorials, Practical-0	Practi	0 – 1eo				
8 Bria	u f Svllahus		1 utor fais -0	riacu	cal = 0				
The course	intends to introduce	etud	ents the objective of e	nvironm	ental sc	iences an	d the importance of		
conservation	of natural resources	The	students will learn abo	ut the sc	urces e	ffects and	control measures of		
air water so	oil noise thermal no	o. The Mutio	n They will also be me	ade awai	re of glo	bal enviro	control incasures of		
students wi	ll understand the ne	ed of	f sustainable developm	auc awai	vironme	ont nacts	role of information		
students will understand the need of sustainable development, environment pacts, role of information technology in the environment. The students will be explained basic principles of green building and									
environmental remedial measures.									
9 Learning objectives:									
• To d	evelop awareness ab	out ou	r environmental scenar	ios.					
• To d	evelop a concern abo	nit sus	stainable development t	hrough t	future st	rategies			
104		ut su		mougni		rategies.			
10. Cou	rse Outcomes (COs)							
On compl	etion of this course,	the stu	adent should be able to:						
• Unde	erstand about enviror	nment	and its components and	d Proble	ms asso	ciated with	n natural resources		
and their sus	stainable use.								
• Sour	ces of pollution in ai	r, wat	er and soil and Solid wa	aste man	agemen	t and natu	ral Disaster		
managemen	t.								
• Unde	erstanding about env	ironm	ental andsocial issues, o	ecosyste	ms, bioc	liversity.			
• Unde	erstanding of role of	inform	nation technology to ad	dress en	vironme	ental issues	s through human		
involvement							_		
11. Unit	wise Detailed Cont	ent	1						
Unit-1	Number of lectur	es=0	Title of the unit: Mu Environmental Scier	lti-disci _] 10es	plinary	Approach	nes of		
Definition a	nd scope: Introducti	on co	omponents of the envir	ronment	enviro	nment des	radation: ecological		
balance: pri	nciples of environn	iental	imponents of the entry	Jeed for	public	awarenes	s on environmental		
issues	neipies of environm	lentui	impuot assessment. 1	100	puone	u warenes	s on environmental		
Unit - 2	Number of lectur	es=0	Title of the unit: Nat	ural Re	sources				
Natural Res	ources: Classification	ı of R	esources: Renewable a	nd non-	renewah	le resourc	es: Water resources:		
use and ov	er utilization of su	face	and ground water. Ro	ole of I	Dams: F	Food Resc	ources: Global food		
challenges.	changes in agricult	tural	ways, water logging.	salinity	: Mine	ral resour	ces: use and over-		
exploitation	: Land resources: Fo	orest	resources. man induces	s landsli	des. soi	l erosion.	and desertification:		
Energy reso	Energy resources: use of alternate energy source case studies: Role of individuals in conservation of natural								
resources									
Unit - 3	Number of lectur	es=0	Title of the unit: Eco	System	S				
Definition	Scope and Importa	ice of	f ecosystem Classifica	tion str	ucture	andfunctio	on of an ecosystem		
Food chain	ns food webe	and	ecological pyramide	Biogeo	chemica		Bioaccumulation		
Biomagnific	ation. Introduction	and cl	haracteristic features of	the foll	owing e	20 system	s.Forest ecosystem		
Grass land	ecosystem Desert 4	ALLO U	stem Aquatic eco eve	teme (n	onde e	treame la	kes rivers oceans		
Grubb Ianu	cosystem Desert (nem, riquare eeo sys	(p	51105, 5				

estuaries)									
Unit - 4	Number of lectures=0	Title of the unit: Bio-diversity and Biotic Resources							
Introduction	, Definition, genetic, speci	es and ecosystemdiversity; Biogeographically classification of India;							
India as Ho	t spots of biodiversity; T	Threats to biodiversity: habitat loss, poaching of wildlife, impactof							
mankind on	wildlife;conservation of b	iodiversity: In-Situ and Ex-situ conservation. National Biodiversity							
act.									
Unit - 5	Number of lectures=0	Title of the unit: Environmental Pollution and Control Technologies							
Environmen	tal Pollution: Classificati	on of pollution. Air Pollution: Primary and secondary pollutants.							
Ambient air quality standards, Water pollution: Sources and types of pollution, drinking water quality									
standards, Soil Pollution: Sources and types, Impacts of modern agriculture, Noise Pollution: Sources and									
Health hazards.Nuclear hazards.Solid waste: Causes, composition, characteristics of e-Waste and its									
managemen	- -								
Pollution co	ontrol strategies:Overview	of different pollution control technologies, Global Environmental							
Issues and C	lobal Efforts: Climate cha	inge and impacts on human environment. Ozone depletion and Ozone							
depleting su	bstances (ODS). Deforesta	ation and desertification. International conventions / Protocols: Earth							
summit, Ky	oto protocol, and Montréal	Protocol.							
Unit - 6	Number of lectures =	Title of the unit: Human population, Social issues and the							
	Nil	Environmental Policy							
Social issue	s and Public awareness	Population and its explosion; role of education on HIV/AIDS							
awareness; I	Role of information techno	logy in environment and human health; Environmental Protection act,							
Legal aspec	ts Air Act- 1981, Water A	Act, Forest Act, Wild life Act, Municipal solid waste management,							
hazardous w	aste management and han	dling rules. EIAstructure. Climate change, global warming, acid rain,							
ozone layer	depletion; Environmental	Ethics;Concept of Green Building.							
12. Brie	f Description of self-learr	ning / E-learning component							
E-Learning,	the online platform, will	involve the NPTEL and SWAYAM portal system for the holistic							
knowledge.	Power Point Presentation	will be used. Online Lecture series will be beneficial for the students.							
Online assig	gnment will be designate	d to students at large. Seminars will be conducted for the broad-							
spectrum kn	owledge.								
13. Bool	as Recommended (1Text	Books + 5 Reference Books)							
TEXT BOC	DKS:								
• Envi	ronmental Studies, Anindi C E BOOKS:	taBasak, Pearson Education, 2009.							
• Tata	McGraw Hill Education P	rivate Limited, 2007.							
• Envi	ronmental Studies, Suresh	K. Dhameja, S.K. Kataria and Sons, 2008.							
• Envi	ronmental Science: toward	ls a sustainable future by Richard T. Wright. 2008 PHL Learning							
Private Ltd.	New Delhi.								
• Envi	ronmental Engineering and	d science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI							
Learning Pv	t. Ltd.	•							

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020 B. Tech. – III Semester

Sr.	Subject	Course title	Schedule				Mark			
No.	Code	Course the	L	Т	Р	С	Int.	Ext.	Total	
1		Digital Electronics & Computer Organization		0	0	3	40	60	100	
2		Signals & Systems	3	0	0	3	40	60	100	
3		Network Theory	3	0	0	3	40	60	100	
4	4 Micro Electronics		3	0	0	3	40	60	100	
5		Engineering Mathematics III	3	1	0	4	40	60	100	
6		Industrial Economics and Management	2	0	0	2	40	60	100	
7		Constitution of India	2	0	0	0	40	60	100	
8		Digital Electronics & Computer Organization Lab	0	0	2	1	40	60	100	
9		Network Theory Lab	0	0	2	1	40	60	100	
10		Circuit Simulation with PCB design Lab	0	0	4	2	40	60	100	
11		Minor Project phase-I		0	2	1	40	60	100	
12		Industrial Training –I	0	0	0	1	40	60	100	
					10	24	100	720	1200	
	Total			30		24	400	120	1200	

1. Name of the Department – Electronics And Communication Engineering								
2. Subject Name	Digital	L	Т	Р				
3.Course Code			3	0	0			
4. Type of Course (us	se tick mark)	Core ($$)	PE()	OE()			

5. Pre-requisit	e (if	Knowledge of Basic	c	6. Frequen	cv	Even	Odd	Either	Everv
any)	· ·	Algebra, Basic Electro	nics	(use √ mar	ks)	0	()	Sem ()	Sem ()
7. Total Numb	er of I	Lectures, Tutorials, Pract	tical		1	~			
Lectures = 38			utoria	ls =0	Practic	cal =0			
8. Course Desc	criptio	n		L					
The course cov	vers ba	sic of logic expression, R	Reduct	ion techniqu	es of B	oolean d	expressi	ion. Knov	vledge of
digital systems	design	n based on combinational	l and	sequential lo	ogic is a	also imp	parted.	This cours	e further
teaches about P	PLD, M	lemories and Logic Famili	ies.	1	C		L		
9. Course obje	ctives:								
1. Underst	anding	g the different number s	system	is used in c	compute	rized s	ystem a	and codes	used to
represent the di	gits an	d arithmetic operation usin	ng eac	h number sy	stem and	d codes.			
2. Enablin	g stude	ents to take up application	speci	fic sequentia	l circuit	to spec	ify the	finite state	machine
and designing the logic circuit.									
10. Course Ou	tcome	s (COs): On completion of	of this	course, the st	tudents v	will be a	able to	_	
1. Verify a	and ana	alyze the input/output data	of eac	ch logic gate	and circ	cuits suc	h as ad	ders, count	ers.
2. Apply t	the dig	ital circuit design concept	ot in d	eveloping ba	asic con	ponent	of con	nputer orga	anization,
projects or exp	erimen	ts.							
11. Unit wise d	ietaileo	a content	ЪT	-h 0		-1	11		
Unit-1	Num	Der of lectures = δ		<u>iber System</u>	and Bo	olean a	Igebra	· · · · ·	·
Review of nur	nber sy	ystem, Boolean algebra: I	De-M	organ's theo	rem, PI	& EPI	, Expre	ession min	imization
using K-maps & Quine McCluskey method, Introduction to Logic Gates and their combinations to design an digital circuit. Universal logic gates & their uses in designing digital system									
Design various logic gates using digital logic families such as TTL FCL CMOS									
Unit – 2 Number of lectures = 10 Combinational & Sequential Circuits									
Combinational Circuits: Design of adder & subtractors Comparators code converters encoders & decoders									
multiplexers &	de-mu	tiplexers Function realize	ation 1	ising multinl	exer	e conve			decoders,
Sequential Circ	uits: L	atches and Flip flops - SR.	. D. Jł	K and T. Des	ign of C	ounters	and shi	ft registers	
Unit – 3	Numł	per of lectures = 10	Svno	chronous &	Asvnch	ronous	Sequer	ntial Circu	its
Finite State Ma	chine.	Mealv/Moore Machines.							
Analysis & de	esign o	of Synchronous sequentia	l circ	uits, Analysi	is & de	esign of	Async	hronous s	equential
machines.	U	•		•		U	•		•
Unit – 4	Numb	per of lectures = 10	Prog	grammable l	Devices	& Logi	ic Fami	lies	
Memories: RO	M, RA	M, PROM, EPROM, Ca	che M	Iemories, An	nd PLA,	PLD, A	And FP	GA. Progr	am these
devices for real	ization	of different logics.							
12 Brief Deser	rintion	of colf-loorning / F-loor	ning o	omnonant					
The students w	ill be e	encouraged to learn using	the S	GT E-I earni	ing port	al and c	hoose t	he relevan	t lectures
delivered by su	hiect e	xperts of SGT University	The l	ink to the E-l	ling poru Learning	ar and c	noose t		t icetures
https://elearnin	g sotur	iversity ac in/course-categ	porv/		Loaining	5 portai.			
13. Books Rec	ommei	nded	<u>, , , , , , , , , , , , , , , , , , , </u>						
Text Books									
1. Mano, M	Morris.	"Digital logic." Computer	r Desi	gn. Englewo	od Cliff	s Prentio	ce-Hall	(1979).	
Reference Boo	ks			0 0					
1. Floyd, 7	Thomas	s L. Digital Fundamentals,	, 10/e.	Pearson Edu	cation I	ndia, 19	986.		
2. Malvino	o, Albe	rt Paul and Donald P. Lea	ch. Di	gital princip	les and a	applicati	ions. M	cGraw-Hil	l, 1986.
3. Jain, Rajendra Prasad. Modern Digital Electronics 3. Tata McGraw-Hill Education, 2003.									
1. Name of the	Depai	rtment – ELECTRONIC	S and	<u>i COMMUN</u>		ON EN	GINE	URING	
2. Subject Nan	ne	Signal & Systems	$\mathbf{L} - \hat{\mathbf{L}}$	5	1 - 0		<u> </u>		
3.Course Code			C	<u>(</u>)	DEC			~	
4. Type of Cou	4. Type of Course (use tick mark) Core (\forall) PE() OE()							C ()	
5. Pre-requisit	te (If	Engineering	0.	r requency	Even	Udd	Eith	er Every	sem ()
				46					

any)	Mathematics-II	(use	tick	0	(√)	Sem ()			
		marks	5)						
7. Total Number of	Lectures, Tutorials, Pract		·-1- 0	D	-1 0				
$\frac{\text{Lectures} = 42}{8}$	0 .0	lutor	ais = 0	Practic	$a_1 = 0$				
8. Course Description	on out the mothematical con-		ion of sig		d arratan		meet immentent		
This subject is abo	but the mathematical repr	resentat	ion of sig	nais and	u system	is. The file line	most important		
representations we	introduce involve the frequ	iency d	iomain – a	differen	it way o	T looking	; at signals and		
systems, and a com	plement to the time-domain	n viewp	point. Inde	ed engin	eers and	scientist	s often think of		
signals in terms of 1	requency content, and syste	ems m	terms of th	leir effec	t on the	Irequenc	y content of the		
input signal.	The star lands and 11 herein an	1 1							
2. Course objectives: The students will learn and understand 1 Determination of system response for a signal									
 Determination of system response for a signal. Eourier and Z transform techniques as tool for signal analysis. 									
2. Fourier and Z transform techniques as tool for signal analysis 10. Course Outcomes (COs): On completion of this course, the students will be able to									
10. Course Outcom	es (COS): On completion of	of this co	ourse, the s	tudents v	will be at	ne to	lution and the		
1. Demonstrate a	in understanding of the re-	tation	among the	e transfe	r luncuc	on, convo	formed many the		
impulse response, t	by explaining the relations	snip, ar	ia using t	ne relati	onsnip t	o solve i	forced response		
problems.	understanding of the relation	nchin h	aturaan the	atability	, and any	colity of	avetome and the		
2. Demonstrate an	and their Laplace transfer	rma bu	etween the	ovnloini	and cau	Isanty OI	systems and the		
relationship to deter	ning the stability and causal	lity of s	votome	ехріанні	ig the re	lationship	, and using the		
11 Unit wise detail	and content	ity of s	ystems.						
II. Unit wise details	Number of lectures -12		Introduct	tion to S	ignola &	Systoms			
Definition types of	signals and their represent	ations	continuous	timo/dia	ignais &	Systems	ia/non pariodia		
even/odd_energy/po	signals and their representation	one di	continuous	-une/us	ansional	le, period	nly used signals		
(in continuous-time	as well as in discrete-til		nensional/	inunuum unit e	ten unit	ramn (and their inter-		
(in continuous-time relationships) expor	as wen as in discrete-in pential rectangular pulse s	sinusoid	lal· operati	α , unit s	continuor	s_time a	nd discrete-time		
signals (including tr	ansformations of independent	nt varial	hles)		ommuoi	is-time a			
Init _ ?	Number of lectures – 10	ii vaita	I anlaca."	Francfor	·m (I T)	and 7_tr	ansform		
One-sided LT of some common signals important theorems and properties of LT inverse LT solutions of									
differential equation	s using LT Bilateral LT I	Regions	of conver	gence (R	(OC) OI D1	ne sided a	and Bilateral Z-		
transforms ZT of se	ome common signals ROC	Prone	erties and t	heorems	solution	n of diffe	rence equations		
using one-sided ZT.	s- to z-plane mapping	, 110pt	und t		, solution		rence equations		
$\frac{\text{using one stated 21}}{\text{Unit}-3}$	Number of lectures = 10		Fourier 7	ransfor	ms (FT)				
Definition, condition	ns of existence of FT, pro	perties.	magnitude	e and ph	ase spec	tra. Som	e important FT		
theorems. Parseval's	s theorem. Inverse FT, rela	ation be	etween LT	and FT.	Discret	e time Fo	ourier transform		
(DTFT), inverse DT	FT. convergence, properties	and the	eorems. Co	mparisoi	1 betwee	n continu	ous time FT and		
DTFT.	,			I					
Unit – 4	Number of lectures = 10		Linear T	ime Inva	riant				
Continuous Time S	vstems: Linear Time invar	iant Sy	stems and	their pr	operties.	Differen	tial equation &		
Block diagram rep	resentation, Impulse respo	nse, Ć	onvolution	integral	l, Freque	ency resp	oonse (Transfer		
Function), Fourier	transforms analysis. Disci	rete Ti	me Systen	n: Diffe	rence eq	uations,	Block diagram		
representation, Impulse response, Convolution sum. MATLAB tutorials.									
12. Brief Description of self-learning / E-learning component									
The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures									
delivered by subject experts of SGT University. The link to the E-Learning portal.									
https://elearning.sgtuniversity.ac.in/course-category/									
13. Books Recommended									
Text Books:									
1. P. Ramakrishna Rao, 'Signal and Systems' 2008 Ed., Tata McGraw Hill, New Delh									
1. Name of the Department – ELECTRONICS and COMMUNICATION ENGINEERING									
2. Subject Name	Network Theory	L –	3	T	- 0		P -0		
3.Course Code	·								
4. Type of Course (use tick mark)	Cor	e (√)	P	E()		OE ()		
5. Pre-requisite	Basic Electrical and	d 6. F	requency	Even	Odd	Either	Every Sem ()		

			1				1		
(if any)	Electronics Engineerin	ng	(use marks)	tick	0	(√)	Sem ()		
7 Total Number of	Lectures Tutorials P	ractic	niar KS) Sal						
Lectures = 39	Lectures, rutorius, r	<u>actic</u>	Tutorial	s =0		P	ractical =	=0	
8. Course Descripti	on		1 4001141	0 0			<u>ucticui</u>	•	
Network Analysis a	Network Analysis and Synthesis is a field of engineering that deals with the study and applications of Graph								
theory, two port parameters and network synthesis, and also deals with the design and application of active									
and passive filters.	Graph theory is consi	idered	to deal	with 1	the prob	lems ass	sociated	with large-scale	
electrical systems s	uch as power transmissi	ion ar	nd distribu	tion s	vstem. T	his cours	se lav for	undation for the	
students to study oth	er subjects related to bo	th the	engineeri	ng stre	ams.				
9. Course objectives:									
1. To learn the co	oncepts of network analy	vsis in	electrical	and el	ectronics	enginee	ring.		
2. To learn linear	circuit analysis, graph t	heory	and netwo	ork the	eorems.	0	0		
3. Analyze two p	ort networks using Z, Y	, ABC	CD and h p	arame	ters				
10. Course Outcom	es (COs): On completio	on of t	his course	the st	tudents w	ill be ab	le to		
1. Analyze an elect	ric network using graph	theor	v and diffe	erent r	network t	heorems	e.g. They	venin's theorem.	
superposition theore	m. Nodal voltage etc. an	nd pov	ver system	transi	nission l	ine using	ABCD r	parameters.	
2. Synthesize an el	ectric network using driv	ving p	oint functi	ons			, 12 02 F		
3. Explain the elect	rical network theories a	nd vei	rifv them t	hrough	n experin	nents			
11. Unit wise detail	ed content			0	- I -				
Unit-1	Number of lectures = 1	12	Graph T	heory	& Netw	ork The	orems		
Graph of a Network	, definitions, tree, co tr	ee , li	ink, basic	loop a	nd basic	cut set.	Incidence	e matrix, cut set	
matrix. Tie set matri	x Duality, Loop and No	dal m	ethods of a	inalysi	is.	· · · · · · · · · · · · · · · · · · ·		,,	
Super-position theo	orem, Thevenin's theor	rem,	Norton's	theore	em, max	kimum p	bower tra	ansfer theorem,	
Reciprocity theorem	. Millman's theorem, co	mpen	sation theo	orem, '	Tellegen	's theore	m.	,	
Unit – 2 Number of lectures = 8 Network Functions and Transient analysis									
Transform Impedan	ces Network functions	of one	e port and	two p	ort netw	orks, coi	ncept of	poles and zeros,	
properties of driving	g point and transfer fund	ctions	, time resp	onse	and stabi	lity from	n pole zer	o plot, transient	
analysis of ac & dc	systems.		· 1			5	1	I /	
Unit – 3	Number of lectures =	9	Two Por	t Netv	works				
Characterization of	LTI two port network	ks ZY	, ABCD	and l	h parame	eters, red	ciprocity	and symmetry.	
Interrelationships be	tween the parameters, in	nter co	onnections	of two	o port net	works, T	& П Re	presentation.	
Unit – 4	Number of lectures = 1	10	Network	Synt	hesis & l	Filters			
Positive real function	on; definition and prop	erties	; propertie	es of l	LC, RC	and RL	driving	point functions,	
synthesis of LC, RC	C and RL driving point	immi	ttance fun	ctions	using Fo	oster and	Causer	first and second	
forms. Image paran	neters and characteristic	s imp	edance, pa	assive	and acti	ve filter	fundame	entals, low pass,	
high pass, (constant	K type) filters, and intro	duction	on to activ	e filter	s.				
12. Brief Description	on of self-learning / E-le	earnii	ng compoi	nent					
The students will be	e encouraged to learn us	ing th	ne SGT E-	Learni	ing porta	l and cho	oose the i	relevant lectures	
delivered by subject	experts of SGT Univers	ity. T	he link to	the E-l	Learning	portal.			
https://elearning.sgt	https://elearning.sgtuniversity.ac.in/course-category/								
13. Books Recomm	ended								
Text Books									
1. A. Chakrabart	1. A. Chakrabarti, "Circuit Theory" Dhanpat Rai & Co								
Reference Books									
1. M.E. Van Valkenburg, "An Introduction to Modern Network Synthesis", Wiley Eastern Ltd.									
1. Name of the Department – ELECTRONICS and COMMUNICATION ENGINEERING									
2. Subject Name	Micro- Electronics	L –	3		T – 0		P -0		
3.Course Code			,						
4. Type of Course (4. Type of Course (use tick mark) Core ($$ PE() OE()								
5. Pre-requisite (if	Basic of Electronics	6. F	requency	(use	Even	Odd	Either	Every Sem ()	
any)		tick	marks)		0	()	Sem ()		

7. Total Number of	Lectures, Tutorials, Practi	ical							
Lectures = 41	Tutorials =	:0	Practical =0						
8. Course Descripti	on								
Analog Electronics	is the base of Electronics	& Communication	on stream. In thi	s course the working of					
various amplifiers is	explained. Students learn h	ow BJT work at 1	low and high freq	uencies, what happens in					
FET amplifiers, Pov	ver amplifiers and feedback	amplifiers, differ	ent types of oscil	llators and their working,					
studying of various t	types of tuned amplifiers.								
9. Course objective	s:								
1. To learn differ	ent biasing techniques and b	ehavior of BJT, F	ET at low and hig	gh frequencies.					
2. To understand the	2. To understand the principle of operation of different amplifier circuits like feedback amplifiers, power								
amplifiers.									
3. To understand	3. To understand the principle of operation of different oscillators circuits.								
10. Course Outcom	es (COs): On completion of	this course, the s	tudents will be ab	le to					
1. Explain the meth	hods of biasing transistors &	t design of simpl	le amplifier circu	its and to develop the					
ability to analyze and	d design analog electronic ci	rcuits using discre	ete components.						
2. Design, construc	t, and take measurement of	various analog ci	ircuits to compare	e. Experimental results in					
the laboratory with t	heoretical analysis.								
11. Unit wise detail	eu content	DIT = 4 1 1	high for any						
Unit-1	Number of lectures $=$ 12	BJ I at low and	nign frequencies	5					
Millors theorem and	12	r amplifiar Unb	rid models of CE	CP CC configurations					
Study of the offect	of amitter by pass condenses	r/ragistance at los	u mouels of CE,	taga gain Current Gain					
gain bandwidth prod	Study of the effect of emitter by pass condenser/resistance at low frequencies, voltage gain, Current Gain,								
Unit – 2 Number of lectures – 8 FFT amplifiers and Power Amplifiers									
$ \begin{array}{c} \text{Omt} - 2 \\ \text{Study of EET Amplifiers: Common source/gete/drain Amplifiers: NMOS/DMOS/CMOS transister analysis: } \\ \end{array} $									
Suuy of FE1 Amplifiers: Classification of amplifiers class A large signal amplifiers second harmonic									
distortion – higher order harmonic generations – computation of Harmonic distortion – Transformer coupled									
audio power amplifi	er – efficiency – push - pull	amplifier – class	B amplifier – cla	ass AB operation – Push-					
Pull circuit with Tra	nsistors of Complimentary S	vmmetrv.	empilier en						
Unit – 3	Number of lectures = 9	Feedback Ampl	ifiers						
The feedback conce	pt – Transfer gain with fee	dback – general	characteristics an	d advantages of negative					
feedback– analysis of	of voltage series, Voltage sh	unt, current serie	es and current shu	int feedback amplifiers –					
Study of the effect	t of Negative feedback on	Gain, Bandwid	lth, Noise, Disto	rtion, Input and Output					
impedances with the	help of Block Schematic and	d Mathematical E	xpressions.						
Unit – 4	Number of lectures = 12	Oscillators a	and FET Amplifi	iers					
Sinusoidal oscillator	s –phase shift oscillator – W	ien bridge oscilla	tor – Hartley osc	illator – Colpits oscillator					
– frequency stability	, Crystal oscillators.	C	•	1					
Common source, C	ommon gate and Common	drain Amplifier	rs – problems. A	analysis of Single tuned,					
Doubled tuned and s	stagger tuned amplifiers.	_	_						
12. Brief Descriptio	on of self-learning / E-learn	ing component							
The students will be	e encouraged to learn using t	the SGT E-Learn	ing portal and ch	oose the relevant lectures					
delivered by subject	experts of SGT University.	The link to the E-	Learning portal.						
https://elearning.sgtu	https://elearning.sgtuniversity.ac.in/course-category/								
13. Books Recommended									
Text Books									
1. Jacob. Millman, Christos C.Halkias, 'Electronic Devices and Circuits', Tata McGraw Hill Publishing									
Limited, New Delhi,	Limited, New Delhi, 2008, ISBN 0070634556, 9780070634558.								
1. Name of the Dep	1. Name of the Department – ELECTRONICS and COMMUNICATION ENGINEERING								
2. Subject Name	Engineering	L – 3	T – 1	P -0					
	Mathematics- III								
3.Course Code									
4. Type of Course (use tick mark)Core $()$ PE()OE()									
5. Pre-requisite (if	Engineering	6. Frequency	Even Odd	Either Every Sem ()					

any)	Mathematics- I	I	(use t	ick	0	(√)	Sem ()	
7. Total Number of	 Lectures, Tutori	als. Practic	marks) al					
Lectures = 54	Lectures, rutor	Tutorials =	=10		Practic	al =0		
8. Course Descripti	on	i atoriais -	-10	I	Tractic	u 1 – 0		
9. Course objective	s:The objective of	this course	is to:					
1. Develop a four	dation of set theo	ry concepts	and notation	n				
2. Demonstrate th	ne application of l	ogic to analy	vzing and wi	riting	proofs			
10. Course Outcom	es (COs): At the	end of the co	ourse studen	t wil	be able	to:		
1. Construct proo	fs using direct pro	of or by co	ontraposition	or b	v contra	diction c	or by cases	S
2. Construct math	nematical argumen	nts using log	gical connect	tives	and quar	ntifiers a	and verify	the
Correctness of an arg	gument using prop	ositional an	d predicate	logic	and trut	h tables.	. 5	
11. Unit wise detail	ed content		•					
Unit-1	Number of lect	ures = 12	Fourier Se	eries	and For	irier Tr	ansforms	
Euler's formulae, co	nditions for a Fou	arier expansi	ion, change	of in	terval, F	ourier e	xpansion	of odd and even
functions, Fourier en	xpansion of squar	re wave, red	ctangular wa	ave,	saw-tool	thed way	ve, half a	nd full rectified
wave, half range sir	e and consine se	ries. Fourie	r integrals, 1	Four	ier transf	forms, S	Shifting th	eorem (both on
time and frequency	axes), Fourier tra	ansforms of	derivatives,	, For	irier tran	isforms	of integra	als, Convolution
theorem, Fourier tran	nsform of Dirac-de	elta functior	1.				-	
Unit – 2	Number of lect	ures = 12	Functions	of C	omplex	Variabl	le	
Definition, Exponen	tial function, Tri	gnometric	and Hyperb	olic	function	ıs, Logi	rithmic f	unctions. Limit
and Continuity of a	a function, Differ	metiability	and Analyti	city.	Cauchy-	-Rieman	n equat	ions, necessary
and sufficient con	ditions for a fur	nction to be	analytic, po	lar f	form of	the Cat	uchy-Rien	nann equations.
Harmonic functions,	application to flo	ow problem	ns. Integrat	ion	of comp	plex fun	ctions.	Cauchy-Integral
theorem and fourmu	la							
Unit – 3	Number of lect	ures = 10	Power ser	ries,	radius a	and circ	le of con	vergence
Power series, radiu	is and circle of	convergenc	e, Taylor's I	Macl	aurin's a	ind Lau	rent's ser	ies. Zeroes and
singularities of com	plex functions, 1	Residues. E	Evaluation of	f real	l integral	ls using	residues (around unit and
semi circle only).								
Unit – 4	Number of lect	ures = 10	Probabilit	y Di	stributio	ons and [Hypothes	sis Testing
Conditional probabi	lity, Bayes theor	rem and its	application	is, ez	spected	value	of a ra	andom variable.
Properties and applic	ation of Binomia	l, Poisson a	and Normal	distri	ibutions.			
UNIT- 5	Number of lect	ures = 10	Testing of	fa h	ypothes	is		
Testing of a hypot	hesis, tests of	significance	for large	sam	ples, Stu	dent's t-	-distributi	on (applications
only), Chi-square te	est of goodness of	fit. Linear	Programmin	ıg: L	inear pro	ogrammi	ng proble	ms formulation,
Solving linear progr	amming problem	s using (i)	Graphical m	ietho	d (ii) Si	mplex n	nethod (ii	i) Dual simplex
method.								
12. Brief Descriptio	n of self-learning	g / E-learniı	ng compone	nt				
The students will be	encouraged to le	arn using th	e SGT E-Le	earni	ng porta	l and ch	oose the i	relevant lectures
delivered by subject	experts of SGT U	niversity. T	he link to the	e E-I	Learning	portal.		
https://elearning.sgtu	<u>iniversity.ac.in/co</u>	urse-categoi	<u>ry/</u>					
13. Books Recomme	ended							
1. Engg Mathematics	s By Babu Ram, F	Pearson India	a					
4 37 0.1 5		• • • •			<u> </u>	•		
1. Name of the Depa	artment – Electro	onics And (Communica	tion	Enginee	ring		
2. Subject Name	Industrial Eco	nomics &	L-3		T = 0		P -0	
	Managen	nent		\longrightarrow				
3.Course Code			a !.	\longrightarrow				
4. Type of Course (use tick mark)		Core (√)	\square	PE()		OE ()	
5. Pre-requisite	Econom	ics	6.		Even	Odd	Either	Every Sem ()
							~	Jan V

	Lectures. Tutorials	Practical			
Lectures $= 50$		Tutorials =0	Practical	=0	
8 Course Description			Tucticut	-0	
The course describes	The course describes the basics of demand and demand forecasting. It explains cost functions cost control				
cost reduction and pri	cost reduction and pricing techniques				
9 Course objectives	•				
1 To describe the role	, e of the company in	the society the d	ifferent business c	ultures and how companies are	
organized and mana	ged from a busine	ss concept to or	ngoing operations	with the support of strategic	
planning formulation	planning, formulation of Objectives and management control				
2. To describe centra	al theories within the	e field of indust	rial management.	such as costing, and to master	
terminology within t	he field. Furthermo	re, to have the a	bility to use tools	in fields such as costing and	
investment analysis.		,			
10. Course Outcome	s (COs):				
1. Get an idea of Price	cing Practices.				
2. Get an idea of Ma	rket Equilibrium and	d Price determina	tion.		
3. Develop Strategie	s to incorporate kno	wledge of good p	ractices of foreign	market in indigenous market.	
11. Unit wise detailed	d content			6	
Unit-1	Number of lectures	s = 10 Introdu	iction		
Introduction: The So	cope and Method	of Managerial e	economics – Fun	damental Economics concepts	
Managerial Economic	es with other subject	s -Objectives of t	he Firm.		
Unit – 2	Number of lectures	s = 10 Deman	d and Supply Ana	llvsis	
Meaning Types and	Determinants – Der	mand estimation-	Demand elasticity	for decision making Business	
and Economic foreca	sting: Qualitativean	d Quantitative m	ethods – Supply at	alvsis: Meaning, elasticity and	
determinants – Marke	t equilibrium and pr	ice determination			
Unit – 3	Number of lectures	s = 10 Produc	tion Economics		
Production and Produ	ction function – Tvr	bes – Estimation -	- Returns to Scale -	- Economies and Diseconomies	
of Scale and Economi	ies of Scope.Factor I	Inputs - Input-Ou	tput Analysis.		
Unit – 4	Number of lectures	s = 10 Market	Structure		
Perfect Competition –	- Imperfect Competi	tion: Monopoly –	Monopolistic – O	igopolistic Strategy, Cartels,	
Cournot. Kinked Dem	hand and Price Lead	ership. Oligopolis	stic Rivalry & The	pry of Games – Measurement	
of economic concentr	ation – Policy again	st monopoly and	restrictive trade pra	actices - Competition Law –	
Pricing Practices: Obi	ectives – Determina	ints – Pricing Met	hods – Governmer	t Policies and Pricing.	
	Number of lectures	s = 10 Introdu	iction to Macroec	onomics	
Unit - 5 Number of lectures = 10 Introduction to Macroeconomics				Income and its significance -	
Circular Flow of Ind	come and Expendi	Circular Flow of Income and Expenditures - Components of National Income and its significance -			
Circular Flow of Ind Measuring Gross Do	come and Expendion mestic Product (G	DP) –Inflation	and Business Cyc	les – Government Fiscal and	
Unit – 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba	come and Expendi omestic Product (G lance of payments –	DP) – Compon DP) –Inflation a Foreign exchang	and Business Cyc e markets	les – Government Fiscal and	
Unit – 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Bai12. Brief Description	come and Expendi omestic Product (G lance of payments – of self-learning / H	DP) – Inflation a Foreign exchang E-learning comp	and Business Cyc e markets o nent	les – Government Fiscal and	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba12. Brief Description13. Books Recommendation	come and Expendi omestic Product (G lance of payments – of self-learning / H nded	DP) –Inflation a Foreign exchang	and Business Cyc e markets onent	les – Government Fiscal and	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba12. Brief Description13. Books Recommend Text Books	come and Expendi omestic Product (G lance of payments – of self-learning / H nded	DP) –Inflation a Foreign exchang E-learning comp	and Business Cyc e markets onent	les – Government Fiscal and	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba12. Brief Description13. Books Recommend Text Books1. P.L. Mehta – Mand	come and Expendi omestic Product (G lance of payments – of self-learning / H nded	Tures – Compon DP) –Inflation a Foreign exchang E-learning compo Analysis, Problen	and Business Cyc e markets onent ns and cases, Sultar	les – Government Fiscal and	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba12. Brief Description13. Books Recommend Text Books1. P.L. Mehta – Mand Reference Books	come and Expendi omestic Product (G lance of payments – of self-learning / H nded	Tures – Compon DP) –Inflation a Foreign exchang E-learning compo Analysis, Problen	and Business Cyc e markets onent hs and cases, Sultar	les – Government Fiscal and	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Bai12. Brief Description13. Books RecommendText Books1. P.L. Mehta – Man Reference Books1. Peterson and Lew	come and Expendi omestic Product (G lance of payments – of self-learning / I nded agerial Economics A is: Managerial Econ	Tures – Compon DP) –Inflation a Foreign exchang E-learning compo Analysis, Problen omics, 4th Ed., P	and Business Cyc e markets onent hs and cases, Sultar rentice Hall , 2004	les – Government Fiscal and	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba12. Brief Description13. Books RecommendText Books1. P.L. Mehta – Man Reference Books1. Peterson and Lew2. Dholakia and Oza	come and Expendi omestic Product (G lance of payments – 1 of self-learning / H nded agerial Economics A is: Managerial Econ : Microeconomics for	Tures – Compon DP) –Inflation a Foreign exchang E-learning comp Analysis, Problen omics, 4th Ed., P or Management S	and Business Cyc e markets onent as and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic	les – Government Fiscal and n Chand & Co. Ltd., 2001	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba12. Brief Description13. Books RecommendText Books1. P.L. Mehta – ManReference Books1. Peterson and Lew2. Dholakia and Oza	come and Expendi omestic Product (G lance of payments – of self-learning / I nded agerial Economics A is: Managerial Econ : Microeconomics for	Tures – Compon DP) –Inflation a Foreign exchang E-learning comp Analysis, Problen omics, 4th Ed., P or Management S	and Business Cyc e markets onent hs and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic	les – Government Fiscal and n Chand & Co. Ltd., 2001 on, Oxford University	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Bai12. Brief Description13. Books RecommendText Books1. P.L. Mehta – Man Reference Books1. Peterson and Lew2. Dholakia and Oza	come and Expendi omestic Product (G lance of payments – of self-learning / I nded agerial Economics A is: Managerial Econ : Microeconomics fo	The second secon	and Business Cyc e markets onent hs and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic	les – Government Fiscal and n Chand & Co. Ltd., 2001	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba12. Brief Description13. Books RecommendText Books1. P.L. Mehta – Mand Reference Books1. Peterson and Lew2. Dholakia and Oza	come and Expendi omestic Product (G lance of payments – 1 of self-learning / H nded agerial Economics A is: Managerial Econ :: Microeconomics fo	Tures – Compon DP) –Inflation a <u>Foreign exchang</u> E-learning compo Analysis, Problen omics, 4th Ed., P or Management S	and Business Cyc e markets onent as and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic	les – Government Fiscal and n Chand & Co. Ltd., 2001 on, Oxford University	
Unit – 5 Circular Flow of Ind Measuring Gross Do Monetary Policy - Bai 12. Brief Description 13. Books Recomment Text Books 1. P.L. Mehta – Mant Reference Books 1. Peterson and Lew 2. Dholakia and Oza	come and Expendi omestic Product (G lance of payments – of self-learning / I nded agerial Economics A is: Managerial Econ : Microeconomics fo	Tures – Compon DP) –Inflation a <u>Foreign exchang</u> E-learning comp Analysis, Problen omics, 4th Ed., P or Management S	and Business Cyc e markets onent as and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic	les – Government Fiscal and n Chand & Co. Ltd., 2001	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Bai12. Brief Description13. Books RecommendText Books1. P.L. Mehta – Man Reference Books1. Peterson and Lew2. Dholakia and Oza1. Name of the Depa	come and Expendi omestic Product (G lance of payments – n of self-learning / H nded agerial Economics A is: Managerial Econ : Microeconomics for <u>rtment – ELECTR</u>	DP) –Inflation a Foreign exchang E-learning comp Analysis, Problen omics, 4th Ed., P or Management S	and Business Cyc e markets onent ns and cases, Sultan rentice Hall , 2004 tudents, 2nd Editic	les – Government Fiscal and n Chand & Co. Ltd., 2001 on, Oxford University	
Unit - 5Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba12. Brief Description13. Books RecommendText Books1. P.L. Mehta – Man Reference Books1. Peterson and Lew2. Dholakia and Oza1. Name of the Depa 2. Subject Name	come and Expendi omestic Product (G lance of payments – of self-learning / I nded agerial Economics A is: Managerial Econ : Microeconomics for rtment – ELECTR Constitution of	tures – Compon DP) –Inflation a Foreign exchang E-learning compo Analysis, Problen omics, 4th Ed., P or Management S ONICS and CO L - 3	and Business Cyc e markets onent as and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic	les – Government Fiscal and n Chand & Co. Ltd., 2001 on, Oxford University ENGINEERING P -0	
Unit - 5 Circular Flow of Ind Measuring Gross Do Monetary Policy - Bai 12. Brief Description 13. Books Recommend Text Books 1. P.L. Mehta – Man Reference Books 1. Peterson and Lew 2. Dholakia and Oza 1. Name of the Depa 2. Subject Name	come and Expendi omestic Product (G lance of payments – of self-learning / I nded hagerial Economics A is: Managerial Econ : Microeconomics for rtment – ELECTR Constitution of India	tures – Compon DP) –Inflation a Foreign exchang C-learning component Analysis, Problen omics, 4th Ed., P or Management S $\overline{ONICS \text{ and } CO}$ L - 3	and Business Cyc e markets onent hs and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic	les – Government Fiscal and n Chand & Co. Ltd., 2001 on, Oxford University ENGINEERING P-0	
Unit - 5 Circular Flow of Ind Measuring Gross Do Monetary Policy - Bai 12. Brief Description 13. Books Recomment Text Books 1. P.L. Mehta – Man Reference Books 1. Peterson and Lew 2. Dholakia and Oza 1. Name of the Depa 2. Subject Name 3.Course Code	come and Expendi omestic Product (G lance of payments – of self-learning / I nded agerial Economics A is: Managerial Econ : Microeconomics for rtment – ELECTR Constitution of India	tures – Compon DP) –Inflation a Foreign exchang E-learning compo Analysis, Problen omics, 4th Ed., P or Management S ONICS and CO L - 3	and Business Cyc <u>e markets</u> <u>onent</u> as and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic <u>MMUNICATION</u> T - 0	es – Government Fiscal and h Chand & Co. Ltd., 2001 on, Oxford University ENGINEERING P-0	
Unit - 5 Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba 12. Brief Description 13. Books Recommend Text Books 1. P.L. Mehta – Mand Reference Books 1. Peterson and Lew 2. Dholakia and Oza 1. Name of the Depa 2. Subject Name 3.Course Code 4. Type of Course (u	come and Expendi omestic Product (G lance of payments – of self-learning / I nded agerial Economics A is: Managerial Econ :: Microeconomics for rtment – ELECTR Constitution of India se tick mark)	tures – Compon DP) –Inflation a Foreign exchang E-learning compo Analysis, Problen omics, 4th Ed., P or Management S ONICS and CO L – 3 Core ($$)	and Business Cyc <u>e markets</u> onent as and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic MMUNICATION T - 0 $PE()$	les – Government Fiscal and n Chand & Co. Ltd., 2001 on, Oxford University ENGINEERING P-0 OE()	
Circular Flow of Ind Measuring Gross Do Monetary Policy - Ba 12. Brief Description 13. Books Recommen Text Books 1. P.L. Mehta – Man Reference Books 1. Peterson and Lew 2. Dholakia and Oza 1. Name of the Depa 2. Subject Name 3.Course Code 4. Type of Course (u 5. Pre-requisite (if	come and Expendi omestic Product (G lance of payments – of self-learning / I nded hagerial Economics A is: Managerial Econ :: Microeconomics for rtment – ELECTR Constitution of India se tick mark)	tures – Compon DP) –Inflation a Foreign exchang E-learning compo Analysis, Problen omics, 4th Ed., P or Management S ONICS and CO L – 3 Core ($$) 6. Frequency (u	and Business Cyc e markets onent as and cases, Sultar rentice Hall , 2004 tudents, 2nd Editic MMUNICATION $T - 0$ PE() ise Even	les – Government Fiscal and n Chand & Co. Ltd., 2001 on, Oxford University ENGINEERING P -0 OE() od Either Every Sem ()	
Unit - 5 Circular Flow of Ind Measuring Gross Do Monetary Policy - Bai 12. Brief Description 13. Books Recommend Text Books 1. P.L. Mehta – Man Reference Books 1. Peterson and Lew 2. Dholakia and Oza 1. Name of the Depa 2. Subject Name 3.Course Code 4. Type of Course (u 5. Pre-requisite (if any)	come and Expendi omestic Product (G lance of payments – of self-learning / H nded agerial Economics A is: Managerial Econ : Microeconomics for rtment – ELECTR Constitution of India se tick mark)	tures – Compon DP) –Inflation a Foreign exchang E-learning compo Analysis, Problen omics, 4th Ed., P or Management S ONICS and CO L - 3 Core ($$) 6. Frequency (w tick marks)	and Business Cyc <u>e markets</u> <u>onent</u> as and cases, Sultan rentice Hall , 2004 tudents, 2nd Editic MMUNICATION $T - 0$ $PE()$ Se Even C $()$ (1)	les – Government Fiscal and h Chand & Co. Ltd., 2001 on, Oxford University $\overline{\mathbf{ENGINEERING}}$ $\mathbf{P} \cdot 0$ $\mathbf{OE}()$ odd Either Every Sem () $\sqrt{5}$ Sem ()	

7. T ota	l Number	of Lectures, Tutorials,	Practical		
Lectur	es = 38		Tutorials =0	Practical =0	
8. Cou	rse Descri	ption			
0 Com	rso object	was.			
9. Cou	i se objecti				
10. Co	urse Outc	omes (COs):			
11. Uni	it wise det	ailed content			
Unit-1		Number of	Introduction to India	n constitution	
Soliont	factures	f Indian Constitution	Noture of Indian Con	stitution Unitomy	
Constit	ution Citi	zenshin	Inature of mutan Cons	sitution- Onitary (or rederar, rieanible or
Unit –	$\frac{1}{2}$	Number of	Fundamental Rights -	- I	
	-	lectures $= 10$		-	
Definit	ion of Stat	e (Article 12), Laws inc	onsistent with Fundam	ental Rights (Artic	le 13), Right to Equality
(Article	e 14-18)	× //		C X	
Unit –	3	Number of	Fundamental Right –	II	
		lectures = 10			
Freedor	m of Spe	ech & Expression (Art.	19), Protection in res	pect of conviction	of offences (Art. 20),
Protect	ion of Life	& Personal Liberty (Art	. 21), Safeguards again	st arbitrary arrest &	t detention (Art. 22)
Unit –	4	Number of	Fundamental Right –	111	
Dialta	animat Em	$\frac{1}{1} = 10$	isht to Encoder of De	licion (Ant. 25.29)	Cultural & Educational
Right a	igainst Exp	Distation (Art. 23-24), R	remadias (Art 22, 25)	ligion (Art. 25-28),	, Cultural & Educational
Direction	AIL. 29-30), Right to Constitutional les & Fundamental Duti	as: Directive Principles	, v of State Policy (A	rt 36-51) Fundamental
Duties	(Art 51A)	Basic Features of Const	titution & Procedure for	Amendment of Co	nstitution
12. Bri	ef Descrir	, busic reduces of const tion of self-learning / E	-learning component	Timenament of Co	institution
12, 011	er Deserrp		icui iiiig component		
13. Boo	oks Recon	nmended			
1.N. Sh	ukla, Con	stitution of India, Eastern	Book Agency, 201		
1.	P. Jain, In	dian Constitutional Law,	Lexis Nexis, 201		
2.	D. Basu, I	ntroduction to the Indian	Constitution of India,	(20th Ed. 2009	
3.	N. Shukla	, Constitution of India, E	astern Book Agency, 2	01	
4.	P. Jain, In	dian Constitutional Law,	Lexis Nexis, 201		
5.	D. Basu, I	ntroduction to the Indian	Constitution of India,	(20th Ed. 2009	201
6. 7	M. Seerva	1, Constitutional Law of	India, Universal Law P	ublishing Co., Repi	rint 201
/. o	Glanville M. Dolrohi	Austin, Indian Constituti	on – cornerstone of the	Nations, Oxford U	niversity Press, 199
8. 0	D Bacu S	hertor Constitution of Ind	ila, Universal Law Publ	rint 2010)	
9.	D. Dasu, S	Shorter Constitution of In	luia (1411 Eu. 2006, lep	1111t 2010)	
1. Nan	ne of the I	Department : Electronic	es and Communication	n Engineering	
2.	Subject	Digital Electronics &	k L	Т	Р
Name		Computer Organizati	on		
		Lab			
3.	Course		0	0	2
Code					
			52		

4.	Type of Cour	se (use tick mark)	Core (√)	PE ()		O E()	
5.	Pre-	Knowledge of Basic	6. Frequency	Even ()	Odd	Either	Every
requ	isite (if any)	Algebra, Basic	(use tick marks)		(√)	Sem ()	Sem ()
		Electronics Lab					
7.	Total Numbe	r of Lectures, Tutorials	s, Practical (assuming	g 14 weeks o	of one ser	nester)	
Lect	ures = 00	Tute	orials = 00	Practical :	= 14		
8.	Brief Syllabu	S					
The	course introduce	s Boolean algebra, Red	uction techniques and	demonstrat	tes the de	esign of lo	gic gates
Knov	wledge of digital	l systems design based	on combinational and	l sequential	logic is	also impa	rted. This
cours	se further teaches	about PLD, Memories a	and Logic Families.				
9.	Course Object	ives	1 1				
1.	Verifying and	analyzing the practical d	ligital circuits.		· · · · · ·	f ', i i i i i i i i i i	
2.	Enabling stud	ents to take up applicatio	on specific sequential	circuit to sp	becity the	finite state	e machine
and c	Course Outcom	ic circuit.					
10. On a	course Outcon	nes Leouree the students will	l ha ahla ta				
	Varify and an	course, the input/output	dete of each logic ge	a and airou	ita anah	aa addara	aountora
1.	verify and an	laryze the input/output t	lata of each logic ga	le and circu	ins such	as adders,	counters
2	18, etc. A polyze the b	asic operation of memor	y call and its limitation	ne in circuit	designing	r	
2.	Anaryze the ba	asic operation of memory		is in circuit	uesigning	•	
11L 2. 3. 4. 5. 6. 7. 8. 9. 10.	Implementation Verification of Implementation Implementation Design, and very Static and Dyn Study of Arith	on of the given Boolean f f state tables of RS, JK, T on and verification of Dec on of $4x1$ multiplexer usion of 4-bit parallel adder erify the 4-bit synchrono erify the 4-bit asynchrono namic Characteristic of N metic Logic Unit.	Function using logic ga T and D flip-flops usin coder/De-multiplexer ng logic gates. using 7483 IC. us counter. ous counter. VAND and Schmitt-Na	ttes in both S and Encodes AND gate(b	SOP and 1 NOR gat r using lo	POS forms tes. gic gates. and MOS).	
12.	Brief Descrip	tion of sen learning / E	-learning component				
13.	Books Recom	mended (3 Text Books	+ 2-3 Reference Boo	ks)			
1.Ma	nno, Morris. "Dig	ital logic." Computer De	sign. Englewood Cliff	s Prentice-H	Hall (1979	<i>)</i>).	
2.	Kumar, A. Anai	nd. Fundamentals of Dig	ital Circuits 2Nd Ed. I	PHI Learnin	g Pvt. Lto	1., 2009.	
3.	Floyd, Thomas	L. Digital Fundamentals	s, 10/e. Pearson Educa	tion India, 1	986.		
4.	Malvino, Albert	t Paul, and Donald P. Lea	ach. Digital principles	and applica	tions. Mc	Graw-Hill	, Inc.,
1986				-			
5.	Jain, Rajendra F	Prasad. Modern Digital E	electronics 3e. Tata Mo	Graw-Hill	Education	n, 2003.	
			• •	·			
1.	Name of the l	Department : Electronic	cs and Communicati	on Enginee	ring		

2.	Subject	Network	L	Т	Р
Name		Theory Lab			
3.	Course		0	0	2
Code					
4.	Type of Cours	se (use tick	Core $()$	PE()	OE ()

mark)							
5. Pre-	Basic Electrical	6. Frequency (use	Even () Odd	Either Every			
requisite (if any)	and Electronics	tick marks)	()	Sem () Sem ()			
requisite (it any)	Fngineering	lick murks)					
	Lingineering						
7 Total Number of Lectures Tutorials Practical (assuming 14 weaks of one somestar)							
7. I Utar Number of Lectures, 1 utorials, reactical (assuming 14 weeks of one semester)							
$\frac{1}{2} = \frac{1}{2} = \frac{1}$. 4°	1 utorials = 00	Practical = 14				
o. Course Description							
Network Analysis and Synthesis is a field of engineering that deals with the study and applications of Graph							
theory, two port para	meters and network	synthesis, and also deals	with the design and a	pplication of active			
and passive filters. Gr	and passive filters. Graph theory is considered to deal with the problems associated with large-scale electrical						
systems such as power transmission and distribution system. This course lay foundation for the students to							
study other subjects re	study other subjects related to both the engineering streams.						
9. Course Objecti	ives						
1. To learn linear of	circuit analysis, grap	oh theory and network theo	rems.				
2. Analyze two po	rt networks using Z	, Y, ABCD and h paramete	rs.				
10. Course Outcon	nes						
On completion of this	course, the students	s will be able to					
1. Design active an	nd passive filter circ	euits.					
2. Explain the elec	trical network theor	ies and verify them throug	h experiments.				
11 List of Exporin	nonts						
1. List of Experim	nenis						
1. To verify Theve		<i>.</i>					
$\begin{array}{ccc} 2. & \text{Io verify Norto} \\ 2 & \text{T} & \text{if } \end{array}$	n's theorem in a.c.						
3. To verify Super	position theorem in	a.c.					
4. To verify the M	aximum Power Trai	nster Theorem.					
5. Determination of	of Z-parameters of a	two-port network.					
6. To verify and de	etermination of Y-p	arameters of a parallel con	nected two-port netwo	rk.			
7. Determination of	of H-parameters of a	two-port network.					
8. To verify and de	etermination of AB	D-parameters of a cascade	e interconnected two-p	ort network.			
9. Determination of	of characteristics im	pedance of a symmetrical T	Γ-network using S/C a	nd O/C test.			
10. To determin	e equivalent parame	eter of parallel connections	of two port network a	nd study loading			
Effect.							
Note: Ten experimen	ts are to be perform	ned, out of which at least	seven experiments sl	nould be performed			
from above list. Rem	aining three experi	ments may either be perfo	ormed from the above	list or designed &			
setup by the concerne	d institution as per t	he scope of the syllabus.					
12. Brief Descrip	tion of self learning	g / E-learning component					
				_			
13. Books Recom	mended						
Text Books							
1. D.Roy Choudha	ary, "Networks and	Systems" Wiley Eastern Lt	d.				
Reference Books							
1. M.E. Van Valke	enburg, "An Introdu	ction to Modern Network S	Synthesis", Wiley East	tern Ltd.			
2. A.Chakrabarti, '	"Circuit Theory" Dł	nanpat Rai & Co.					
3. M.E. Van Valke	enburg, "Network A	nalysis", Prentice Hall of I	ndia				
1. Name of the I	Department : Elect	ronics and Communication	on Engineering				
	1						
2. Subject	Circuit	L	Т	Р			
Name	Simulation with						
	PCB Design						
	Lab						
3. Course		0	0	2			
Code							

	f Course (use	tick	Core (1)	PF()		OFO	
mark)	i Course (use	TUCK		I E()		OE()	
5. Pre-	Kno	wledge of	6. Frequency (use	Even ()	Odd	Either	Everv
requisite (if a	nv) Ele	ectronics	tick marks)		$(\sqrt{)}$	Sem ()	Sem ()
requisite (if a	Cor	nponents				Sem ()	Sem ()
7. Total	Number of Le	ctures, Tuto	rials, Practical (assuming	2 14 weeks of	one sem	ester)	I
Lectures = 0)	/	Tutorials = 00	Practical =	14	/	
8. Course	Description						
The course inc	ludes the desc	ription of Ele	ectronic components, under	rstanding of E	lectronic	s Project I	Design
Flow, Knowle	dge of Schema	atic Design te	chniques, Knowledge of P	CB Design te	chniques	•	
9. Course	Objectives						
1. Verify	ng and analyz	ing the pract	ical digital circuits.				
2. Enabli	ng students to	take up appl	ication specific sequential	circuit to spe	cify the	finite state	machine
and designing	the logic circu	it.					
10. Course	Outcomes						
On completion	of this course	e, the student	s will be able to				
1. To do	he circuit desi	gn and simu	ation				
2. Can w	ork for PCB D	esign.					
3. Will ge	t exposure to	complete PC	B Design & manufacturing	g process.			
4. Knowl	edge of Under	standing of H	Electronics Project Design I	Flow.			
11. List of Ex	periments						
1. Simula	tion of one rec	ctifier circuit	and one clipper/clamper ci	rcuit.			
2. Simula	tion of any on	e transistor b	iasing circuit.				
3. Simula	tions of CE sin	ngle/double s	stage amplifier circuit.				
4. Simula	tion of any on	e power amp	lifier circuit.				
5. Simula	tion of any on	e JFET/MOS	SFET amplifier circuit.				
6. Simula	tion of any on	e negative fe	edback circuit.				
/. Simula	tion of encode	r/multiplexe	r circuit.				
8. Simula	tion of decode	er/de multiple	exer circuit.				
9. Simula	tion of any on	e flip-flop ci	rcuit using gates.				
10. Simul	ation of any on	ie register/co	unter circuit.				
11. Desig	1 OF PCB for a	ny one circui	t from experiment 1 to 6.				
12. Design	of PCB for an	iy one circuit	from experiment / to 10.				
Note: Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & setup by the concerned institution as per the scope of the syllabus.							
12. Brief Dese	ription of self	f-learning /]	E-learning component				
The students y	vill be encour	aged to lear	using the SGT F-Learnin	o nortal and	choose t	he relevan	t lectures

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. https://elearning.sgtuniversity.ac.in/course-category/

13. Books Recommended

1.	Name of the	Department: Elec	tronics and Communic	ation Engineerin	ng
2. Name	Course	Industrial Training I	L	Т	Р
3. Code	Course		0	0	0
4.	Type of Cou	rse (use tick	Core (✓)	PE ()	OE ()

mar	k)						
5.	Pre-	Technical	6. Frequency	Even	Odd	Either	EverySem ()
requ	uisite (if any)	Knowledge &	(use tick marks)	0	(✔)	Sem()	•
_	-	Professional					
	Skills						
7.	Total Numb	er of Lectures, Tu	torials, Practical (ass	uming 14	weeks o	f one sem	lester)
Lectures = 28 Tutorials = 0 Practical = 0							
8.	Brief Syllab	us					
1.	Select the do	main to apply you	whole knowledge & s	kills to imp	prove en	gineering	
2.	Choose corre	ect field to work fu	rther.				
3.	Select the few	w papers & review	them either on same so	oftware or t	hrough	different e	emulator/simulator.
4.	Summarize th	he work and preser	nt in national/internatio	nal confere	ence at le	east.	
9.	Course Obje	ectives:					
1.	To gain first	t-hand experience	of working as an eng	gineering p	orofessio	nal, inclu	iding the technical
appl	ication of engine	eering knowledge.					
2.	To experienc	the discipline of	working in a profession	nal organiz	ation and	d multidis	sciplinary team.
3.	To develop te	echnical, interperso	onal and communicatio	n skills.			
10.	Course Outco	omes					
On o	completion of th	nis course, the stud	dents will be able to g	get the stru	cture of	industry.	He will know the
vario	ous departments	of industry & how	industry works.				
11.	Course Conte	nt					
1.	After 2 nd sem	hester & before 3 rd	semester.				
2.	Duration for	training should be	1 Months.				
3.	It must be in	Industry for study	the working process &	determine	problem	ns & prop	ose solution.
4.	Students have	e to submit to one	spiral binding report &	PPT prese	ntation i	n internal	examination.
5.	Students have	e to submit three H	lard binding report & P	PT present	ation in	final end	term examination

1	Name of the Department: Electronics and Communication Engineering				
2 Name	Course	Minor Project- Phase I	L	Т	Р
3 Code	Course		0	0	2

4 Type of Cour mark)	rse (use tick	Core (✓)	PE ()		OE ()	
mark)						
5 Pre-	Knowledge of	6 Frequency	Even	Odd	Either	EverySem ()
requisite (if any)	Electronics	(use tick marks)	0	(✔)	Sem	•
	Components				0	
7 Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)						
Lectures = 28		Tutorials = 0	Practic	cal = 0		
8 Course contents:						
1. The students are required to develop a product form the idea & knowledge he has.						
2. Students will be allotted to a guide throughout the whole work for the guidance and supervision.						
3. The final Viva	a-voce of this will b	be conducted by the ext	ernal exa	miner and	d one inte	ernal examiner
appointed by the insti	tute. External exan	niner will be from penal	l of exam	iner.		
4. Assessment of	f this will be based	on viva-voca, report an	d present	ation of	the work.	
						_
9 Course Object	ctives:					
The objectives of the	Minor Project Phase	se I include:				
1. To give studer	nts the opportunity	to apply the knowledge	and skill	ls they ha	we acqui	red on campus into
an idea that they want	t to developed.					
2. To provide stu	idents with opportu	inities for practical, han	ds-on lea	rning fro	m practit	tioners in the
students' areas of spe-	cialization.					
3. To enhance th	e practical skills of	f the students so he beco	omes read	ly for wo	rk.	
10 Course Outcomes	s: The learning out	comes can be as follow	s:			
1. Apply theoret	ical knowledge in p	practical applications.				
2. Acquire skills	in communication	, management and team	work.			

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020

B. Tech. – IV Semester

Sr.	Subject	Course title	Schedule	Mark			

No.	Code		L	Т	Р	С	Int.	Ext	Total
1		Analog Integrated Circuit	3	0	0	3	40	60	100
2		Electromagnetic Theory	3	0	0	3	40	60	100
3		Analog Communication	3	0	0	3	40	60	100
4		Interfacing with µP & µC	3	0	0	3	40	60	100
5		Numerical Method	3	1	0	4	40	60	100
6		VA Course-I	2	0	0	0	40	60	100
7		Integrated Circuit Lab	0	0	2	1	40	60	100
8		Analog Communication Lab	0	0	2	1	40	60	100
9		Interfacing with µP & µC Lab	0	0	2	1	40	60	100
10		Major Project phase- I	0	0	4	2	40	60	100
	Т	tal Contact Hours	17	1	10	21	100	600	1000
Total Contact Hours			28		41	400	000	1000	

1. Name of the Department	t – Electronics & Commun	ication Engi	neering	
2. Subject Name	Analog Integrated	L	Т	Р
	Circuits			
3. Subject Code		3	0	0
4. Type of Subject (use tick	x mark)	Core ($$)	PE ()	OE ()
5. Pre-requisite	Semiconductor Devices	6.	Even Odd	Either Sem Every

(if any)		and Circuits	Fre	quency	(√)	()	()	Sem
								()
7. Total Number of Lectures, Tutorials, Practical								
Lectures = 45 Tutorials = 0 Practical = 0								
8. Brief Syllabus: 7	8. Brief Syllabus: To enable the students to understand the fundamentals of integrated circuits and designing							
electronic circuits u	ising it.	Analysis of four qu	adrant and	variable	trans-	-condu	ctance multipl	iers, Voltage
controlled Oscillator	r D/A co	onverter- Current dri	ven DAC, S	witches	for D	AC, A/	D converter V	lave shaping
circuits, Multivibrat	or - Moi	nostable & Bistable	, Schmitt Ti	igger cii	cuits,	IC 555	5 Timer, Appli	cation of IC
555, Frequency to V	oltage co	onverters.						
9. Learning objecti	ves:							
The student will be a	able to le	arn and understand			_			
1. Architecture, ele	ectrical ch	naracteristics and app	plications of	OP-AM	P.			
2. Architecture	, Charact	eristics and Applicat	ions of PLL	, ADC, I	DAC ai	nd regu	lators.	
3. Apply the metho	ds learne	ed in the class to desi	ign and impl	ement pr	actical	proble	em	
10. Course Outcom	ies (COs): On completion of	this course,	the stude	nts wi	ll be ab	ble to	
1. Demonstrate t	he ability	to apply the practic	e of Analog	Integrate	d Circ	uits in	real-world pro	olems.
2. Design, layout	t, and test	ting of Op Amps and	l other analo	g circuits	5.			
3. Identify, form	ulate, and	l solve engineering p	problems in A	Analog Iı	ntegrat	ed Cire	cuit Design	
11. Unit wise detail	ed conte	nt	r					
Unit - 1		Number of lecture	s = 12 Op	erationa	l Amp	lifiers		
Analysis of diffe	erence a	mplifiers, Monolith	nic IC ope	erational	ampl	ifiers,	specifications	, frequency
compensation, slew	rate and	methods of improvi	ng slew rate	, Linear	and No	onlinea	r Circuits usin	g operational
amplifiers and their	analysis,	Inverting and Non in	nverting Am	plifiers				
Unit – 2		Number of lecture	s = 11 Ap	plication	s of O	perati	onal Amplifie	ſS
Differentiator, Integ	rator Vol	ltage to Current conv	vertor, Instru	imentatio	on amp	olifier,	Sine wave Osc	illators, Low
pass and band pass	filters, co	omparator, Multivib	rator and Sc	hmitt trig	gger, T	riangl	e wave generat	or, Precision
rectifier, Log and An	ntilog am	plifiers, Non-linear	function gen	erator.				
Unit – 3		Number of lecture	s = 11 Ana	alog Mu	ltipliei	r and I	PLL	
Analysis of four qu	adrant a	nd variable trans-co	nductance n	nultiplier	s, Vol	tage co	ontrolled Oscil	lator, Closed
loop analysis of PLI	L, AM, P	M and FSK modula	tors and der	nodulato	rs. Fre	equenc	y synthesizers,	Commander
ICs.						_	-	
Unit – 4		Number of lecture	$\mathbf{s} = 11 \mathbf{D}/\mathbf{A}$	and D/	A Con	verter	S	
Analog switches, H	igh spee	d sample and hold	circuits and	sample	and ho	old IC's	s, Types of D/	A converter-
Current driven DA	C, Swit	ches for DAC, A/	D converter	, Flash,	Single	e slop	e, Dual slope	, Successive
approximation, DM	and ADM	M, Voltage to Time a	and Voltage	to freque	ency co	nverte	rs.	
12. Brief Description	on of self	-learning / E-learni	ng compon	ent				
The students will be	e encoura	aged to learn using	the SGT E-	Learning	porta	l and c	hoose the rele	vant lectures
delivered by subject	experts of	of SGT University. 7	The link to th	e E-Leai	rning p	ortal.		
https://elearning.sgt	university	y.ac.in/course-catego	ory/		01			
		-						
13. Books Recomm	ended							
1. Ramakant A	. Gayakw	vad, "OP - AMP and	Linear IC's	", 4th Ed	ition, l	Prentic	e Hall, 2000, I	SBN
0132808684, 97801	32808682	2			ŗ			
2. Millman J. a	nd Halkia	as C.C., "Integrated	Electronics '	', McGra	w Hill	, 2001,	ISBN 007462	2455,
9780074622452				·				,
1. Name of the Dep	1. Name of the Department – Electronics & Communication Engineering							
2. Subject Name	2. Subject Name Electromagnetic Theory I. T. P							
3. Subject Code		<u> </u>	3		0		0	
4. Type of Subject	(use tick	mark)	Core (V)	PE ()	OE	
5. Pre-requisite	Mather	natical Foundation	6.	Eve	n (√	Ödd	Either Sem	Everv Sem
(if any)	Соц	rse on Vectors	Frequency) `	()	()	()
7. Total Number of	f Lecture	es, Tutorials. Practi	cal		<u> </u>	× /	. ,	

Lectures = 45	Tu	utorials = 0		Pra	ctical = 0			
8. Brief Syllabus:	Unit I Discusses basic	s of Electromagnetic H	Field theory.	Unit	II Signifies ap	plications of		
Electrostatic and M	Aagnetic Field Applica	ations. Unit III Provid	le detail stud	dy of	time varying	Electric and		
Magnetic field. Unit IV gives Wave propagation study of Electromagnetic field.								
9. Learning object	ives: The students will	learn and understand						
1. Understand the	ne concepts of Electrost	tatics and their applicat	ions.					
2. Learn the conce	pt of Electromagnetic I	Fields, waves and wave	e propagatior	1.				
10. Course Outcor	nes (COs): On complet	tion of this course, the	students will	l be at	ole to			
1. Analyze Ve	ctor Mathematics relate	ed to Electric and Mag	netic Field					
2. Analyze the	ory on Wave propagati	on						
11. Unit wise detai	led content							
Unit - 1	Number of lectures =	12 Basic Concept	s Of Field T	heory	/	D :		
Introduction to var	rious Co-ordinate Syst	tems - Sources and el	ffects of ele	ctrom	agnetic fields.	Divergence		
theorem-Strokes th	eorem- Field theory an	id circuit theory compa	arison- Elect	ric fie	eld intensity. E	lectric fields		
due to point, line	, surface and volume	e charge distributions	– Electric	flux	density- Cou	lomb's law.		
Introduction to mag	<u>snetic circuits – Magnet</u>	tically induced ENIF an	a Mechanica	al for	ce, torque calcu	ilations.		
$\frac{\text{Unit} - 2}{\text{Cause's laws and it}}$	Number of lectures =	field in free groups	and Magnet		ics Application	ns nolonization		
Gauss's law and lu	Electric field in mu	ultiple dielectrice. De	unders, d		nc -Dielectric	polarization.		
Dielectric strength	- Electric field in ind	Energy density problem	undary cond	intions	s, Poisson's ai	Id Laplace s		
Magnetic field due	to straight conductors	circular loop infinite	iis.	ant uci	ing Ampara an	d Bio Savart		
law Magnetic flux	density (\mathbf{R}) B in free	e space conductor m	agnetic mate	riale	Magnetizati	n Magnetic		
field in multiple me	dia Boundary conditi	ions	agnetic mate	11115		m. Magnette		
$\frac{11010 \text{ minutiple me}}{11010 \text{ minutiple me}}$	Number of lectures –	11 Time Verving	Flectric and	l Mar	matic Fields			
Faraday's laws _	Transformer and m	otional EME-continui	ty current	equati	ion_Displacem	ent current-		
conduction current	Energy in quasi-stat	ionary Electromagneti	c Fields M	axwel	ll's equations	(differential		
integral forms and	sinusoidal variation of	field with time) Poter	tial for time	varvi	ng fields flow	of power in		
electromagnetic fie	ld-Poynting vector.			, ar j r		or power m		
Unit -4	Number of lectures =	11 Electromagnet	tic Waves					
Wave equations, W	Vave parameters, veloc	ity, intrinsic impedance	e-quantitativ	ve ana	lysis propagat	ion constant.		
Electromagnetic wa	ave equation for free s	pace, lossy/lossless die	electrics. Wa	ave ec	uation for cor	nductors-skin		
depth. Plane wave	reflection and refraction	on, incidence of plane	wave at the	bound	dary b/w two i	region ratios,		
Input impedances,	Standing wave, critical	angle of incidence, Bre	ewster angle.		2	C ,		
12. Brief Descripti	on of self-learning / E	-learning component						
The students will b	be encouraged to learn	using the SGT E-Lear	rning portal	and c	hoose the rele	vant lectures		
delivered by subjec	t experts of SGT Unive	ersity. The link to the E	-Learning po	ortal.				
https://elearning.sg	tuniversity.ac.in/course	-category/						
13. Books Recomm	nended							
Text Books:					.1			
1. William Ha	yt, "Engineering Electre	omagnetics", McGraw	Hill, New Y	ork, 7	$7^{\rm m}$ edition, 2014	4.		
2. Matthew. N	.O. Sadiku, "Elements	of Electromagnetics", I	Fourth Editic	on, Ox	ford Universit	y Press,		
		- /						
1. Name of the Dep	<u> partment – Electronic</u>	s & Communication I	Engineering					
2. Subject Name	Analog Communica	ation L	Т		P			
3. Subject Code		3	0		0			
4. Type of Subject	(use tick mark)	Core $()$	PE ())	OE	()		
5. Pre-requisite	Signal and system	ns 6.	Even $(\sqrt{ } C)$)dd	Either Sem	Every Sem		
(if any)		Frequency) (()	()	()		
7. Total Number of	of Lectures, Tutorials,	Practical						

7. Total Number of Lectures, Tutorials, Practical

Lectures = 45

Tutorials = 0

Practical = 0

8. Brief Syllabus: Communication is the basic process of exchanging information. **Analog** Communication, as the name suggests is the subject which deals with the techniques employed in communication and basically analog in nature. It is a common knowledge that understanding digital communication is impossible if one does not have a knowledge in analog communication methods.

9. Learning objectives:

- 1. Concepts of communication engineering.
- 2. Different analog modulation techniques used.
- 3. Systematic comparison of various modulation techniques.

10. Course Outcomes (COs): On completion of this course, the students will be able to

- 1. Understand different modulation and demodulation techniques.
- 2. Apply signal and system analysis tools in the time and frequency domains, including impulse response, convolution, frequency response, Fourier series, Fourier transform, and Hilbert transform.

3. Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.

11. Unit wise detailed content

Unit - 1Number of lectures = 12Basics of Communication Theory

Need and Importance of Communication, Types of communication systems- Simplex and Duplex systems, Analog and digital systems, Applications of Electronic Communications, Electromagnetic Spectrum used in communication and various frequency bands, Concept of bandwidth. Noise in communication and types of noise (External and Internal), Noise voltage, Signal-to-noise ratio, Noise Figure, Noise temperature.

Unit - 2Number of lectures = 11Amplitude Modulation

Baseband and pass band signals. Amplitude Modulation(AM)- generation & demodulation, Modified forms of AM- Double sideband suppressed carrier (DSBSC), single sideband suppressed carrier (SSBSC) and Vestigial sideband (VSB) modulation, Mixers, Frequency Division Multiplexing.

Unit - 3Number of lectures = 11Angle Modulation

Phase modulation (PM) and Frequency modulation (FM), narrow and wideband FM, Generation & demodulation, phase locked loop (PLL), homodyne and heterodyne receivers, elements of TV broadcast and reception; Noise in CW modulation: Receiver model, SNR, noise figure, noise temperature, noise in DSB-SC, SSB, AM & FM receivers, pre-emphasis and de-emphasis.

Unit - 4Number of lectures = 11Pulse Modulation

Sampling Process, Basics of Pulse modulation, Types of Pulse Modulation – PAM, PWM and PPM.

12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

13. Books Recommended

Text Books

1. Simon Haykin, "Communication Systems", 4th edition, John Wiley & Sons, 2006, ISBN 812650904X, 9788126509041

2. R. E. Ziemer, W. H. Tranter: "Principles of Communications: Systems, Modulation, and Noise", 5th Edition, Pearson Education India, 1998, ISBN 8131703266, 9788131703267

1. Name of the Department – Electronics & Communication Engineering									
2. Subject Name	Т		Р						
3. Subject Code		3	0		0				
4. Type of Subject (use tick mark)		Core ($$)	PE ()		OE ()				
5. Pre-requisite	Digital Design/Computer	6.	Even (√	Odd	Either Sem	Every Sem			
(if any) Architecture Frequency) () () ()									
7. Total Number	7. Total Number of Lectures, Tutorials, Practical								

Lectures = 45

Tutorials =0

Practical =0

8. Brief Syllabus: Course consists of various microprocessor and microcontrollers. It also comprises the interfacing & programming for the development of different applications.

9. Learning objectives:

1. To gain an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques with peripheral devices

2. To gain an understanding of applications of microprocessors in designing processor-based automated electronics system.

10. Course Outcomes (COs): On completion of this course, the students will be able to

- 1. Explain the internal organization and operation of microprocessors/microcontrollers.
- 2. Program 8086 Microprocessor, 8051 and PIC Microcontrollers for application specific solution
- 3. Implement and develop new experiments on microprocessor/microcontroller based systems.

11. Unit wise detailed content

Unit - 1Number of lectures = 12Introduction

Introduction to Microprocessors, Microcontrollers. System design: Assembly and High Level language programming. System Development Environment: assembler, compiler and integrated development environment.

Unit - 2Number of lectures = 118086 Microprocessor & interfacing

Architecture, Programming: Instruction sets, addressing modes and Interrupts and interrupts handling. I/O Interfacing: 8255 PPI interface, DMA controller interface.

Unit - 3Number of lectures = 118051 Microcontroller

MCS-51 family features, Architecture Instruction set & programming, addressing modes– Programming interrupts, timers and serial communication–system design with 8051. Interfacing to various input and output device & their programming.

Unit - 4Number of lectures = 11Introduction to Embedded Systems

System level interfacing design; ARM microcontrollers; Embedded system design methodologies.

12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. https://elearning.sgtuniversity.ac.in/course-category/

13. Books Recommended

Text Books

1. Barry B Brey, The Intel microprocessor: Architecture, programming and interfacing, PHI, 2003. ISBN: 0138027455, 4th Edition.

2. Mohammad Ali Mazidi and Janice Gillispie Maszidi "The 8051 Microcontroller and Embedded Systems" Pearson education, 2003, ISBN- 9788131710265, 2nd Edition.

Reference Books

1. Kenneth J. Ayla, "The 8051 Microcontroller", Thomson learning, 3rd edi, 2004, ISBN-140186158X

2. Alan Clements, "Principles of Computer Hardware", Oxford University Press, 3rd Edition, 2003.

1. Name of the Department – Electronics & Communication Engineering								
2. Subject Name	e Numerical Method	L	Т		I)		
3. Subject Code		3	1		0)		
4. Type of Subject (use tick mark)		Core ($$)	PE ()	OE	()		
5. Pre-requisite	Engg. Mathematics	6.	Even (√	Odd	Either Sem	Every Sem		
(if any)		Frequency)	()	()	()		
7. Total Numbe	r of Lectures, Tutorials, Prac	tical						
Lectures $= 43$	5 Tutoria	als =0		Pra	ctical =0			
8. Brief Syllabu	is: Syllabus covers basic of	mathematics met	hodologie	s range	s from linear	& non linear		

equations, interpolation. It also covers numerical differentiation and integration.

9. Learning objectives:

To enhance problem solving skills of engineering students using a powerful problem solving tool namely numerical methods. The tool is capable of handling large systems of equations, nonlinearities and complicated geometries that are common in engineering practice but often impossible to solve analytically.

10. Course Outcomes (COs): On completion of this course, the students will be able to

- 1. Apply various numerical methods and appreciate a trade off in using them.
- 2. Understand the source of various types of errors and their effect in using these methods.
- 3. To distinguish between Numerical and Analytical methods along with their Merits and demerits.

11. Unit wise detailed content

Unit - 1Number of lectures = 12Non- Linear Equations and system of Linear Equations

Introduction, error and error propagation, Bisection method, False position Method, Method of Iteration, Newton-Raphson Method, Secant Method, Gauss Elimination method Gauss – Jordan method, Gauss – Seidel method, convergence of iterative methods.

Unit - 2Number of lectures = 11Interpolation

Newton's Forward and Backward Interpolation, Lagrange's Interpolation, Newton's Divided Difference Interpolation, Inverse Interpolation.

Unit - 3Number of lectures = 11Numerical Differentiation and Integration

Derivations from difference tables, Higher order derivations. Newton – Cotes integration formula, Trapezoidal rule, Simpson's rule, Boole's rule and Weddle's rule, Romberg's Integration

Unit – 4	Number of lectures = 11	Numerical Solution of Ordinary & Partial Differential
		Equations

Taylor series method, Euler and modified Euler method, Runge Kutta methods, Milne's method, Finite Difference method. Finite difference approximations of partial derivatives, Solution of Laplace's equation (Elliptic) by Liebmann's iteration method, Solution of one dimensional heat equation (Parabolic) by Bender-Schmidt method and Crank – Nicolson method, Von-Neumann stability condition, Solution of one dimensional wave equation (Hyperbolic), CFL stability condition.

12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

13. Books Recommended

Text Books:

1. Introductory Methods of Numerical Analysis: S.S. Sastry, PHI learning Pvt Ltd.

Refrence Books:

1. Numerical Methods for Scientific and Engineering computation: M.K Jain, S.R.K Iyengar and R.K Jain, New age Inter-national Publishers.

1. Name of the Department – Electronics & Communication Engineering								
2. Subject Name	. Subject Name VA Course I		L	Т		Р		
3. Subject Code			3	0		0		
4. Type of Subject (use tick mark)			Core ($$)	PE ()		OE ()		
5. Pre-requisite			6.	Even	Odd	Either Sem	Every Sem	
(if any)			Frequency	(√)	()	()	()	
7. Total Number of Lectures, Tutorials, Practical								
Lectures = 45 Tutorial			s = 0			Practical = 0		

ves:	
tes (COs): On completion of this course	the students will be able to
ed content	
Number of lectures = 12	
Number of lectures = 11	
Number of lectures = 11	
Number of lectures = 11	
on of self-learning / E-learning compo	nent
ended	
	ves: nes (COs): On completion of this course, ed content Number of lectures = 12 Number of lectures = 11 Number of lectures = 11 Number of lectures = 11 on of self-learning / E-learning component ended

1. Name of the Department – Electronics & Communication Engineering								
2. Subject Name Integrated Circuit Lab L T P						Р		
3. Subject Code 0 0 2								
4. Type of Subject	(use tick mark)	Core ($$)	PE (()	0	$\mathbf{E}()$		
5. Pre-requisite		6.	Even	Odd	Either Sem	Every Sem		
(if any) Frequency $()$ () ()								
7. Total Number of	f Lectures, Tutorials, Practi	cal						

Lectures = 24

Tutorials =0

8. Brief Syllabus: Course cover the basic IC & their applications. Theses IC applications includes analog filter designing, drivers for different motors operation and multi vibrators.

9. Learning objectives:

1. To familiarize the students with the analog computer

2. To help the students understand and practice the modeling, simulation, and implementation of a physical dynamical system by a linear time invariant ordinary differential equation

3. To highlight the electrical modeling of a second order system and analyze the under-damped, overdamped and critically damped cases

- 4. To familiarize students with Servo-Motor.
- 5. To implement the basic principles of Servo-Motor calibration.

10. Course Outcomes (COs): On completion of this course, the students will be able to

1. Students will demonstrate the ability to apply what they have learned theoretically in the field of control engineering using both analog and digital techniques.

2. Students will demonstrate the ability to apply what they have learned theoretically in the field of control engineering using both analog and digital techniques.

11. Contents of Lab

- 1. Log and antilog amplifiers.
- 2. Voltage comparator and zero crossing detectors.
- 3. Second order filters using operational amplifier for-
- Low pass filter of cutoff frequency 1 KHz.
- High pass filter of frequency 12 KHz
- Band pass filter with unit gain of pass band from 1 KHz to 12 KHz.
- 4. Wien bridge oscillator using operational amplifier.
- 5. Determine capture range; lock in range and free running frequency of PLL.

6. Voltage regulator using operational amplifier to produce output of 12V with maximum load current of 50mA.

- 7. Voltage to current and current to voltage convertors.
- 8. Function generator using operational amplifier (sine, triangular & square wave)
- 9. Astable and monostable multiviberator using IC 555
- 10. To study speed Torque characteristics of a) A.C. servo motor b) DC servo motor
- 11. (a) To demonstrate simple motor driven closed loop DC position control system.
- (b) To study and demonstrate simple closed loop speed control system.
- 12. To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots.

13. To study a stepper motor & to execute microprocessor or computer-based control of the same by changing number of steps, direction of rotation & speed.

14. To implement a PID controller for temperature control of a pilot plant.

12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

13. Books Recommended

1. Name of the Department – Electronics & Communication Engineering								
2. Subject Name	Analog Communication	L	Т	I	H			
	Lab							
3. Subject Code		0	0		2			
4. Type of Subject (use	tick mark)	Core ($$)	PE (()	OE ()			
5. Pre-requisite	Signal and systems	6.	Even	Odd	Either Sem	Every Sem		
(if any)		Frequency	(√)		()	()		

7. Total Number	r of Lectures. Tutorials. 1	Practio	cal			
Lectures = 24		Tuto	rials =0		Pra	ctical =0
8. Brief Syllabus: The Lab subject basically deals with the different aspects of a signal and spectra. It also deals with the modulation of signals and different mathematical aspects related to signals. It gives a more analytical look into the basic entities such as those of signals, modulation, noise etc. which form the base for higher studies in telecommunication.						
9. Learning obje	ectives:					
1. Concepts of	f communication engineer	ring.				
2. Different a	nalog modulation techniqu	ies use	d.			
10. Course Outc	omes (COs): On completi	ion of t	this course, the	students will	be al	ble to
1. Understand	different modulation and	democ	lulation techniq	les.	c	· 11/
2. Develop the	e ability to compare and co	ontrast	the strengths ar	d weaknesse	es of	various modulation
11 Contents of	 Lahi					
 To design r 	 To design Modulation and Demodulation of Amplitude Modulated signal. To design modulation and demodulation through DSB-SC techniques. To design modulation and demodulation through SSB-SC techniques. To design modulation and demodulation through vestigel side band techniques. To design Modulation and Demodulation of Frequency modulated Signal. To design Pulse Amplitude Modulation. To design Pulse Width Modulation. To design Pulse Position Modulation. To design Band-pass Filter. To design Mixer Circuit. 					
12. Brief Descrip The students will delivered by subj <u>https://elearning.s</u>	be encouraged to learn us ect experts of SGT University.ac.in/course-	learni sing the rsity. T <u>catego</u>	ng component e SGT E-Learnin The link to the E- ory/	ng portal and Learning po	l choortal.	ose the relevant lectures
13. Books Recon	nmended					
Text Books 1. Simon Haykir 9788126509041. 2. Bernard Skl 9788131720929.	 Text Books 1. Simon Haykin, "Communication Systems", 4th edition, John Wiley & Sons, 2006, ISBN 812650904X, 9788126509041. 2. Bernard Sklar, "Digital Communication", Pearson Education India 2009, ISBN 8131720926, 9788131720929. 					
 Reference Books 1. R. E. Ziemer, W. H. Tranter: "Principles of Communications: Systems, Modulation, and Noise", 5th Edition, Pearson Education India, 1998, ISBN 8131703266, 9788131703267 2. Herbert Taub and Donal L. Schilling, "Principles of communication Systems", Tata McGraw-Hill Education, 2008, ISBN 0070648115, 9780070648111 3. K. Sam Shanmugam,"Digital and Analog Communication Systems", John Wiley and Sons, 2006, ISBN 8126509147, 9788126509140. 						
1 1 0 4 5		0.0	• .•	• •		
1. Name of the D	epartment – Electronics	& Col	mmunication E	ngineering		n
2. Subject Name	Lab	μc	L	I		ľ

Name	Lab					
3. Subject Code		0	0		2	2
4. Type of Subject	ct (use tick mark)	Core ($$)	PE ()	OE	()
5. Pre-requisite	Digital Design/Computer	6.	Even (√	Odd	Either Sem	Every Sem
(if any)	Architecture	Frequency)	()	()	()

Le	ctures = 24	Tutorials =0	Practical =0
8. Br	rief Syllabus: Students will	l be able to design, construct	t. program, verify, analyze, and troubleshoot
funda	mental microprocessor inte	rface and control circuits using	g related equipments.
9. Le	arning objectives:		
Unde	rstanding and implementa	tion of the operation of mich	roprocessors and microcontrollers,
mach	ine language programming	& interfacing techniques with	peripheral devices
10. C	ourse Outcomes (COs): O	n completion of this course, th	e students will be able to
1.	Program 8086 Microproc	essor, 8051 and PIC Microcon	trollers for application specific solution
2.	Design microprocessors/r	nicrocontrollers-based systems	8
3.	Implement and develop n	ew experiments on microproce	essor/microcontroller based systems.
11. C	ontents of Labs		
1.	Programming for differen	t mathematical operations.	
2.	Programming for logical	operations	
3.	Interfacing of display dev	ices	
4.	Interfacing with actuators		
Micro	ocontroller Lab		
1.	Programming for various	arithmetical & logical operation	on programming.
2.	Interfacing of input & out	put devices & operate them th	rough programming.
3.	Communication to periph	erals through programming.	
4.	Generation of different si	gnals of different duty cycle.	
12. B	rief Description of self-lea	rning / E-learning componen	nt
The s	tudents will be encouraged	to learn using the SGT E-Learn	ning portal and choose the relevant lectures
delive	ered by subject experts of S	GT University. The link to the	E-Learning portal.
https:	//elearning.sgtuniversity.ac.	in/course-category/	
13. B	ooks Recommended		
Text	Books		
1.			
ittv h	DIEV. THE INTEL MICROPROC	essor: Architecture, programm	ing and interfacing. Prentice hall of

India, New Delhi, 2003, ISBN-0138027455, 4th Edition

2.

ohammad Ali Mazidi and Janice Gillespie Mazidi "The 8051 Microcontroller and Embedded Systems" Pearson education, 2003, ISBN- 9788131710265, 2nd Edition

Reference Books

1.

enneth J. Ayla, "The 8051 Micro controller", Thomson learning, 3rd edition, 2004, ISBN-140186158X 2.

lan Clements, "Principles of Computer Hardware", Oxford University Press, 3rd Edition, 2003, ISBN-9780198564539

1. Name of the Department – Electronics & Communication Engineering								
2. Subject Name	Minor project phase - I	L	Т		Р			
3. Subject Code		0	0		2			
4. Type of Subjec	t (use tick mark)	Core ($$)	PE ()	OE ()			
5. Pre-requisite		6.	Even	Odd	Either Sem Every Sem			
(if any)		Frequency	(√)	()	()	()		

7. Total Number of Lectures, Tutorials, Practical							
Lectures = 24	Tutorials =0	Practical =0					

8. Brief Syllabus: Students will be able to design, construct, program, verify, analyze, and troubleshoot fundamental microprocessor interface and control circuits using related equipments.

9. Learning objectives:

The objectives of the Minor Project Phase II include:

4. To give students the opportunity to apply the knowledge and skills they have acquired on campus into an idea that they want to developed.

5. To provide students with opportunities for practical, hands-on learning from practitioners in the students' areas of specialization.

6. To enhance the practical skills of the students so he becomes ready for work.

10. Course Outcomes (COs): The learning outcomes can be as follows:

- 3. Apply theoretical knowledge in practical applications.
- 4. Acquire skills in communication, management and team work.

11. Course Contents:

- 5. The students are required to develop a product form the idea & knowledge he has.
- 6. Students will be allotted to a guide throughout the whole work for the guidance and supervison.
- 7. The final Viva-voca of this will be conducted by the external examiner and one internal examiner

appointed by the institute. External examiner will be from penal of examiner.

8. Assessment of this will be based on viva-voca, report and presentation of the work.

12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT E-Learning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. <u>https://elearning.sgtuniversity.ac.in/course-category/</u>

13. Books Recommended

Sr. Subject Course title		Schedule				Mark			
No.	Code	Course the	L	Т	Р	С	Int.	Ext.	Total
1		Antenna wave propagation	3	0	0	3	40	60	100
2		Digital Communication	3	0	0	3	40	60	100
3		DSP with simulation	3	0	0	3	40	60	100
4		Program Elective-I	3	0	0	3	40	60	100
6		Open Elective -I	3	0	0	3	40	60	100
7		Essence of Indian knowledge Traditional	2	0	0	0	40	60	100
8		Antenna Design & Simulation Lab	0	0	2	1	40	60	100
9		Digital Communication Lab	0	0	2	1	40	60	100
10		DSP with Simulation	0	0	2	1	40	60	100
11		Manor Project phase -II	0	0	2	1	40	60	100
12		Industrial Training-II	0		0	1	40	60	100
13		General Lab -I	0	0	2	1	40	60	100
	Total Contact Hours		17	0	10	21	520	780	1200
			27			21	520	/80	1300

B. Tec	h. – V	Semester
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1. Name of the Department – ELECTRONICS & COMMUNICATION ENGINEERING								
2. Course Name	Antenna wave	L – 3	T - 0		P -0			
	propagation							
3.Course Code								
4. Type of Course (use tick mark)		Core ($$)	PE()		OE ()			
5. Pre-requisite	Electromagnetic Field	6. Frequency (use	Even	Odd	Either	Every		

(if any)	Theory	tick marks)	0	(√)	Sem ()	Sem ()		
7. Total Number of	Lectures, Tutorials, P	ractical			·	-		
Lectures = 38	Tu	torials =0	Practic	al =0				
8. Brief Syllabus								
The above said subj	ect is divided into 4 un	ts. Unit I Discusses basic	es of Ante	enna Para	ameters. U	Jnit II Gives		
derivations of Field	l Equations. Unit III F	rovide study of Arrays	and Dipe	ole Ante	nna Unit	IV . Study		
characteristics of Ar	rays and Wave Propaga	ion.						
9. Learning objecti	ves: The students will le	arn and understand						
1. To develop an	1. To develop and apply the mathematical tools to analyze radiation characteristics of aperture							
antennas.								
2. To design and ana	alyze various broadband	, high gain, planar antenn	as and and	tenna arr	ays.			
3. To summarize dif	ferent diversity and com	bining techniques.						
4. To study smart an	itenna and algorithms.							
10. Course Outcom	ies (COs): On completion	on of this course, the stude	ents will b	be able to)			
3. Describe va	rious parameters and ou	line radiation equations.						
4. Design vario	ous types of radiators for	wireless communication	S.					
5. Analyze and	synthesize antenna and	antenna arrays.						
6. Characterize	various diversity and co	ombining techniques.						
11. Unit wise detail	ed content	10 1.4						
Unit-1	Number of lectures = $\frac{1}{2}$	12 Introduction		A (
Retarded potential,	field of short dipole, A	itenna pattern & antenna	paramet	ers Ante	enna patte	rn, Gain,		
Directivity, Radiatio	on resistance, Aperture, I	Seam-width etc, Reciproc	Ity theore	m for an	tenna.			
$\frac{\text{Unit} - 2}{\text{W}}$	Number of lectures =	8 Derivation of Field	Equation	ns f alla atui	1	- 4 4 1		
wave equation for i	radiated fields from cur	ent and voltage sources i	in terms (finition	c scalar p	otential and		
magnetic vector po	tential .Fleids and path	ern of an infinitesimal d	ipole. De	inition	of variou	s potentials		
Used in antenna theo	Dry.	0 Antonno Amora II	alf Dinal	a A nton	n 0			
Two alamant array	hroad side Ways agust	9 Antenna Arrays, п	an Dipol	e Allen	lla	og in torme		
1 wo element array,	otential and magnetia	on for radiated fields fro	in current	and voi	infinitaci	mal dinala		
Definition of variou	s potentials used in ante	rector potential. Fields a	ind patier	II OI all	minitesi	mai uipoie.		
Relation between c	urrent distribution and	field nattern of an ante	nna line	ar anten	na half v	vave dinole		
Antenna impedance	Directivity Radiation	resistance Directional r	roperties	Fffect of	of ground	on antenna		
pattern Input imped	ance Broad band match	ng End fired nattern	noperties,		or ground	on antenna		
$I_{\text{init}} = 4$	Number of lectures =	9 Characteristics of	Arravs ai	nd Wave	Pronaga	tion		
Beam width pattern	multiplication multi ele	ment array and their prop	perties Sy	vnthesis	of an arra	v Parabolic		
feed antenna, conica	l helix log periodic ho	rn. Microwave antenna g	round wa	ves prop	agation S	pace waves		
propagation, Effect	of Earth. Duct formation	Ionosphere, and sky wa	ve.		ugution, b	puee waves		
12 Brief Descriptio	on of self-learning / E-l	parning component						
The students will be	encouraged to learn usi	ng the SGT EI earning no	rtal and c	hoose th	e relevant	lectures		
delivered by subject	experts of SGT Univers	ity		noose in	e reievant	lectures		
The link to the E-Le	arning portal https://ele	rning sotuniversity ac in/	course-ca	tegory/				
13. Books Recomm	ended	<u>annig.sgtaniversity.ae.m/</u>		<u></u>				
1 Antennas by ID Kraus TMH								
2 Antenna & Wave Propagation by K D Prasad								
1. Name of the Den	1. Name of the Department – ELECTRONICS & COMMUNICATION ENGINEERING							
2. Course Name	Digital Communicati	on $L-3$	T – 0		P-0			
3.Course Code	8							
4. Type of Course (use tick mark)	Core $()$	PE()		OE ()			
5. Pre-requisite	Analog Communicatio	n 6. Frequency (use	Even	Odd	Either	Every		
(if any)		tick marks)	0	()	Sem	Sem ()		
		,			0	, v		
			•					

7. Total Number of I	Lectures, Tutorials, Practica	ıl					
Lectures $= 40$		utorials =	Practical =				
8. Brief Syllabus	I						
This course will intro	oduce students to the concept	t of analog digitizat	ion using PCM.	maximum-likelihood			
design digital modula	design digital modulation and demodulation techniques and performance of digital communication systems						
using error probability	using error probability. Student will learn about multiple access techniques after completion of this course						
9 Learning objective	es. The student will learn and	understand	ues unter complet	ion of this course.			
1 Difference betw	een analog and digital commu	unication systems	nd compare their	respective			
advantages and disadv	vantages	unication systems, a	nd compare them	respective			
2 Pole of Digital I	Modulation and Demodulation	n techniques in diffe	rent application				
2. Role of Digital I	$(\mathbf{CO}_{\mathbf{g}})$. The students will be	a abla to					
1 Explain the mas	s (COS). The students will be	e able io Collowing: Shonnon'	a abannal aanaaitu	theorem whor			
1. Explain the mea	uning and significance of the i	onowing. Snannon s	s channel capacity	meorem, super-			
neterodyne receiver, n	humplexing and multiple acco	ess	-1. ¹				
2. Apply the sample	ling theorem to quantify the f		snips between cha	innel bandwidth			
(in hertz), digital sym	bol rate, and bit rate (in bits/se	ec).		•			
3. Understand the	concept of Spread Spectrum t	echniques and Mult	iple Access Techr	nques.			
11. Unit wise detailed	1 content						
Unit-1	Number of lectures = 10 C	ommunication Sys	tem & Informati	on Theory			
Mathematical Models	of Communication Channel.	Information and Ch	annel Capacity, E	Entropy, Discrete and			
Continuous Channels	, Fano and Huffman's Codin	ng. Overview of Sa	mpling, Quantiza	ation – Uniform and			
Non-uniform (A-law	& μ-law), Encoding Techn	iques for Analog S	Sources. Classific	ation of line codes,			
characteristics and pov	wer spectra of line codes.						
Unit – 2	Number of lectures = 8 B	aseband Transmiss	sion				
Baseband data Trans	mission Systems: Baseband	and Band pass tra	ansmission throu	gh AWGN channel,			
Coherent and non coh	erent receiver structures, Err	or Probability, Pulse	Shaping, M-ary	,			
Signaling Schemes, M	latched Filter. Equalization. I	SI. Eve Pattern analy	vsis. Symbol Syn	chronization.			
$\frac{1}{1} = 3$	Number of lectures -8 M	Indulation Scheme	<u>, , , , , , , , , , , , , , , , , , , </u>				
Digital Modulation Sc	chemes ASK PSK ESK and	OAM systems Prol	, hability of Error i	n Digital Modulation			
Schemes Continuous	Phase Carrier Modulation	Differential module	ation schemes re	ceiver structure and			
orror performance De	rformance comparison of mo	dulation schemes	ation schemes, it	cerver structure and			
			•				
$\frac{\text{Unit}-4}{1}$	Number of lectures =14 S	peech Coding Tech	niques				
Adaptive Delta Moc	Iulation, Speech coding, Li	inear Predictive C	oding, Sub band	Coding, Adaptive			
Transform Coding; S	pread Spectrum & Multip	ole Access Techniq	ues: Generation	of PN Sequences –			
Properties of PN S	equences – Direct Sequence	ce Spread Spectru	m – Frequency	Hopped Spectrum.			
Introduction to Multip	ole Accesses – TDM/TDMA -	– FDM/FDMA – CE	DMA – SDMA - C	OFDM/OFDMA.			
12 Brief Description	of self-learning / E-learning	g component					
The students will be e	ncouraged to learn using the	SGT FL earning port	al and choose the	relevant lectures			
delivered by subject e	vperts of SGT University	SOT LLearning port	ai and choose the	Televant lectures			
The link to the F-I ear	rning portal https://elearning.	atuniversity ac in/co	ourse_category/				
	The link to the E-Learning portar <u>intps://elearning.sgtuniversity.ac.in/course-category/</u>						
12 Deales Decommon	ndad						
13. BOOKS Recommended							
1. Simon Haykin, "Digital Communication", John Wiley, edition- 2009, ISBN 0-471-17869-1							
1. Name of the Depa	artment – ELECTRONICS	& COMMUNICA	FION ENGINE	ERING			
2. Course	Digital Signal Processing	L - 3	T - 0	P -0			
Name	With Simulation						
3. Course Code		,					
4. Type of Cours	se (use tick mark)	Core $()$	PE()	OE ()			
5. Pre-	Signals and Systems	6. Frequency	y Even Odd	Either Every			
	0	•					
requisite (if any)		(use tick marks)	() $()$	Sem Sem ()			
requisite (if any)		(use tick marks)	() (1)	Sem Sem ()			

Lectures $= 40$			Tutorials =	I	Practical :	=		
8. Brief Syllabus								
Digital signal processing (DSP) is concerned with the representation of signals in digital form, and with the								
processing of these signals and the information that they carry. Although DSP, as we know it today, began to								
flourish in the 1960's.	some of the importa	nt and po	werful process	ing tech	niques tha	t are in us	se todav mav be	
traced back to numeric	al algorithms that w	vere propo	sed and studie	d centuri	les ago			
0 Loorning objectives:								
1 To import the kn	owledge of key DS	Deconcent	and how do t	hav ralat	a to real a	nnligation	26	
1. To impart the kind of the control	he methods of time	domain a	s and frequency d	lomoin ir	e il leal a	ppilcation	15.	
	2. To introduce to the methods of time domain and frequency domain implementation.							
to present a comprehensive influencient to important DSF technologies with a focus on filter design								
techniques and Fourier analysis of signals using DFI								
10. Course Outco	mes (COs):		1 /					
On completion of this	course, the students	will be a	ble to					
I. Apply digital signa	al processing fundan	nentals.						
2. Acquire the knowl	edge of representation	on of disc	rete-time signa	als in the	frequency	/ domain,	, using z-	
transform and discrete	Fourier transform.							
11. Unit wise deta	iled content							
Unit-1	Number of lectur	es = 10	Introduction	l				
Basic elements of DS	P and its requirement	nt, Advar	tages of Digit	al over a	nalog sig	nal proce	ssing, sampling	
theorem, sampling pro	ocess and reconstrue	ction of s	ampling data.	Discrete	time sign	nals & sy	stems: Discrete	
time signals & system	s, classification of c	liscrete ti	me signals and	l systems	s, LTI sys	tems, line	ear convolution,	
Cross Correlation, Aut	ocorrelation.		-	•	-			
Unit – 2	Number of lectur	es = 10	Z-Transforn	1				
The Z-transform: Defi	nition, properties of	the regio	n of convergen	ce for th	e Z-transf	orm. Z-tr	ansform	
properties. Inverse Z-t	ransform. Parseval's	s theorem	unilateral Z-t	ransform		,		
Unit -3	Number of lectur	es = 10	Discrete and	Fast Fo	urier Tra	nsforms		
Definition and propert	ies of DFT IDFT R	elation b	etween DFT ar	$d Z_{Tra}$	nsform R	adix-2 F	FT algorithms	
Linear filtering method	ds based on DFT ci	reular cor	volution Fred	uency an	alveis of a	discrete ti	me signals	
using DFT Gortzel alo	orithm		ivolution, i req	ucincy an	1d1 y 515 01 V		ine signais	
$\frac{1}{1} = \frac{1}{2}$	Number of lectur	es -12	Multirate DS	SP				
Introduction Decimat	ion by factor D. Int	ernolation	by factor I	ampling	roto cons	version by	v rational factor	
I/D Sub band coding	of speech signals	and its on	nlightions int	oduction	, factory t_{0}	lot & way	valat transform	
I/D, Sub band counig	of speech signals a	ind its ap	plications, inti	oduction	I to wave	let & wa	velet transform,	
Introduction to DSP and	contecture TWIS 520). / E. L	•					
12. Brief Descript	ion of self learning	/ E-learr	ing compone	nt	1 1	.1 1	. 1	
The students will be en	icouraged to learn u	sing the S	GI ELearning	g portal a	nd choose	the relev	ant lectures	
delivered by subject ex	sperts of SGT Unive	ersity.		• •				
The link to the E-Lear	ning portal. <u>https://e</u>	learning.s	sgtuniversity.ac	c.in/cours	se-categor	<u>'y/</u>		
13. Books Recom	mended (3 Text Bo	oks + 2-3	Reference Bo	oks)				
1. J.G. Proakis, I	D.G. Manolakis "D	igital Sig	nal Processing	g: Princi	ples, algo	rithms an	nd applications,	
Pearson Education.								
Reference Books								
1. De Fatta, D.J.Lucas	, J.G. & Hodgkiss, V	W. S.," Di	gital Signal Pr	ocessing	", John W	iley& So	ns.	
1. Name of the D	epartment- ELEC	TRONIC	CS & COMM	UNICAT	FION EN	GINEER	ING	
2. Course	Measurements	L		Т		Р		
Name	and							
	Instrumentation							
3. Course Code		3		0		0		
4. Type of Cours	e (use tick mark)	√ (Core ()	PEO		OE O		
5 Pro_roquisito	Rasic Flectrical	6 1	Treatiency	Even	Odd	Fither	Every Sem ()	
(if any)	and Electronics	U. I (uso tiol	z marlza)		1 ch	Sem ()		
	Engineering		s mai 185 <i>j</i>			Sem ()		
1	Lugmeering			Ì	1	1	1	
. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)								
--	----------------	-------------	--	--	--	--	--	
Lectures = 38	Tutorials = 00	Practical =						

8. Brief Syllabus

This course deals with the basics of Electrical and Electronic measuring instruments used in laboratory and industry. In the process they learn different type of instruments like PMMC, Moving Iron, Electrodynamometer which includes voltmeter, ammeter, wattmeter, energy meter, power factor meter, frequency meter, Q meter, etc. Students will also learn about different AC and DC bridges to obtain various electrical parameters. Display devices which include DVM, CRO, and DSO etc are also learnt to analyze electrical signals in the course.

9. Learning objectives:

1. 1 To know the necessity of different measuring instruments and their design principle

2. To understand the working principle of different measuring instruments and technical solutions to handle different errors.

3. To learn the architecture and working principle of advanced measuring instrument and their applications.

10. Course Outcomes:

On completion of this course, the students will be able to:

1. Learn units, dimensions, standards and errors and basics of different types of measuring instruments to measure different electrical quantities

2. Apply their knowledge to measure electrical quantities using standard analog and digital measuring instruments.

11.	Unit wise detai	iled content							
Unit-1		Number of	Philosophy	of	Measurement	&	Analog	Measurement	of
		lectures = 13	Electrical Quantities						

Unit & dimensions, standards, Errors, Characteristics of Instruments and measurement system, basics of statistical analysis. PMMC instrument, DC ammeter, DC voltmeter, Ohm meter, Moving Iron instrument, Electrodynamics Wattmeter, errors and remedies, Three Phase Wattmeter, Power in three phase system, Energy meter.

Unit - 2	Number of	Measurement: Instrument Transformer
	lectures = 05	

Instrument Transformer and their applications in the extension of instrument range, Introduction to measurement of speed, frequency and power factor.

Unit - 3	Number of	Measurement of Parameters
	lectures = 08	

Different methods of measuring low, medium and high resistances, measurement of inductance & capacitance with the help of AC Bridges- Wheatstone, Kelvin, Maxwell, Hay's, Anderson, Owen, Heaviside, Campbell, Schering, Wien bridges, Wagner Earthling device, Q Meter.

Unit - 4	Number of	AC Potentiometer & Magnetic Measurement
	lectures = 08	

Polar type & Co-ordinate type AC potentiometers, application of AC Potentiometers in electrical measurement. Ballistic Galvanometer, Flux meter. **Digital Measurement:** Concept of digital measurement, Digital voltmeter, Frequency meter, Power Analyzer and Harmonics Analyzer, Electronic, Multimeter. DSO and its applications.

12. Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

13. Books Recommended

1. E.W. Golding & F.C. Widdis, "Electrical Measurement & Measuring Instrument", A.W. Wheeler & Co. Pvt. Ltd. India.

A.K. Sawhney, "Electrical & Electronic Measurement & Instrument", Dhanpat Rai & Sons **Reference Books**

Forest K. Harries, "Electrical Measurement", Willey Eastern Pvt. Ltd. India

1.	Name of the Department-ELECTRONICS & COMMUNICATION ENGINEERING									
2.	Course	Embedded system	L		Т		Р			
Name	!									
3.	Course		3		0		0			
Code										
4.	4. Type of Course (use tick mark)		\checkmark	Core ()	PE()		OE ()			
5.	Pre-	Microcontroller	6.	Frequency	Even	Odd	Either	Every Sem ()		
requis	site (if any)		(use	tick marks)	0	()	Sem	-		

					<u>^</u>					
				<u>e</u>	0					
7. Total Numb	er of Lectures, Tutorials,	Practical (assuming	14 weeks of	t one	semeste	r)				
Lectures = 40		1 utorials = 00	Practical =	=						
Brief Syllabus:										
Course consists of PIC microcontroller & their family members architectures and features as well. It also										
covers the developm	ent of PIC based projects to	or any applications.								
8. Learning ob	jectives:									
1. The student will l	earn and understand									
1. Fundamental	description of PIC microco	ontroller & their fami	ly members.							
2. Interfacing o	f different peripherals & pro	ogram to operate ther	n							
0 Course Outer	mos. The students will be	blato								
7. Course Outco	he smart and intelligent pro	duct prototype								
2 Design a BIC	microsoptrollar based app	liestions								
2. Design a Fic	incrocontroner based appr									
I. Ont wise ut	Number of leatures –	Overview of DIC N	liorocontrol	llorg						
	10			nei s						
Introduction to PIC:	micro controllers. Advantas	e of PIC micro contr	ollers. Types	s and i	products	s of PIC				
Unit - 2	Number of lectures =	PIC Architecture	onons, 19pes		p1000000	, 01 1 101				
	10									
PIC18F4550 archite	cture, features, CPU registe	rs, Instruction Set; pr	ogramming							
Unit - 3	Number of lectures =	PIC Programming								
	10									
Different peripheral	device -Difference types of	display units -7 Seg	ments & its t	types	-Princip	le of Operation-				
Common Anode mo	ode-Common Cathode mod	le -16x2 LCD - App	lications-Ha	ardwai	re interf	aces-Interfacing				
Circuits for LCD &	LED -Pin diagram of 16x2-	working mechanism	LCD using	Array	vs & Poi	nters.				
Unit - 4	Number of lectures =	Application develo	pment							
	10		_							
Interfacing with Al	DC, use of Interrupts, Ser	rial communication:	UART Imp	pleme	ntation,	Max 232; I2C				
Protocols I2C Protoc	col: Programming for I2C P	rotocol, interfacing w	vith Motors,	interf	acing w	ith sensors;				
11. Brief Descri	ption of self learning / E-le	earning component								
The students will be	encouraged to learn using t	he SGT ELearning p	ortal and cho	oose tl	he relev	ant lectures				
delivered by subject	experts of SGT University.									
The link to the E-Le	arning portal.									
https://elearning.sgtuniversity.ac.in/course-category/										
12. Books Record	mmended									
References Books										
1. PIC microcontroll	er by Peatman									
2. Microchip techno	logies Datasheet									
1	C									

1.	Name of the Department- ELECTRONICS & COMMUNICATION ENGINEERING									
2.	Subject	Power Electronics	L	Т	Р					
Name										
3.	Subject		3	0	0					
Code	-									
4.		Type of	Core (✓)	PE()	OE ()					
Cours	e (use tick	k mark)								

	1			1	1	1	1
5. Pre-	NIL	6.	Frequency	Even	Odd	Either	Every
requisite (if		(use	tick marks)	0	(🗸)	Sem	Sem ()
any)						0	
7. Total Nu	mber of Lectures, Tu	itoria	ls, Practical (assuming 14 we	eks of	one se	mester)	
Lectures = 42		Tut	orials = 0	Pract	ical =		
8.	Brief Syllabus						
This course is an	i introduction to the co	ncept	s of Partial differential equation	ons and	their s	olution.	The calculus
of function of co	omplex variable is disc	ussec	I. Among the most important	topics a	are Me	thod of s	separation of
variables and its	s applications to wave	equa	tion, one dimensional heat e	quation	and t	wo-dime	ensional heat
flow, Analytic f	unction, Cauchy-Riema	ann E	quations, Harmonic functions	with a	pplicat	ion to fl	ow problem,
Zeroes and Sing	gularities of complex	value	d functions, Residues, Residu	ie theor	rem an	id It's aj	pplication in
evaluation of rea	l integrals around unit	and s	emi circle. Z-Transform is als	o introd	luced a	nd appli	ed in solving
difference equati	on.						
9.	Learning object	ives:					
1. Develop	the skills to gain a basi	c und	erstanding of Analyze and des	sign con	trolled	rectifie	; DC to DC
converters, DC t	o AC inverters,						
2. Build and	l test circuits using pov	ver de	evices.				
3. Build and	test switching power	suppl	ies				
10.	Course Outcome	es (C	Os):				
At the end of this	s course students will d	lemor	strate the ability to				
1. Build and test	circuits using power de	evice	s such as SCR				
2. Analyze and d	lesign controlled rectifi	ler, D	C to DC converters, DC to AC	inverte	ers,		
3. Learn how to	analyze these inverters	and s	ome basic applications.				
4. Design SMPS							
11.	Unit wise detaile	ed con	ntent				
Unit-1	Number of lectures :	=	Characteristics of Semicono	ductor	Power	Devices	
Thereiston	10 • MOSEET and ICDT	- T	streamt should consist of str		Chara	tanistias	
ratings protocti	and thermal cond	- IIC	iong Priof introduction to n	ouver d		via TD	
controlled thuris	tor (MCT) Power Into	aroto	d Circuit (DIC) (Smart Down) Triga	evices oring/I	VIZ. IK	IAC, MOS
and snubber cir	cuits for thyristor not	ver N	AOSEETs and IGBTs (discre	, mgg te and	IC bas	ad) Con	cent of fast
recovery and Sch	ottky diodes as freewk	ver n veelin	g and feedback diode	ic and	IC Das	cu).com	sept of fast
Unit 2	Number of lectures -	<u>–10</u>	Controlled Pactifiers				
$\operatorname{Omt} = 2$	Number of fectures -	-10	Controlled Rectifiers				
Single phase: S	tudy of semi and full	hrido	e converters for R RL RLE	and lex	vel load	ds Anal	vsis of load
voltage and input	it current. Derivations	of l	ad form factor and ripple fa	ctor Ef	fect of	f source	impedance
Input current For	urier series analysis of	innut	current to derive input supply	nower	factor	displace	ment factor
and harmonic fac	ctor.	mput	carrent to derive input suppry	power	iuctor,	anspiace	inent fuetor
Choppers: Ou	adrant operations of 7	Гуре	A. Type B. Type C. Type	D and	type F	E choppe	ers. Control
techniques for ch	α and α	$C D \epsilon$	etailed analysis of Type A cho	pper. St	en un e	chopper.	Multiphase
Chopper.	ioppois file and en	с, р.		pp e n st	op up	enoppen	maniphase
Unit – 3	Number of lectures :	=	Single-phase inverters				
	12		~ <u>8</u> -• F				
Single-phase inv	erters: Principle of one	eratio	n of full bridge square wave, o	wasi-so	uare w	ave. PW	M inverters
and comparison	of their performance.	Driver	circuits for above inverters ar	nd math	ematic	al analys	sis of output
(Fourier series)	voltage and harmonic	cont	rol at output of inverter (Fo	urier ar	alvsis	of outp	ut voltage)
Filters at the out	put of inverters, Single	phas	e current source inverter.		j	r	
Unit – 4	Number of	Swi	tching Power Supplies				
	lectures = 12						
Analysis of fly l	back, forward converte	ers fo	r SMPS, Resonant converters	- need	, conce	ept of so	ft switching,
switching trajec	tory and SOAR, Load	d reso	onant converter - series load	ed half	bridg	e DC-D	C converter.
					U	1	<i>c</i> · · · <i>c</i>

Applications: Power line disturbances, EMI/EMC, power conditioners. Block diagram and configuration of UPS, salient features of UPS, selection of battery and charger ratings, sizing of UPS. Separately excited DC

motor drive. P M Stepper motor Drive.

12. Brief Description of self learning / E-learning component The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. https://elearning.sgtuniversity.ac.in/course-category/ Journal papers; Patents in the respective field. **Books Recommended (3 Text Books + 2-3 Reference Books)** 13. 1. Muhammad H. Rashid, "Power electronics" Prentice Hall of India. 2. Ned Mohan, Robbins, "Power electronics", edition III, John Wiley and sons. 3. P.C. Sen., "Modern Power Electronics", edition II, Chand& Co. 4. V.R.Moorthi, "Power Electronics", Oxford University Press. 5. Cyril W., Lander," Power Electronics", edition III, McGraw Hill.

1.	Name of the Department- ELECTRONICS & COMMUNICATION ENGINEERING							
2.	Course	Sensor and	L	Т	Р			
Name		Architecture						
		interfacing						
3.	Course		3	0	0			
Code								

4. Type of	Course (use tick	Core (✓)	PE()		OE ()					
mark)	NII	C Encouron or	Erron	044	Ether	Errows Com				
5. Pre-	INIL	o. Frequency	Even		Either	Every Sem				
requisite (ii		(use lick marks)	0	(•)	Sem ()	0				
any)										
semester)										
Lectures = 42 Tutorials = 0 Practical =										
8.	Brief Syllab	us								
This course d	eals with the d	ifferent type of sensors, transd	ucers a	nd the	eir interf	facing with				
microcontrollers	s. This also describ	es their role to know the domain sta	tus. It al	lso dea	ls with th	e process to				
further processing	ng of sensing elem	ents.				-				
9.	Learning of	ojectives:								
• Educate st	tudents to understa	and the functioning of different type	es of sen	sors &	their role	e in order to				
sense various pa	arameters.									
• To utilize	the status of differ	ent signal parameters in the real time	e applica	ation to	control t	he working.				
10.	Course Out	comes (COs):								
At the end of the	e course, the studer	nts will be able to								
1. Explain stati	c and dynamic ch	aracteristics and operating principle	e of Indu	ictive,	capacitiv	e, magnetic,				
piezo electric, ra	adiation, electro ch	emical sensors.								
2. Illustrate the	importance of stan	dard of calibration	. 1	1	c	1				
3. Select suitabl	e sensor for a give	n automobile, aeronautics, machine	tools and	1 manu	facturing	application				
II. Unit 1	Unit wise a	Introduction								
Unit-1	Number of	Introduction								
Definition Me	$\frac{1}{1}$	ques Classification of errors E	ror ana	lucio	Static ar	d dynamic				
characteristics	of transducers Pe	rformance measures of sensors C	lassifica	tion of	Static al	calibration				
techniques	or transducers, re	formatice measures of sensors, c	lassiilea		5015015,	canoration				
Resistance. Ind	luctance and Can	acitance Transducers: Potentiome	eter, stra	in gaug	pes, optic	al encoders.				
LVDT, RVDT,	Synchro, Microsyr	l,	,	82	, - F					
Applications: F	Pressure, position,	angle and acceleration. Capacitance	circuitr	y, Feed	lback typ	e condenser				
microphone, fi	requency modulati	ng oscillator circuit, Dynamic cap	acitance	variati	ion, A.C.	Bridge for				
Amplitude Mod	ulation, Applicatio	ns: Proximity, microphone, pressure	e, displac	cement		C				
Unit – 2	Number of	Piezoelectric & Magnetic Sensor	S							
	lectures =12									
Piezoelectric M	laterials and prop	erties, Modes of deformation, Mu	ılti-morp	ohs, Er	nvironme	ntal effects,				
Applications: A	ccelerometer, ultra	sonic. Magnetic Sensors, types, pri	nciple, r	equirer	nent and	advantages:				
Magneto resistiv	ve, Hall Effect – E	ldy current.		-						
Radiation and E	lectro Chemical S	ensors: Photo conductive cell, photo	voltaic,	, Photo	resistive	, Fiber optic				
sensors, Ray an	d Nuclear radiatio	n sensors, Electro chemical sensors	: Electro	ochemi	cal cell, I	olarization,				
sensor Electrode	es and electro-ceral	mics in Gas Media.								
Unit – 3	Number of	Modern Sensors								
	lectures = 10									
Film sensors, 1	nicro-scale sensor	s, Particle measuring systems, V	bration	Sensor	rs, SMA	RT sensors,				
Machine Vision	, Multi-sensor syst	ems								
Applications of	f Sensors: Appli	cations and case studies of Ser	isors in	Auto	mobile I	Engineering,				
Aeronautics, Ma	achine tools and M	anufacturing processes.								
Unit – 4	Number of	Applications and architecture in	terfacin	g						
	lectures = 08	••		0						
Interfacing of L	EDs, 7 Segment d	lisplay device, LCD display, DIP S	witches,	Push I	Button sv	vitches, Key				
denounce techniques, Keyboard connections load per key and matrix form, Interfacing A/D converter,										

D/A converter, Relay, opto isolator stepper motor and DC motor.

Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

12.

13.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

Books Recommended (3 Text Books + 2-3 Reference Books)

1. Patranabis D.," Sensor and Actuators", Prentice Hall of India (Pvt) Ltd., 2005.

2. Renganathan S.," Transducer Engineering", Allied Publishers (P) Ltd., 2003.

3. Ernest O. Doebelin, "Measurement systems Application and Design", International Student Edition, VI Edition, Tata McGraw-Hill Book Company, 2011.

4. Bradley D.A., and Dawson, Burd and Loader, "Mechatronics, Thomson Press India Ltd", 2004.

5. Bolton W, "Mechatronics", Thomson Press, 2003.

	Essence of Indian knowledge Traditional	L	T	P	C
Pre-requisites/Exposure		2	0	0	0

1. Name of the Department : Electronics and Communication Engineering							
14. Subject Name	Antenna Design & Simulation lab	L	Τ	Р			

15. Subject		0	0		2					
16. Type of Cou	urse (use tick	Core (1)	PE ()		OE ()					
mark)					020					
17. Pre-	Knowledge of	18. Frequency	Even ()	Od	Eithe	Every Sem ()				
requisite (if any)	Basic Algebra,	(use tick marks)		d	r					
	Basic			(√)	Sem					
	Electronics				0					
	Lab									
19. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)										
Lectures = 00		Tutorials = 00	Practical =	: 10						
20. Brief Syllab	ous									
The course introduc	ces Boolean algeb	ra, Reduction techniqu	ies and demor	istrate	s the de	sign of logic gates.				
Knowledge of digit	tal systems design	based on combinatio	nal and seque	ntial I	ogic is a	also imparted. This				
course further teach	es about PLD, Me	emories and Logic Fam	ilies.							
21. Course Obje	ctives	1 / 1 '								
3. To be famili	ar with the most p	opular antenna design	programs							
4. I o investiga	te the different pa	rameters associated wi	th the specific	anten	na.					
5. To deal with	n various wire ant	different personators th	1X etc.	change	of the m	ottom				
0. 10 get close 7 To design u	to arrays and the	designs graphs and set	at controls the	snape	e or the p	battern.				
7. To design y	agi antenna using	onal antennas such as I	I wate program	18.	ntonnos					
0. 10 mvestiga 22 Course Outer	are the high theeth	onai antennas such as i			intennas.					
At the end of the co	urse students will	he able to								
1 Demonstrate	the structure and	operation of various a	ntennas and to	descr	ihe their	narameters				
2 Apply basic	theorems to analy	ve the variation of field	d strength of r	adiate	d waves	parameters.				
2. Apply basic 3. Measure the	radiation pattern	of wired aperture plar	ar and array a	ntenn	a waves.					
4 . Familiar wit	h EM simulation	tools to implement ante	enna prototype	s.	u 5.					
23. List of Exper	riments	cools to improment unit	iniu prototype							
1. Study of the struc	cture and operation	n of wired, aperture, pla	anar and array	anten	nas.					
2. Proof of Inverse	square law		5							
3. Proof of Recipro	city theorem									
4. Measurement of	radiation pattern o	f all wired and aperture	e antennas							
5. Measurement of	radiation pattern o	f planar antennas								
6. Measurement of	radiation pattern o	f reflector antennas								
7. Measurement of a	radiation pattern o	f array antennas								
8. Analysis of co-po	plarization and cro	ss polarization								
9. Design and simul	ation of microstri	p antenna using CST to	ool.							
10. Measurement of	f antenna paramete	ers using Network Ana	lyzer.							
	• 4• • • • • • • •									
24. Brief Descr.	iption of self lear	ning / E-learning com	iponent	ما م ام		nalassant la atuma a				
The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures										
delivered by subject experts of SG1 University.										
The link to the E-Le	earning portal.									
https://elearning.sgt	university.ac.in/co	ourse-category/								
Journal papers; Pate	ents in the respecti	ve field.								

25.Books Recommended (3 Text Books + 2-3 Reference Books)1.Mano, Morris. "Digital logic." Computer Design. Englewood Cliffs Prentice-Hall (1979).

6.	Kumar, A. Anand. Fundamentals of Digital Circuits 2Nd Ed. PHI Learning Pvt. Ltd., 2009.
7.	Floyd, Thomas L. Digital Fundamentals, 10/e. Pearson Education India, 1986.
8. 1986	Malvino, Albert Paul, and Donald P. Leach. Digital principles and applications. McGraw-Hill, Inc., 5.
9.	Jain, Rajendra Prasad. Modern Digital Electronics 3e. Tata McGraw-Hill Education, 2003.

1. Name of the Department : Electronics and Communication Engineering						
2.Subject Name	Digital Communicati on Lab	L	Т	Р		
3.Subject Code		0	0	2		

4.Type of Course ((use tick mark)	Core $()$	PE()		OE ()			
5.Pre-requisite	Signals and	10. Frequency	Even ()	Od	Eithe	Every Sem ()		
(if any)	Systems	(use tick marks)		d	r			
				(√)	Sem			
					0			
6.Total Number of	f Lectures, Tuto	orials, Practical (assun	ning 14 weeks	s of on	ne semes	ster)		
Lectures $= 00$		Tutorials = 00	Practical =	= 10				
7.Brief Syllabus	7.Brief Syllabus							
The purpose of this	s lab is to explor	e digital communicatio	ns with a soft	ware 1	radio to	understand how each		
component works t	ogether. The lab	will cover, analog to d	igital conversi	on, m	odulatio	n, pulse shaping, and		
noise analysis.								
8.Course Objectiv	es							
1. To acquire Pr	actical knowledg	ge of each block in AM	, FM transmit	ters ar	nd receiv	ers.		
2. To understand	d the concepts of	baseband transmission	IS.					
9.Course Outcome	es							
On completion of the	his course, the st	udents will be able to						
1. Analyze and	design of various	s continuous wave and	angle modulat	ion an	nd demo	dulation		
2. Techniques u	nderstand the eff	fect of noise present in	continuous wa	ve an	d angle i	nodulation		
techniques.								
3. Attain the know	owledge about A	M, FM Transmitters ar	d Receivers					
4. Analyze and	design the variou	is Pulse Modulation Te	chniques					
5. Understand th	ne concepts of D	igital Modulation Tech	niques and Ba	seban	d transm	ission.		
10.List of Experim	nents							
1. Signal Sam	pling and reconst	truction						
2. Amplitude 1	modulation and o	lemodulation						
3. Frequency r	nodulation and c	lemodulation						
4. Pulse code i	modulation and o	lemodulation.						
5. Delta modu	lation, adaptive of	delta Modulation						
6. Line Coding	g Schemes	1 1 1 (77 1		<u>a</u> .				
7. BFSK mod	ulation and Dei	modulation (Hardware)	(Kit based) &	z Sim	ulation	using MATLAB /		
SCILAB / Equivale	ent)		/TT 1	0	a :			
8. BPSK n	nodulation a	and Demodulation	(Hardwar	e&	Simu	lation using		
MAILAB/SCILAE	3/Equivalent)	(C:1.(:)						
9. FSK, PSK a	and DPSK scheme	les (Simulation)						
10. Error conurc	of country scheme	s (Simulation)						
11. Spieau spec	tion link simulat	tion						
12. Communication 13 TDM and E	MOII IIIK SIIIUIA	1011						
11 Brief Description	DNI on of solf loorni	ng / F-learning compo	nont					
The students will be	e encouraged to	learn using the SGT FI	earning portal	and	phoose th	ne relevant lectures		
delivered by subject	t experts of SGT	' University The link t	o the E-I earni	ino	noose u	ie relevant lectures		
portal.https://elearn	ing sofuniversity	.ac.in/course-category/						

1. Name of the Department : Electronics and Communication Engineering

2.Subject Name	Digital Signal	L	Т		Р				
	Processing								
	Lab								
3.Subject Code		0	0		2				
4.Type of Course (use tick mark)	Core $()$	PE ()		OE ()				
5.Pre-requisite	Signals and	11. Frequency	Even ()	Od	Eithe	Every Sem ()			
(if any)	Systems	(use tick marks)		d	r	-			
				(√)	Sem				
(Total Number of	et actures Tutor	iala Duastiaal (agaum			()	(4 or c)			
$\mathbf{I}_{\text{octures}} = 00$	Lectures, Tutor	Tutorials – 00	Practical -	- 12	le semes	ster)			
7.Brief Syllabus			Tacucai -	- 14					
Digital signal proce	essing (DSP) is c	oncerned with the rep	resentation of	signa	ls in dig	gital form, and with			
the processing of th	lese signals and th	e information that the	y carry.	~-8		····· ····			
	_		-						
8.Course Objectiv	es								
1. Understand th	ne DSP concepts a	and to relate to real app	olications.						
2. Time domain	and frequency do	main implementation.							
9.Course Outcome	28								
On completion of the	his course, the stu	dents will be able to							
1. Apply digital	signal processing	fundamentals.							
2. To construct	new experiment in	ndependently or as a te	am member.						
10.List of Experim	nents								
Perform the exper 1. To understand sa 2. To study Ouantiz	iments using DS impling theorem & vation technique.	P Hardware Processo & generation of wavefor	or using Prog	rams , squa	in C La re & Tri	angle.			
3. To study PCM er	ncoding & Hamm	ing code generation.							
4. To Study Digital	modulation techr	iques ASK/FSK& PS	К.						
5. To study FIR Fil	ter Implementatio	n.							
6. To study Auto co	orrelation & linear	convolution							
Experiments to be p	performed on MA	TLAB							
1. Represent basic s	signals (Unit step,	unit impulse, ramp, ex	kponential, sir	ne and	cosine)				
2. To develop progr	ram for discrete co	onvolution.							
3. To develop progr	ram for discrete c	orrelation.	1						
4. To design analog	III filter (low-pass,	nign pass, band-pass, t	band-stop).						
6 To design FIR fil	Iters using window	vass, iligii pass, ballu-p vs technique	ass, band-stop	9.					
o. To design The mens using windows definique.									
11.Brief Description	on of self learnin	g / E-learning compo	nent						
The students will be delivered by subjec	e encouraged to le t experts of SGT	earn using the SGT EL University.	earning portal	and c	hoose tl	ne relevant lectures			
The link to the E-L	earning portal.								
https://elearning.sg	tuniversity.ac.in/c	ourse-category/							
Journal papers: Pate	Journal papers: Patents in the respective field.								

12.Books Recommended (3 Text Books + 2-3 Reference Books)

1. Oppenheim A.V., Schafer, Ronald W. & Buck, John R.,"Discrete Time Signal processing", Pearson Education , 2nd Edition.

Reference Books

 De Fatta, D. J. Lucas, J. G. & Hodgkiss, W. S.," Digital Signal Processing", John Wiley & Sons.
 Proakis, J.G. & Manolakis, D.G.," Digital Signal Processing: Principles Algorithms and Applications", Prentice Hall of India.

3. Rabiner, L.R. and Gold B., "Theory and applications of DSP", Prentice Hall of India.

1. Name of the Department : Electronics and Communication Engineering

2.Subject Name		L		Т		Р	
	Major Project						
	phase - II						
	1						
3.Subject Code		0		0		4	
4.Type of Course (use tick mark)	Core	(\style="text-align: right;">(\style="text-align: right;") (\style="text-align: right;")</(\style="text-align: right;")</(\s</th <th>PE()</th> <th></th> <th>OE()</th> <th></th>	PE()		OE ()	
5.Pre-requisite	Minor Project	12.	Frequency	Even ()	Od	Eithe	Every Sem ()
(if any)		(use t	ick marks)		d	r	
					()	Sem	
						0	
6.Total Number of	Lectures, Tutor	ials, P	ractical (assum	ning 14 weeks	of on	e semes	ter)
Lectures $= 00$		Tuto	rials = 00	Practical =	=04		
7.Brief Syllabus							
Major projects are g	generally large-sc	ale infr	astructure proje	cts in Enginee	ering,	environi	ment and other
sectors such as educ	cation, energy or I	ICT. TI	hey also concern	n big producti	ve inv	estment	s and research &
development project	ts.		-				
8.Course Objectives							
The objectives of the Major Project Phase I include:							
7. To give students the opportunity to apply the knowledge and skills they have acquired on campus							
into an idea that the	y want to develop	oed.	-		•		_
8. To provide s	students with opp	ortunit	ies for practical.	, hands-on lea	rning t	from pra	actitioners in the

- students' areas of specialization.
- 9. To enhance the practical skills of the students so he becomes ready for work.

9. Course Outcomes

The learning outcomes can be as follows:

- 5. Apply theoretical knowledge in practical applications.
- 6. Acquire skills in communication, management and team work.

10.List of Experiments

Course contents:

9. The students are required to develop a product form the idea & knowledge he has.

- 10. Students will be allotted to a guide throughout the whole work for the guidance and supervision.
- 11. The final Viva-voca of this will be conducted by the external examiner and one internal examiner

appointed by the institute. External examiner will be from penal of examiner.

12. Assessment of this will be based on viva-voca, report and presentation of the work.

11.Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.<u>https://elearning.sgtuniversity.ac.in/course-category/</u>

12.Books Recommended (3 Text Books + 2-3 Reference Books)

1. Name of the De	1. Name of the Department : Electronics and Communication Engineering						
2.Subject Name		L	Т		Р		
	Industrial						
	Training -II						
3.Subject Code		0	0		0		
4.Type of Course (use tick mark)		Core ($$)	ore $()$ PE ()		OE ()		
5.Pre-requisite	Courses up to	13. Frequency	Even ()	Od	Eithe	Every Sem ()	
(if any)	4 th Sem	(use tick marks)		d	r		
				()	Sem		
					0		
6.Total Number of	f Lectures, Tutor	rials, Practical (assun	ning 14 weeks	of on	e semes	ster)	
Lectures = 00		Tutorials = 00	Practical =	=00			
7.Brief Syllabus	7.Brief Syllabus						
	••••				• 1	1 1	

The Industrial Training indicates to a program which aims to provide a managed good practical training within a particular time frame. The main objectives of the industrial training are to provide the best and relevant theoretical knowledge to gain in a particular time period.

8.Course Objectives

1. To gain first-hand experience of working as an engineering professional, including the technical application of engineering knowledge.

- 2. To experience the discipline of working in a professional organization and multidisciplinary team.
- 3. To develop technical, interpersonal and communication skills.

9.Course Outcomes

On completion of this course, the students will be able to get the structure of industry. He will know the various departments of industry & how industry works.

10. Course contents: After 4th semester & before 5th semester.

- 1. Duration for training should be 6 weeks.
- 2. It must be in Industry for study the working process & determine problems & propose solution.
- 3. Students have to submit to one spiral binding report & PPT presentation in internal examination.
- 4. Students have to submit three Hard binding report & PPT presentation in final end term examination

11.Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

12.Books Recommended (3 Text Books + 2-3 Reference Books)

1. Name of the De	partment : Elect	ronics and Communi	cation Engine	ering				
2.Subject Name		L	Т		Р			
U U								
	GL1 Lab							
3.Subject Code		0	0		0			
4.Type of Course	(use tick mark)	Core $()$			OE ()			
5.Pre-requisite	Courses up to	14. Frequency	Even ()	Od	Eithe	Every Sem ()		
(if any)	4 th Sem	(use tick marks)	· ·	d	r			
				(√)	Sem			
					0			
6.Total Number o	f Lectures, Tutor	rials, Practical (assum	ning 14 weeks	of on	e semes	ster)		
Lectures $= 00$		Tutorials = 00	Practical =	:00				
7.Brief Syllabus								
A course covers the	e architectural des	cription and program	ning of PIC mi	croco	ntroller			
8.Course Objectiv	ves							
The student will lea	arn and understand	d						
1. Basics of P	IC microcontrolle	r features.						
2. Needs and s	significance of dif	ferent peripherals for	the development	nt of a	applicati	ions		
3. To testing t	he programming s	skills.						
0 Course Outcom	00							
9.Course Outcom	es							
The students will b	e able to							
1 Design & d	evelop a PIC mici	ocontroller based pro	duct prototype	for ar	applica	ation		
				101 001				
10. Section A: Inst	trumentation & I	Measurement						
List of Experimen	its:							
1. Calibration	of capacitive tran	sducer for angular dis	placement.					
2. Calibration	of capacitive tran	sducer for angular dis	placement.					
3. Study of res	sistance temperatu	re detector for temper	ature measurer	nent.				
4. Calibration	of Pressure Gauge	es.						
5. Calibration	of strain gauge fo	r temperature measure	ement.					
Section B: PIC &	programming							
List of Experimen	its:							
6. Interfacing	of LEDs							
7. Interfacing	of Switches							
8. Interfacing	Interfacing of Relays							
9. Interfacing	ot LCD							
Section C. Down	Flootnamica							
Section C: Power	Electronics							
LIST OF Experimen	ILS:	f CCD and manager 1-	tohing and k-1	dina				
$\begin{array}{ccc} 10. & 10 \text{ study V} \\ 11 & \text{To study II} \end{array}$	-1 characteristics of	or bolf ways and full	uching and not	ung	urrents.			
11. To study U.	ngle phase belf w	or name wave and full years controlled reactify	wave control.	otivo	load (#) inductive load with		
and without freewy	ngie-phase hall w	ave controlled rectill	eu with (1) res	isuve	10au (11) muucuve loau with		
13 To study of	and without freewneeling diode. 13 To study single phase (i) fully controlled (ii) half controlled bridge rectifiers with resistive and							

inductive loads.

14. To study three-phase fully/half controlled bridge rectifier with resistive and inductive loads. **Section D: Sensor & Architecture Interfacing**

List of Experiments:

15. To study development tools/environment for ATMEL/PIC microcontroller program and Architecture.

- 16. Write an ALP to interface seven segment with 8051 and display 0-9 on it.
- 17. Write an ALP to interface DC Motor with 8051.
- 18. Write an ALP to interface 4x4 keyboards with 8051.
- 19. Write an ALP to interface temperature sensor using 8051.

11.Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

12.Books Recommended (3 Text Books + 2-3 Reference Books)

	Digital Signal Processing Lab	L	Т	P	С
Pre-requisites/Exposure	Signals and Systems	0	0	2	1

Course Objectives

- 3. Understand the DSP concepts and to relate to real applications.
- 4. Time domain and frequency domain implementation.

Course Outcomes

On completion of this course, the students will be able to

- 3. Apply digital signal processing fundamentals.
- 4. To construct new experiment independently or as a team member.

Course Description

Digital signal processing (DSP) is concerned with the representation of signals in digital form, and with the processing of these signals and the information that they carry.

List of Experiments:

Perform the experiments using DSP Hardware Processor using Programs in C Language:

1. To understand sampling theorem & generation of waveforms like sine, square & Triangle.

- 2. To study Quantization technique.
- 3. To study PCM encoding & Hamming code generation.
- 4. To Study Digital modulation techniques ASK/FSK& PSK.
- 5. To study FIR Filter Implementation.
- 6. To study Auto correlation & linear convolution

Experiments to be performed on MATLAB

- 1. Represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine).
- 2. To develop program for discrete convolution.
- 3. To develop program for discrete correlation.
- 4. To design analog filter (low-pass, high pass, band-pass, band-stop).
- 5. To design digital IIR filters (low-pass, high pass, band-pass, band-stop).
- 6. To design FIR filters using windows technique.

Text Books

1. Oppenheim A.V., Schafer, Ronald W. & Buck, John R.,"Discrete Time Signal processing", Pearson Education , 2nd Edition.

Reference Books

1. De Fatta, D. J. Lucas, J. G. & Hodgkiss, W. S.," Digital Signal Processing", John Wiley & Sons.

2. Proakis, J.G. & Manolakis, D.G.," Digital Signal Processing: Principles Algorithms and Applications", Prentice Hall of India.

3. Rabiner, L.R. and Gold B., "Theory and applications of DSP", Prentice Hall of India.

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020**

Sr.	Subject	Course title	Schedule					Mark	
No.	Code	Course the	L	Т	P	С	Int.	Ext.	Total
5		Microwave & Radar	3	0	0	3	40	60	100
6		VLSI Design	3	0	0	3	40	60	100
7		Program Elective-II	3	0	0	3	40	60	100
8		Program Elective-III	3	0	0	3	40	60	100
5		Open Elective- II	3	0	0	3	40	60	100
6		VA Course-II	2	0	0	0	40	60	100
7		Microwave & Radar Lab	0	0	2	1	40	60	100
8		VLSI Design Lab	0	0	2	1	40	60	100
9		Major Project phase -II	0	0	4	2	40	60	100
10		GL-II	0	0	2	1	40	60	100
11		GL-III	0	0	2	1	40	60	100
		Total Contact Hours	17	0	12	21	140	660	1100
		Total Contact Hours		29		41	440	000	1100

B. Tech. – VI Semester

1. Name of the Department –ELECTRONICS & COMMUNICATION ENGINEERING

2. Subject Name	Microwave & Radar	L – 3	T - 0	P -0				
3. Subject								
Code								
4. Type of Course	e (use tick mark)	Core ($$)	PE()	OE ()				
5. Pre-requisite (i	f Electromagnetic Field	6. Frequency	Even () Odd	Either	Every			
any)	Theory	(use tick marks)	· (√)	Sem ()	Sem ()			
7. Total Number	of Lectures, Tutorials, Pr	actical						
Lectures = 38		Tutorials =0	Practical =0					
8. Brief Syllabus								
The above said su	bject is divided into 4 uni	its. Unit I Introduc	ction to microw	ave comm	unication			
and EM spectrun	n. Unit II Signifpies study	of Microwave Pass	sive Circuits. Ur	nit III Will	be able to			
study generation of	f Microwave. Unit IV Ana	lyze Microwave thr	ough Semicondu	ctor Device	e.			
9. Learning objec	tives: The students will lea	arn and understand						
1. Students w	ill be able to study Microw	vave Propagation						
2. Microwave	e Generation							
3. Microwave	e Measurement							
10. Course Outco	mes (COs): On completion	n of this course, the	students will be	able to				
1. Derive Mic	crowave Equations in all m	odes						
2. Will be abl	e to study Microwave Tub	es, Generation						
11. Unit wise deta	illed content	T. 4 1	•	•				
Unit-1	Number of lectures $= 11$	introduction to n	ncrowave com	nunication	and EM			
Pootongular way	quida: Field Compone	spectrum nto TE TM Mo	das Dominant	TE10 mo	do Field			
Distribution Powe	er Attenuation Circular w	aveguides. TE TM	Les, Dominant	velocities I	Microstrin			
transmission line (TI) Coupled TI Strip TI	Coupled strip line	Coplanar TL N	Aicrowave	viiciosuip			
Unit _ 2	Number of lectures – 8	Passive Microway	, Copianai TL, N					
Scattering matrix	Passive microwave device	s. Microwave hybri	d circuits Term	inations At	tenuators			
Phase Shifters D	irectional couplers: Two-	-hole directional c	ouplers. S- Ma	trix of a d	lirectional			
coupler. Hybrid co	ouplers. Microwave propag	vation in ferrites. Fa	raday rotation.	Isolators. C	irculators.			
S-parameter analys	sis of all components	,, . ,	, , , , , , , , , , , , , , , , , , ,					
Unit – 3	Number of lectures = 9	Microwave Tube	s:					
Microwave tubes:	Limitations of convention	nal active devices a	at microwave fro	equency, T	wo cavity			
Klystron, Reflex	Klystron, Magnetron, Tra	aveling wave tube	, Backward wa	ve oscillate	ors, Gyro			
Devices: Their sch	ematic, Principle of operat	ion, Performance ch	naracteristic and	their applic	ations.			
Unit – 4 N	Number of lectures = 9	Solid state amplif	iers and oscilla	tors & Rad	lar			
Transferred electro	on devices: Gunneffect di	iodes & modes of	operation. Aval	anche trans	sit – time			
devices: IMPATT	diode, TRAPPAT diode, E	BARITT diode.						
Introduction and w	vorking of radar system.							
12. Brief Descript	tion of self-learning / E-le	arning component						
The students will b	be encouraged to learn usin	g the SGT ELearnin	ng portal and cho	pose the rele	evant			
lectures delivered	by subject experts of SGT	University.						
The link to the E-L	The link to the E-Learning portal.							
https://elearning.sgtuniversity.ac.in/course-category/								
Journal papers; Patents in the respective field.								
13. BOOKS Recom	mended							
1 SV Line	Miaromana Daviaga & Cir	mite DUI 2rd Ed						
1. S.Y. Liao, Microwave Devices & Circuits; PHI 3rd Ed.								
1 A Das and S K	Das Microwaye Engineer	ing: McGraw Hill F	ducation					
2 S Vacuki D Me	argaret Helena R Raisswa	ing, meoraw IIII E i Microwaya Engir	neering. MHF					
3 M I Skolnik In	troduction to Radar Engine	ering · TMH	icering, with					
4. Om P. Gandhi	Microwave Engineering an	d Applications: Per	gamon Pres					
· · · · · · · · · · · · · · · · · · ·								

1. Name of t	he Department – ELECTRONIC	S & COMM	UNICAT	TION EN	GINEEF	RING
2. Subject	VLSI Design	L -3	T – 0		P -0	
Name						
3. Subject						
Code						
4. Type of Cours	e (use tick mark)	Core ($$)	PE()		OE ()	
5. Pre-requisite	Analog Communication	6.	Even	Odd	Either	Every
(if any)		Frequency	0	(√)	Sem	Sem
		(use tick			0	0
		marks)				
7. Total Number	of Lectures, Tutorials, Practical	1				
Lectures $= 40$		Tutorials	Practic	al =		
		=				
8. Brief Syllabus						
Course consists of	f Integrated circuit technology. It a	lso comprises	the analog	og VLSI	and Digit	al VLSI
design and also th	e fabrication technologies.					
9. Learning obje	ctives: The student will learn and u	nderstand				
1. The evolut	tion of VLSI technologies for the de	evelopment of	Integrate	ed circuit	•	
2. Design pro	cedure of Analog and VLSI design	and Digital V	LSI desi	gn.		
10. Course Outco	Somes (COs): The students will be a $(D + 1)$	able to	•, •			
1. Develop at	nalog/Digital VLSI IC's for the use	of analog cire	cuits in co	ompact fo	orm.	
2. Develop th	ne semiconductor memories using V	LSI technolo	gies.			
11. Unit wise det	alled content	TALL		T 1		
Unit-I	Number of lectures = 10	Introduction	$\frac{n \text{ to VLS}}{T}$	ol design	D 1	<u> </u>
Overview of VL	SI; Basic of MOS: NMOS & PN	ios operation	n, Thresh	iold volta	ige, Body	y effect;
MOS Device Desi	Ign Equations & Basic DC equation		• .• •	7 1 11 / 1		
Snort Channel F	Litects: Scaling Theory, Threshold	i voltage vai	riation, N	lobility I	Degradati	on with
Unit 2	Number of lectures – 8	Analog VI	I Docior			
Unit – 2 Introduction to on	Number of fectures = δ	Allalog VL	of Design	I Docio MO	C modele	SDICE
Models and freque	alog VLSI; Wixed signal issues in vanay dapandant paramatara. CMC	CMOS lecinic	ologies; E	reant Sou	s models	, SPICE
references MOS	EET Amplifier Differential am	olifiar Occill	otor usi	MOS	$\mathbf{FET} \mathbf{E}_{\mathbf{r}}$	voltage
Synthesizers and	Physed lock loop Non-linear and	log blocks.	alor usi	ore Char	$\Gamma E I, \Gamma I$	circuits
and Multipliers:	Thased lock loop. Non-Inteat and	ilog blocks.	Joinparat	ors, Chai	ge-pump	circuits
$\frac{1}{10} \frac{1}{10} \frac$	Number of lectures – 8	Digital VI S	I Design			
MOS as a Swite	$\frac{1}{1} + \frac{1}{1} + \frac{1}$	hination Se	ries con	pection o	f NMOS	/PMOS
Parallel connectio	n of NMOS/PMOS: NMOS, COM	ology Need	of Pull u	n resistor	Univers	al Gates
design PMOS :	Universal Gates design: CMOS	Technology	v: Logic	gate de	sion De	esion of
combinational dev	vice like adder, subs-tractor, Comp	arator. Multin	lexer: T	ansmissi	ion Gate	& Stick
Diagram.			10/10/1, 11			C Stien
Unit – 4	Number of lectures =14	VLSI Fabri	cation T	echnolog	v	
Core to wafer .	Journey: Fabrication Processes:	Fabrication	of diffe	rent M() SFET	devices:
NMOSFET. PMC	SFET. CMOSFET. Bi-CMOS: Fa	brication of	complex	devices:	CMOS	Inverter.
CMOS NAND ga	te. CMOS NOR gate:		···· r ····			
12 Brief Descrin	tion of self-learning / E-learning	component				
The students will	be encouraged to learn using the SC	GT ELearning	portal ar	nd choose	the relev	ant
lectures delivered	by subject experts of SGT University	ity	portar ar		the relev	unt
The link to the E-	Learning portal.					
https://elearning.s	gtuniversity.ac.in/course-category/					
Journal papers: Pa	itents in the respective field.					
13. Books Recom	mended					
1. Design of Anal	og CMOS Integrated Circuits by B	Razavi. McG	raw Hill			
				•		

1. Name of t	he Department – ELE	CTRONICS & COMMUN	NICATI	ON EN	GINEER	ING
2. Subject	Bio medical	L - 3	T – 0		P -0	
Name	Electronics					
3. Subject Code						
4. Type of C	ourse (use tick mark)	Core $()$	PE()		OE ()	
5. Pre-	Signals and Systems	6. Frequency (use	Even	Odd	Either	Every
requisite (if		tick marks)	0	()	Sem	Sem
any)					0	0
7. Total Nun	nber of Lectures, Tuto	rials, Practical (assuming	14 week	s of one	e semeste	er)
Lectures $= 40$		Tutorials =	Practi	cal =		
8. Brief Sylla	abus					
Bio medical elect	ronics (BME) is the ap	pplication of engineering p	rinciples	and de	sign con	cepts to
medicine and biol	ogy for healthcare purpo	oses (e.g. diagnostic or ther	apeutic).	This fie	eld seeks	to close
the gap between	engineering and medici	ne, combining the design	and pro	oblem s	solving s	kills of
engineering with	medical and biologic	al sciences to advance h	ealth ca	re treat	ment, in	cluding
diagnosis, monitor	ring, and therapy. Biom	nedical engineering has on	ly recen	tly eme	rged as	its own
study, compared to	o many other engineerin	ng fields.				
9. Learning	objectives:					
1. To study the	ne working of different	medical equipments				
10. Course Ou	utcomes (COs):					
On completion of	this course, the students	s will be able to				
1. Introduce the s	student to the electronic	devices and theory of operation	ation in t	he medi	cal area.	
2. Electronic cire	cuits for Biomedical Ap	plications: Apply knowledg	ge of eng	ineering	and scie	nce to
understand the print	nciple of biomedical ele	ectronic circuits. Understand	how to	apply, n	neasure c	ircuit
performance, and	solve problems in the ar	reas of biomedical signals.			.1	
3. Work in Multi	-disciplinary teams: Lea	arn to work and communica	te effecti	vely wi	th peers of	on
multi-disciplinary	teams to attain a comm	on goal.				
	Normel on tent					
Unit-1	= 10	Introduction				
Introduction to the	physiology of cardiac,	nervous & muscular and re	spiratory	system	s. Transd	ucers
and Electrodes: Di	ifferent types of transdu	cers & their selection for bi	omedica	l applica	ations. El	ectrode
theory, selection c	riteria of electrodes & d	lifferent types of electrodes	such as,	Ag - Ag	g Cl, pH,	etc
Unit – 2	Number of lectures = 10	Cardiovascular measure	ement			
Cardiovascular me	easurement: The heart &	the other cardiovascular s	ystems. N	Aeasure	ment of I	Blood
pressure-direct and	d indirect method, Cardi	iac output and cardiac rate.	Electroca	ardiogra	phy-wav	eform-
standard lead syste	ems typical ECG amplif	ier, phonocardiography, Ba	llisto car	diograp	hy, Cardi	iac
pacemaker defibr	rillator -different types	and its selection.				
Unit – 3	Number of lectures = 10	EEG Instrumentation				
EEG Instrumentat	ion requirements –EEG	electrode -frequency bands	s – recor	ding sys	tems EM	G basic
principle-block dia	agram of a recorder – pre	e amplifier. Bed side monite	or –block	diagrai	n- measu	iring
parameters-cardia	c tachometer-Alarms-Le	ead fault indicator-central m	onitorin	g. Telen	netry –	-
modulation system	ns – choice of carrier fre	equency – single channel tel	emetry s	ystems.	-	
Unit – 4	Number of lectures =12	Clinical Laboratory	-			
Instrumentation for	r clinical laboratory. Bi	o electric amplifiers-instrur	nentation	n amnlif	iers isola	tion
amplifiers-choppe	r stabilized amplifiers –	input guarding - Measurem	ent of pH	I value	of Blood-	blood

amplifiers-chopper stabilized amplifiers –input guarding - Measurem cell counting, blood flow, Respiratory transducers and instruments.
 12. Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal https://elearning.sgtuniversity.ac.in/course-category/	/
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13. Books Recommended :

1. J J Carr, "Introduction to Biomedical Equipment Technology": Pearson Education 4th e/d **Reference Books**

1. K S Kandpur, "Hand book of Biomedical instrumentation", Tata McGraw Hill 2nd e/d.

1.	Name of the	e Department- ELECTRC	DNICS	& COMMUN	ICATI	ON ENG	JINEER	ING
2.	Subject	D.T Signal Processing	L		Т		Р	
Name	-							
3.	Subject		3		0		0	
Code								
4.	Type of Cou	ırse (use tick mark)	\checkmark	Core ()	PE()		OE ()	
5.	Pre-	Signal & Systems	6.	Frequency	Even	Odd	Either	Every
requis	site (if any)		(use ti	ick marks)	0	()	Sem	Sem
							0	0
7.	Total Numb	per of Lectures, Tutorials,	Practic	al (assuming	14 week	s of one	semeste	r)
Lectu	res = 38		Tutor	rals = 00	Practic	al =		

8. Brief Syllabus

This course deals with the basics of Electrical and Electronic measuring instruments used in laboratory and industry. In the process they learn different type of instruments like PMMC, Moving Iron, Electrodynamometer which includes voltmeter, ammeter, wattmeter, energy meter, power factor meter, frequency meter, Q meter, etc. Students will also learn about different AC and DC bridges to obtain various electrical parameters. Display devices which include DVM, CRO, and DSO etc are also learnt to analyze electrical signals in the course.

9. Learning objectives:

1. To introduce various techniques of digital signal processing that are fundamental to various industrial applications.

2. To know third generation DSP architectures and interfacing of memory and I/O peripherals to the DSP processors.

10. Course Outcomes:

At the end of the course, the student should be able to

1. Design IIR and FIR filters

2. Apply adaptive filters appropriately in communication systems.

11. Unit wise de	etailed content	
Unit-1	Number of lectures =	Discrete Fourier Transform
	13	
Analysis & synthes	sis equations for FT & D'	TFT, frequency domain sampling, Discrete Fourier
transform (DFT) d	eriving DFT from DTFT,	properties of DFT periodicity, symmetry, circular
convolution. Linear	filtering using DFT. Filteri	ng long data sequences overlap save and overlap add
method. Fast compu	utation of DFT Radix-2 Dec	cimation-in-time (DIT) Fast Fourier transform (FFT),
Decimation-in-frequ	ency (DIF) Fast Fourier tran	nsforms (FFT), Linear filtering using FFT.
Unit - 2	Number of lectures =	Infinite Impulse Response Filters
	05	
Characteristics of pr	actical frequency selective f	ilters, Characteristics of commonly used analog filters
Butterworth filters,	Chebyshev filters, Design of	TIR filters from analog filters (LPF, HPF, BPF, BRF)
Approximation of	derivatives, Impulse invar	riance method, Bilinear transformation, Frequency
transformation in th	ne analog domain, Structure	e of IIR filter direct form I, direct form II, Cascade,
parallel realizations.		
Unit - 3	Number of lectures =	Finite Impulse Response Filters
	08	
Design of FIR filter	rs, symmetric and Anti-sym	metric FIR filters, design of linear phase FIR filters
using Fourier series	s method, FIR filter design	using windows (Rectangular, Hamming & Hanning
window), Frequenc	y sampling method, FIR	filter structures, linear phase structure, direct form

realizations.

Unit - 4	Number of lectures =	Finite Word Length Effects

	08					
aint and fla	ating naint number rennade	ntation	ADC	guantization	two	and nounding

Fixed point and floating point number representation, ADC, quantization, truncation and rounding, quantization noise, input / output quantization, coefficient quantization error, product quantization error, overflow error, limit cycle oscillations due to product quantization and summation, scaling to prevent overflow.

12. Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

13. Books Recommended

Text Book

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth Edition, Pearson Education / Prentice Hall, 2007. (UNIT I - V)

References

1. Emmanuel C. Ifeachor & Barrie. W. Jervis, "Digital Signal Processing", Second Edition, Pearson Education / Prentice Hall, 2002.

1.	Name of the Department-ELECTRONICS & COMMUNICATION ENGINEERING						
2.	Subject	Scientific	L	Т	Р		

Name	computing					
3. Subject Code		3	0		0	
4. Type of Cours	e (use tick mark)	✓ Core ()	PE()		OE ()	
5. Pre-requisite		6. Frequency	Even	Odd	Either	Every
(if any)		(use tick marks)	0	(√)	Sem ()	Sem ()
7. Total Number	of Lectures, Tutor	ials, Practical (assumi	ng 14 we	eks of on	e semeste	er)
Lectures = 40	· · · · ·	Tutorials = 00	Practic	al =		
Brief Syllabus:						
Course consists of PIC also covers the develop	c microcontroller & ment of PIC based	their family members a projects for any applicat	rchitectu ions.	res and fe	atures as	well. It
 8. Learning obje 1. Develop the sk theory. 2. Introduce stud perspective 	c tives: tills to gain a basic ents to artificial r	e understanding of neur neural networks and fu	al netwo uzzy the	rk theory ory from	and fuzz	zy logic ineering
 Course Outcom Upon completion of th Comprehend the fuz theory. Understand the con reasoning, fuzzy infere Reveal different app 	es e course, the studen zy logic and the cor cepts of fuzzy sets, nce systems, and fu lications of these m	t are expected to neept of fuzziness involv knowledge representat zzy logic odels to solve engineerin	ed in var ion using ng and otl	ious syste g fuzzy ru her proble	ems and f lles, appr ems.	uzzy set oximate
10. Unit wise deta	iled content					
Unit-1	Number of lectures = 10	Introduction:				
Sources of Approxima Absolute Error and Re and Accuracy. Computer Arithmetic: Rounding, Machine P Point Arithmetic, Canc	ations, Data Error a lative Error, Sensiti Floating Point Num recision, Subnorma cellation	ind Computational, Tru- ivity and Conditioning, nbers, Normalization, Pa and Gradual Underfl	ncation E Backwar roperties ow, Exce	Error and d Error A of Floatin eptional N	Roundin nalysis, S ng Point Values, F	g Error, Stability System, loating-
Unit - 2	Number of lectures – 10	System of liner equation	ons:			
Linear Systems, Solvi Condition Numbers, S for Linear Systems Linear least square Orthogonalization Me and Column Pivoting Eigenvalues and sing Eigenvalues, Jacobi Decomposition, Applie	ng Linear Systems, ymmetric Positive 1 s: Data Fitting, thods, QR factoriza gular values: Eiger Method, Methods cation of SVD	Gaussian elimination, I Definite Systems and In Linear Least Square ation, Gram-Schmidt On avalues and Eigenvector for Computing Select	Pivoting, definite es, Norr thogonal ors, Met ed Eiger	Gauss-Jo System, I mal Equ ization, F hods for nvalues,	rdan, Nor terative M aations I Rank Def Comput Singular	rms and Aethods Method, iciency, ing All Values
Unit - 3	Number of lectures = 10	Nonlinear equations:				

Fixed Point Iteration, Newton's Method, Inverse Interpolation Method Optimization: One-Dimensional Optimization, Multidimensional Unconstrained Optimization, Nonlinear Least Squares Interpolation: Purpose for Interpolation, Choice of Interpolating, Function, Polynomial Interpolation, Piecewise Polynomial Interpolation. Numerical Integration and Differentiation: Quadrature Rule, Newton-Cotes Rule, Gaussian Quadrature Rule, Finite Difference Approximation, Initial Value Problems for ODES, Euler's Method, Taylor Series Method, Runga-Kutta Method, Extrapolation Methods, Boundary Value Problems For ODES, Finite Difference Methods, Finite Element Method, Eigenvalue Problems

Unit - 4	Number of	Partial Differential:
	lectures = 10	

Equations, Time Dependent Problems, Time Independent Problems, Solution for Sparse Linear Systems, Iterative Methods. Fast Fourier Transform, FFT Algorithm, Limitations, DFT, Fast polynomial Multiplication, Wavelets, Random Numbers And Simulation, Stochastic Simulation, Random Number Generators, Quasi-Random Sequences

11. Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

12. Books Recommended

Text Books:

1. Heath Michael T., "Scientific Computing: An Introductory Survey", McGraw-Hill, 2nd Ed., 2002 **References Books**

2. Press William H., Saul A. Teukolsky, Vetterling William T and Brian P. Flannery, "Numerical Recipes: The Art of Scientific Computing", Cambridge University Press, 3rd Ed., 2007

3. Xin-she Yang PIC microcontroller by Peatman Microchip technologies Datasheet

I4. Name ENGINEERING	of the Department	t- ELECTRONICS & COMMU	NICATION	
15. Subje	Information &	L	Τ	Р
ct Name	Communicatio n Theory			
16. Subje		3	0	0
ct Code	f C		DEO	OEO
tick mark)	i Course (use	Core (*)	PE()	OE()
18. Pre-	NIL	19. Frequen	Eve Od	Eithe Ever
requisite (if any)		cy (use tick marks)	$n()$ d (\checkmark)	r y Sem Sem
			(,)	$\begin{array}{c c} \text{Sem} & \text{Sem} \\ 0 & 0 \end{array}$
20. Total N	Number of Lectur	es, Tutorials, Practical (assumin	g 14 weeks o	f one
semester)		Tutorials - 0	Dractical -	
$\frac{1}{21} Course Description$		1 utor rais = 0	Fractical =	
The Lab subject basically dec	le with the differen	at aspects of a signal and spectra. I	t also deals w	vith the
modulation of signals and dif	ferent mathematics	a spects of a signal and spectra. I	s a more anal	vtical look into
the basic entities such as those	e of signals modul	ation noise etc. which form the ba	ase for higher	studies in
telecommunication.	e or signais, modu	auton, noise etc. which form the of	ase for higher	studies in
22. Learni	ng objectives:			
3. Concepts of communic	ation engineering.			
4. Different analog modul	ation techniques us	sed.		
23. Course	Outcomes (COs)	:		
3. Understand different m	odulation and dem	odulation techniques.		
4. Develop the ability to c	ompare and contra	st the strengths and weaknesses of	various mod	ulation
	-	-		anation
techniques.				
techniques.	ise detailed conter	at		
techniques. 24. Unit w Unit-1	ise detailed conter	nt Information Theory:		
techniques. 24. Unit w Unit-1	ise detailed conter Number of lectures = 10	nt Information Theory:		
techniques. 24. Unit w Unit-1	ise detailed conter Number of lectures = 10	nt Information Theory:		
techniques. 24. Unit w Unit-1 Information measure and sou discrete memory lass source	ise detailed conter Number of lectures = 10	nt Information Theory: ation measure, Entropy and Inform	nation rate, C	oding for a
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transmission, Automatic repeat request.

25.

Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

Books Recommended (3 Text Books + 2-3 Reference Books)

Text Books:

26.

1. Blahut R.E., Theory and practice of error control codes, AWL1983.

Reference Books:

1. Wilson, Digital Modulation and coding, Pearson

2. B.P. Lathi, Communication System, Oxford

3. Ranjan Bose, Information Theory, Coding & Cryptography, TMH

4. J. Dass., S.K. Malik & P.K. Chatterjee, Principles of digitals communication.

ENGINEERING			1			I	
15.	Subje	Device	L	Т		Р	
ct Name		Modelling					
16.	Subje		3	0		0	
ct Code				<u> </u>			
17.	Type of	Course (use	Core (✓)	PE()		OE ()	
tick mark)							r
18.	Pre-	Semiconducto	19.Frequen	Eve	Od	Eithe	Ever
requisite (if any)		r Physics &	cy (use tick marks)	n ()	d	r	У
		Electronic			(✓)	Sem	Sem
		Devices				()	()
20.	Total N	umber of Lectur	es, Tutorials, Practical (assumin	ng 14 we	eeks of	f one	
semester)							
Lectures = 42	•		Tutorials = 0	Pract	ical =		
21. Course Descri	ption					.1	41
The course covers b	asic of these	emiconductor ma	iterials, their physical & chemical	propert	ties. It	also co	ver the
characteristics & use	s of these	semiconductor in	laterials in different devices so the	ey can pe	eriorin	better.	
22	Loomi	a objectives.					
1 Understandin	Learing the che	ig unjectives:	rious semiconductor materials and	their or	nector	annlice	ation
1. Understandin 2 Development	of variou	s structural device	the for the replacement of existing f	or better	peciei r porfo	rmance	uion.
	. Or variot		tor the replacement of existing I	or belle	i perio	minance.	
23	Course	Outcomes (COs))•				
On completion of thi	s course	the students will	he able to				
1 To restructur	e evictino	electronic comp	opent to improve the performance				
1. To restructur	e existing	es by replacing th	e existing materials used in different	ent regio	n in th	ne devic	90
		es by replacing in	e existing materials used in differen	In regic	/11 111 u		<i>cs</i> .
24.	Unit wi	se detailed conte	nt				
24. Unit-1	Unit wi	se detailed conte Number of	nt Introduction				
24. Unit-1	Unit wi	se detailed conte Number of lectures = 12	nt Introduction				
24. Unit-1 Basic Device Physics	Unit wi	se detailed conte Number of lectures = 12 ns and holes in sil	nt Introduction	r. High f	field e	ffects.	
24. Unit-1 Basic Device Physics	Unit wi	se detailed conte Number of lectures = 12 ns and holes in sil	nt Introduction licon, p-n junction, MOS capacitor	r, High 1	field e	ffects.	
24. Unit-1 Basic Device Physics Unit – 2	Unit wi	se detailed conte Number of lectures = 12 ns and holes in sil	nt Introduction licon, p-n junction, MOS capacitor Device Physics	r, High 1	field e	ffects.	
24. Unit-1 Basic Device Physics Unit – 2	Unit wi s: Electro	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12	nt Introduction licon, p-n junction, MOS capacitor Device Physics	r, High f	field e	ffects.	
24. Unit-1 Basic Device Physics Unit – 2 Basic Device Physics	Unit wi s: Electro s: Electro	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12 ns and holes in sil	nt Introduction licon, p-n junction, MOS capacitor Device Physics licon, p-n junction, MOS capacitor	r, High f	field e	ffects.	
24. Unit-1 Basic Device Physics Unit – 2 Basic Device Physics	Unit wi s: Electro s: Electro	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12 ns and holes in sil	nt Introduction licon, p-n junction, MOS capacitor Device Physics licon, p-n junction, MOS capacitor	r, High f	field e	ffects.	
24. Unit-1 Basic Device Physics Unit – 2 Basic Device Physics Unit – 3	Unit wi s: Electro s: Electro	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12 ns and holes in sil Number of	nt Introduction licon, p-n junction, MOS capacitor Device Physics licon, p-n junction, MOS capacitor CMOS	r, High f	field e	ffects.	
24. Unit-1 Basic Device Physics Unit – 2 Basic Device Physics Unit – 3	Unit wi s: Electro s: Electro	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12 ns and holes in sil Number of lectures = 10	nt Introduction licon, p-n junction, MOS capacitor Device Physics licon, p-n junction, MOS capacitor CMOS	r, High f	field e	ffects.	
24. Unit-1 Basic Device Physics Unit – 2 Basic Device Physics Unit – 3 CMOS Performance	Unit wi s: Electro s: Electro Factors:	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12 ns and holes in sil Number of lectures = 10 Basic CMOS circ	nt Introduction licon, p-n junction, MOS capacitor Device Physics licon, p-n junction, MOS capacitor CMOS uit elements, parasitic elements, S	r, High f r, High f ensitivit	field e	ffects. ffects.	elay to
24. Unit-1 Basic Device Physics Unit – 2 Basic Device Physics Unit – 3 CMOS Performance device parameters, P	Unit wi s: Electro s: Electro Factors: T erforman	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12 ns and holes in sil Number of lectures = 10 Basic CMOS circ ce factors of adva	nt Introduction licon, p-n junction, MOS capacitor Device Physics licon, p-n junction, MOS capacitor CMOS uit elements, parasitic elements, Sonced CMOS devices.	r, High f	field end field end y of C	ffects. ffects.	elay to
 24. Unit-1 Basic Device Physics Unit – 2 Basic Device Physics Unit – 3 CMOS Performance device parameters, P 	Unit wi s: Electro s: Electro Factors: 1 erforman	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12 ns and holes in sil Number of lectures = 10 Basic CMOS circ ce factors of adva	nt Introduction licon, p-n junction, MOS capacitor Device Physics licon, p-n junction, MOS capacitor CMOS uit elements, parasitic elements, Senced CMOS devices.	r, High f	field e	ffects. ffects.	elay to
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 24. Unit-1 Basic Device Physics Unit – 2 Basic Device Physics Unit – 3 CMOS Performance device parameters, P Unit – 4 Bipolar Devices: n-p transistor, Bipolar de Device Design: Design Modern bipolar transistor 	Unit wi s: Electro s: Electro Factors: Terforman en Transi evice mod gn of the sistor strue	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12 ns and holes in sil Number of lectures = 10 Basic CMOS circ ce factors of adva Number of lectures = 08 stors, Ideal current els for circuit and emitter design, D ctures.	nt Introduction licon, p-n junction, MOS capacitor Device Physics licon, p-n junction, MOS capacitor CMOS uit elements, parasitic elements, Senced CMOS devices. Bipolar Devices ut-voltage characteristics, Character time-dependent analyses, Breakd esign of the base region, Design or	r, High f r, High f ensitivit eristics o own vol f the col	field e field e y of C of a typ tages. lector	ffects. ffects. MOS de bical n-p Bipolar design,	elay to -n
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 24. Unit-1 Basic Device Physics Unit – 2 Basic Device Physics Unit – 3 CMOS Performance device parameters, P Unit – 4 Bipolar Devices: n-p transistor, Bipolar de Device Design: Design Modern bipolar trans 25. The students will be delivered by subject The link to the E-Lea https://elearning.sgtu Journal papers; Pater 	Unit wi S: Electro s: Electro Factors: erforman erforman gn of the sistor stru Brief D encourag experts of arning points in the	se detailed conte Number of lectures = 12 ns and holes in sil Number of lectures =12 ns and holes in sil Number of lectures = 10 Basic CMOS circ ce factors of adva Number of lectures = 08 stors, Ideal current els for circuit and emitter design, D ctures. escription of self ed to learn using to f SGT University. rtal. ac.in/course-cates respective field.	nt Introduction licon, p-n junction, MOS capacitor Device Physics licon, p-n junction, MOS capacitor CMOS uit elements, parasitic elements, Senced CMOS devices. Bipolar Devices nt-voltage characteristics, Character time-dependent analyses, Breakd esign of the base region, Design of Flearning / E-learning component the SGT ELearning portal and cho	r, High f r, High f ensitivit eristics o own vol f the col nt ose the	field e field e y of C f a typ tages. lector releva	ffects. ffects. MOS de pical n-p Bipolar design, nt lectur	elay to -n : es

26. Books Recommended

Text Book

1. Yuan Taur, Tak.H.Ning, Fundamentals of Modern VLSI Devices, Cambridge University Press,

Reference Books

- 1. Donald Neamen, Semiconductors Physics and Devices, Tata Mc Graw Hill, 2003
- 2. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley Publications, 2002.
- 3. S.M. Sze (Ed), Physics of Semiconductor Devices, 2nd Edition, Wiley Publications, 1998

2. Subje	Control Systems	L	Т		Р	
3.Subje		3	0		0	
ct Code	f Course (mas		DEO		ΟΕΟ	
4. Type of tick mark)	i Course (use	Core (V)	PE()		OE()	
5. Pre-	Measurement	6. Frequen	Eve	Od	Eithe	Ever
requisite (if any)	&	cy (use tick marks)	n ()	d	r	y S
	n. Signals &			(•)	Sem ()	Sem ()
	System					
7. Total N	Number of Lecture	s, Tutorials, Practical (assuming	g 14 wee	eks of	fone	
semester) Lectures = 42		Tutorials = 0	Practi	cal =		
8. Course Description			Tructi	<u>cui –</u>		
Study of analog and compute	er controlled system	ns, classical and modern control s	ystem d	esign	method	s, state
space, dynamics of linear sy	stems, and frequence	cy domain analysis and design te	chnique	s. An	alysis of	f linear
recuback systems, then chara	cteristics, periorina	nee, and stability				
9. Learni	ng objectives:					
The students will learn and up	nderstand	setuical and other types of dynami			u a h a th	
1. Methodology for mode frequency domain and state-s	nng mechanical, ele	ectrical, and other types of dynami	ic system	ns usi	ng both	
2. Principles of feedback	control to a variety	of scientific disciplines				
		_				
10. Course	e Outcomes (COs):	a abla ta				
1 Know the methodology	for modeling dyna	e able lo mic systems				
2. Work with state-space	models and their ap	plication to frequency domain mo	dels.			
3. Design feedback contro	ollers and compensation	tors to achieve desired performan	ce speci	ficatio	ons.	
11. Unit wise detailed content Unit 1 Number of						
Unit-1	lectures = 12	Introduction to Control System	11			
Open loop & closed control;	servomechanism, P	hysical examples. Transfer functi	ons, Blo	ock di	agram a	lgebra,
and Signal flow graph, Maso	on's gain formula R	eduction of parameter variation a	nd effec	ts of	disturba	nce by
using negative recuback.						
Unit – 2	Number of	Time Response analysis				
	lectures =12					
Standard test signals, time r	esponse of first and	l second order systems, time res	nonce si	pecifi	cations	steady
state errors and error constants. Steady state Accuracy. Transient Accuracy. Disturbance, Rejection, Design						
specifications of second order systems: Derivative error, derivative output, integral error and PID						
compensations, design considerations for higher order systems.						
Unit _ 3	Number of	Concept of Stability & Algebra	nic Crit	aria		
Cint – 5	lectures = 10	Concept of Stability & Algebra		c1 1a		
Concept of Stability, Necessary condition for Stability, Routh Hurwitz Stability Criterion, Relative Stability						
Analysis, and Stability of Systems modeled in State variable form. Root locus concepts, its construction, Root						
contours, sensitivity of roots of Unaracteristic equations.						
Unit – 4	Number of	Frequency response Analysis				
	lectures = 08					

Polar and inverse polar plots, Bode plots, Stability in Frequency Domain: Nyquist stability criterion; assessment of relative stability: gain margin and phase margin; Nichols Charts; **Introduction to Design of control systems:** lead, lag and lead-lag networks, design of closed loop systems using compensation techniques in time domain and frequency domain. Review of state variable technique: State Models for Linear continuous Time systems, State Variables for linear discrete time, Conversion of state variable model to transfer function model and vice-versa, Controllability and observability and their testing.

12.

Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

13. Books Recommended

Text Books

Nagrath & Gopal, "Control System Engineering", 4th Edition, New age International, ISBN: 0130980412.
 8.

Reference Books

Norman S. Mise, Control System Engineering 4th edition, Wiley Publishing Co, ISBN: 0132273071.
 K. Ogata, "Modern Control Engineering", Prentice Hall of India, 3rd edition ISBN: 0132273071

1. Name of the Department : Electronics and Communication Engineering

26. Subject Name	ARM Controller	L	Т		Р		
27. Subject		3	0)		0	
28. Type of (mark)	Course (use tick	Core (√)	PE ()		OE ()		
29. Pre- requisite (if	Knowledge of Digital electronics.	30. Frequency (use tick marks)	Even ()	Odd $()$	Either Sem ()	Every Sem ()	
any)	Microcontroller				~	~	
	Architecture and Programming						
31. Total Nu	mber of Lectures, Tu	itorials, Practical (a	ssuming 14	weeks of	one semest	er)	
Lectures = 00		Tutorials = 00	Practical	= 10			
32. Brief Syl	labus						
The course intro	duces ARM Embedd	ed Systems and AR	M Process	or Fundan	nentals. Kno	owledge of	
ARM Instruction	Set is also imparted.	This course further te	eaches abou	it ARM Pr	ogramming,	Exception	
and Interrupt har	idling schemes.						
1 Collect knowl	Jecuves: edge of probitecture of	APM 7processor II	DC21/8 and	lassambly	nrogrammi	ng of	
	euge of architecture of	ARM /processor, Li	C2140 all	assembly	programmi	lig of	
2 Learn to desig	on construct program	verify analyze and t	roubleshoo	t ARM ass	sembly and (C language	
programs and su	porting hardware	, verify, analyze and t	.10001051100		seniory and v		
programs and su	PP 01 0118 1101 01 01 01 01						
34. Course Ou	itcomes						
At the end of the	course, the students w	vill be able to					
1. Understand th	ne features of embedde	d systems, architectu	re of ARM	7 and appli	ications.		
2. Analyse and u	nderstand the instructi	on set and developme	ent tools of	ARM			
5.							
14. Unit wise detailed content							
Unit-1 Number of ARM Embedded Systems and ARM Processor							
1	Number of	ARM Embedded S	ystems and		0005501		
The DISC desig	$\frac{1}{1} \frac{1}{1} \frac{1}$	Fundamentals			andwara A	MDA bug	
The RISC desig	$\frac{1}{1}$	Fundamentals design philosophy,	embedded	system h	hardware- A	MBA bus	
The RISC design protocol, embed	In the second se	Fundamentals design philosophy, - applications. ARM	embedded core data	system h flow mo	hardware- A del, Registe	MBA bus ers, CPSR-	
The RISC design protocol, embed Processor modes	In the second se	Fundamentals design philosophy, - applications. ARM peline- Characteristics	embedded core data	system h flow mo	ardware- A del, Registe	MBA bus ers, CPSR-	
The RISC design protocol, embed Processor modes	Inductor of lectures = 12 gn philosophy, ARM ded system software- , Banked registers. Pip Number of	Fundamentals design philosophy, applications. ARM peline- Characteristics	embedded core data	system h flow mo	ardware- A del, Registe	MBA bus ers, CPSR-	
The RISC design protocol, embed Processor modes Unit – 2	Industrial lectures = 12 gn philosophy, ARM ded system software- , Banked registers. Pip Number of lectures =12	Fundamentals design philosophy, - applications. ARM peline- Characteristics ARM Instruction S	embedded core data	system h flow mo	ardware- A del, Registe	MBA bus ers, CPSR-	
The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of	Industrial Indust	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifier	embedded core data Set	system h flow mo explanatio	ardware- A del, Registe	MBA bus ers, CPSR-	
The RISC design protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p	Industriallectures = 12gn philosophy, ARMded system software-, Banked registers. PipNumber oflectures =12F ARM instructions, Brocessing, Branch, Loa	Fundamentals design philosophy, - applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifiad-store, SWI and Pro-	embedded core data set core ata set	system h flow mo explanations Register	ardware- A del, Registe	MBA bus ers, CPSR-	
The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p	Industrial for the second seco	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifiad-store, SWI and Pro-	embedded core data Set	system h flow mo explanations Register	ardware- A del, Registe on of instruc- instruction.	MBA bus ers, CPSR-	
The RISC design protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p Unit – 3	Number of lectures = 12 gn philosophy, ARM ded system software- , Banked registers. Pip Number of lectures =12 F ARM instructions, B rocessing, Branch, Los Number of lectures =12	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifiad-store, SWI and Programmin	embedded core data s Set ication and ogram Statu	system h flow mo explanations Register	ardware- A del, Registe	MBA bus ers, CPSR- ctions with dling	
The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p Unit – 3	Number of lectures = 12 gn philosophy, ARM ded system software- , Banked registers. Pip Number of lectures =12 F ARM instructions, B rocessing, Branch, Los Number of lectures = 10	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifiad-store, SWI and Programmin schemes Barrel Shifter, Classifiad-store, SWI and Programmin	embedded core data Set ication and ogram Statu	system h flow mo explanations Register	ardware- A del, Registe on of instruc- instruction. terrupt han	MBA bus ers, CPSR- ctions with dling	
The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p Unit – 3 Differences betw Structure of AD	Number of lectures = 12 gn philosophy, ARM ded system software- , Banked registers. Pip Number of lectures =12 F ARM instructions, B rocessing, Branch, Los Number of lectures = 10 reen ARM and THUM M assembly, maching	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifiad-store, SWI and Programmin ackeres B, Register usage in face	embedded core data set ication and ogram Statu ng, Exception Thumb, AR	system h flow mo explanations Register on and Int CM Thumb	on of instruc- instruction.	MBA bus ers, CPSR- ctions with dling	
The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p Unit – 3 Differences betw Structure of AR	Number of lectures = 12 gn philosophy, ARM ded system software- , Banked registers. Pip Number of lectures =12 F ARM instructions, B rocessing, Branch, Loa Number of lectures = 10 'een ARM and THUM M assembly module, YL DCO_FOUL EXPO	ARM Endedded S Fundamentals design philosophy, - applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifi ad-store, SWI and Programmin schemes B, Register usage in ' Assembler directive PT ALIGN CODE1	embedded core data Set ication and ogram Statu ng, Exception Thumb, AF es- AREA,	system h flow mo explanations Register on and Int EM Thumb ENTRY,	on of instruction. terrupt han	MBA bus ers, CPSR- ctions with dling ng. General CE, DCD, P programs	
The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p Unit – 3 Differences betw Structure of AR DCB, DCW, DC on Arithmetic &	Number of lectures = 12 gn philosophy, ARM ded system software- , Banked registers. Pip Number of lectures =12 F ARM instructions, B rocessing, Branch, Los Number of lectures = 10 veen ARM and THUM M assembly module, ZI, DCQ, EQU, EXPO logical operations	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S arrel shifter, Classifiad-store, SWI and Programmin ad-store, SWI and Programmin schemes B, Register usage in 'Assembler directive RT, ALIGN, CODE1 ctorial_string operative	embedded core data set ication and ogram Statu ng, Exception Thumb, AR es- AREA, 6, CODE3	system h flow mo explanations Register on and Int EM Thumb ENTRY, 2, DATA. searching	ardware- A del, Registe on of instruc- instruction. terrupt han Interworkin END, SPA Simple ALI and Scan	MBA bus ers, CPSR- ctions with dling ng. General CE, DCD, P programs	
The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p Unit – 3 Differences betw Structure of AR DCB, DCW, DC on Arithmetic & Exception hand	Number of lectures = 12 gn philosophy, ARM ded system software- , Banked registers. Pip Number of lectures =12 F ARM instructions, B rocessing, Branch, Los Number of lectures = 10 reen ARM and THUM M assembly module, ZI, DCQ, EQU, EXPO logical operations, Factoring- ARM processor	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifiad-store, SWI and Programming ad-store, SWI and Programming Schemes B, Register usage in 'Assembler directive RT, ALIGN, CODE1 ctorial, string operation exceptions, and model	embedded core data set ication and ogram Statu ng, Exceptia Thumb, AF es- AREA, 6, CODE3 on, sorting, des_vector	system h flow mo explanations resplanations	on of instruction. terrupt han Interworkin END, SPA Simple ALI and Scan.	MBA bus ers, CPSR- ctions with dling ng. General CE, DCD, P programs orities link	
The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p Unit – 3 Differences betw Structure of AR DCB, DCW, DC on Arithmetic & Exception handl register offsets	Number oflectures = 12gn philosophy, ARMded system software-, Banked registers. PipNumber oflectures =12E ARM instructions, Brocessing, Branch, LoaNumber oflectures = 10veen ARM and THUMM assembly module,CI, DCQ, EQU, EXPOlogical operations, Facing- ARM processorInterrupts- assigning	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S arrel shifter, Classifiad-store, SWI and Programming ad-store, SWI and Programming B, Register usage in 'Assembler directive RT, ALIGN, CODEI ctorial, string operation interrupts, interrupts	embedded core data core data s Set ication and ogram Statu ng, Exception Thumb, AF es- AREA, 6, CODE3 on, sorting, des, vector t latency	system h flow mo explanations Register on and Int M Thumb ENTRY, 2, DATA. searching, table, explanations IRO and	ardware- A del, Registe on of instruc- instruction. terrupt han Interworkin END, SPA Simple ALI and Scan. ception prio FIO excen	MBA bus ers, CPSR- ctions with dling ng. General CE, DCD, P programs orities, link tions with	
The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p Unit – 3 Differences betw Structure of AR DCB, DCW, DC on Arithmetic & Exception handl register offsets. example- code for	Number oflectures = 12gn philosophy, ARMded system software-, Banked registers. PipNumber oflectures =12F ARM instructions, Brocessing, Branch, LosNumber oflectures = 10reen ARM and THUMM assembly module,CI, DCQ, EQU, EXPOlogical operations, Facing- ARM processorInterrupts- assigningor enabling and disablic	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifiad-store, SWI and Programming ad-store, SWI and Programming Schemes B, Register usage in 'Assembler directive RT, ALIGN, CODE1 ctorial, string operation interrupts, interrup ing IRQ and FIQ exc	embedded core data core data s Set ication and ogram Statu ng, Exceptia Thumb, AF es- AREA, 6, CODE3 on, sorting, des, vector t latency, eptions, Co	system h flow mo explanation is Register on and Int EM Thumb ENTRY, 2, DATA. searching, table, exc IRQ and omparison	ardware- A del, Registe on of instruc- instruction. terrupt han Interworkir END, SPA Simple ALI and Scan. ception prio FIQ excep between exc	MBA bus ers, CPSR- ctions with dling ng. General CE, DCD, P programs orities, link tions with ception and	
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The RISC desig protocol, embed Processor modes Unit – 2 Fundamentals of examples-Data p Unit – 3 Differences betw Structure of AR DCB, DCW, DC on Arithmetic & Exception handl register offsets. example- code foi interrupts. Interri	Number of lectures = 12 gn philosophy, ARM ded system software- , Banked registers. Pip Number of lectures =12 F ARM instructions, B rocessing, Branch, Los Number of lectures = 10 reen ARM and THUM M assembly module, ZI, DCQ, EQU, EXPO logical operations, Fac ing- ARM processor Interrupts- assigning or enabling and disablic upt handling schemes esign.	Fundamentals design philosophy, applications. ARM beline- Characteristics ARM Instruction S Barrel shifter, Classifiad-store, SWI and Programmin schemes B, Register usage in 'Assembler directive RT, ALIGN, CODEI ctorial, string operation exceptions and mode interrupts, interruping IRQ and FIQ exceptions and mode interrupt here.	embedded core data core data s Set ication and ogram Statu ng, Exception Thumb, AF es- AREA, 6, CODE3 on, sorting, des, vector t latency, eptions, Co andler, nor	system h flow mo explanations resplanations resplanations resplanation	ardware- A del, Registe on of instruc- instruction. terrupt han Interworkir END, SPA Simple ALI and Scan. ception prio FIQ excep between exconterrupt han	MBA bus ers, CPSR- ctions with dling ng. General CE, DCD, P programs orities, link tions with ception and dler. Basic	
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lectures = 08	
LPC 2148 - Salient features, applications, memory mapping. Interrupt controller, RTC, US	B, UART,
2C, SPI, SSP controllers, watch dog timers and other system control units.	
LPC 2148 - Peripherals: Pin Connect Block- Features, Register description with examp	le. GPIO-
Features, Applications, Pin description, Register description with examples PLL-Featu	res, block
diagram, bit structure of PLLCON, PLLCFG, & PLLSTAT, and PLLFEED. PLL	frequency
Calculation- procedure for determining PLL settings, examples for PLL Configuration Timera	s-Features,
applications, Architecture of timer module, register description, Simple C programs for a	application
using -GPIO, PLL, Timer.	

15.

16.

Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

Books Recommended

Text Books

1. ARM System Developer's guide –Andrew N. SLOSS, ELSEVIER Publications, 2016. **Reference Books**

- 1. ARM Assembly Language William Hohl, CRC Press, ISBN:978-81-89643-04-1
- 2. ARM System-on-chip Architecture by Steve Furber, Pearson Education,
- 3. LPC 2148 USER MANUAL
- 4. IN SIDE R'S GUIDE TO PHILIPS ARM7 BASED MICROCONTROLLERShitex.co.uk
- 5. ARM Programming Techniques from ARM website

6. Embedded Systems: A Contemporary Design Tool- James K. PeckolISBN: 978-0-471- 72180-2 October 2007, ©2008

2. t Name	Subjec	Speech Processing	L	T	Р		
		&					
		Recognitio n					
3. t Code	Subjec		3	0	0		
4.	Type of	Course (use	Core (✓)	PE()	OE ()		
tick mark)	Pre-	Signal	6 Frequenc	Eve Od	Fithe Ever		
requisite (if any)	110-	Processing	y (use tick marks)	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	r Sem y		
				· (✓)	() Sem		
7.	Total Nu	umber of Lect	ures, Tutorials, Practical (assumi	ng 14 weeks o	of one		
semester)							
$\frac{\text{Lectures} = 42}{2}$			Tutorials = 0	Practical =			
8. Course Descri	ption	rial in the accu	ustic theory of speech production	populatio phon	ation and signal		
representation It des	cribes alo	orithmic aspec	ts of speech recognition systems in	cluding patter	m classification		
search algorithms, si	tochastic 1	nodelling. and	language modelling techniques. I	t compares a	nd contrasts the		
various approaches	to speech	recognition,	and describes advanced technique	es used for a	coustic-phonetic		
modelling, robust spe	eech recog	inition etc.	1		1		
9.	Learnin	g objectives:					
The students will lea	rn and und	lerstand					
1. To enable studen	its to mas	ter the state-of	-the-art theories and technologies	behind variou	s speech related		
and voice biometrics	s, such as	mobile phones	, voice search, voice over IP, Interi	het phones, di	rectory services,		
10.	Course	Outcomes (CC) s):				
On completion of thi	s course, t	he students will	l be able to	_			
1. Master the fu	1. Master the fundamental principles behind voice-enable products and services;						
2. Know what the	he current	state-of-the-art	speech technologies can offer;				
3. Take the limit	itations of	current speech	technologies into consideration w	nen deployin	g voice-enabled		
services							
11.	Unit wis	e detailed con	tent				
Unit-1		Number of	Production And Classification of	of Speech Sou	nds		
		lectures =		L			
Introduction machan	niam of an	12	Acoustic phonotics: yoursla dia	hthongs age	ivovala nasala		
fricatives stops and	nsm or sp affricates	peech productio	on, Acoustic phonetics: vowers, dip	mulongs, sem	ivowels, nasals,		
Unit – 2		Number of	Time-Domain Methods For Spe	ech Processir	ng		
		lectures					
Time dependent and	ooggina -	=12	t time operate and eveness meaning	uda ahart tir	0.000000 7000		
rune dependent processing of speech, short-time energy and average magnitude, short-time average zero							
Speech vs. silence detection- Speech vs. silence detection, nitch period estimation using narallel processing							
approach, short-time autocorrelation function.							
Unit – 3 Number of Frequency Domain Methods for Speech Processing							
		lectures =		· · · · · · · · · · · · · · · · · · ·	0		
		10					
Introduction, definiti	ons and pr	operties: Fouri	er transforms interpretation and lin	ear filter inter	pretation,		
			107				

 sampling rates in time and frequency.

 Unit – 4
 Number of

 APPLICATIONS OF SPEECH PROCESSING

lectures = 08

Brief applications of speech processing in voice response systems hearing aid design and recognition systems

12.

Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Books Recommended

Journal papers; Patents in the respective field.

13. Text Books

1. M.W. Mak and J.T. Chien, "Machine Learning for Speaker Recognition", Cambridge University Press, 2019.

Reference Books

1. Y. LeCun, Y. Bengio and G.E. Hinton, "Deep Learning", Nature, vol. 521, pp. 436-444, May 2015.

2. T. Kinnunen and H. Z. Li, "An overview of text-independent speaker recognition: From features to supervectors," Speech Communication, 2010.

3. J.R. Deller, J.G. Proakis, and J.H.L. Hansen, Discrete-Time Processing of Speech Signals, Macmillan Pub. Company, 2000.

4. L.R. Rabiner and B.H. Juang, Fundamentals of Speech Recognition, Prentice Hall, 1993.

1. Name of the Department : Electronics and Communication Engineering							
2.	Subject	Wireless Sensor	L	Т	Р		
Name	Network						
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3. Subject		3	0		0		
Code							
4. Type of Co	urse (use tick mark)	Core $()$	PE()		OE ()		
5. Pre-	Sensors &	6. Frequency	Even ()	Even () Odd $(\sqrt{)}$		Every	
requisite (if	Transducers	(use tick			Sem ()	Sem ()	
any)		marks)					
7. Total Num	7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)						
Lectures = 00 Tutorials = 00 Practical = 10							

8. Brief Syllabus

This course provides a broad coverage of challenges and latest research results related to the design and management of wireless sensor networks. Covered topics include network architectures, node discovery and localization, deployment strategies, node coverage, routing protocols, medium access arbitration, fault-tolerance, and network security.

9. Course Objectives:

Wide range of applications such as disaster management, military and security have fuelled the interest in sensor networks during the past few years. Sensors are typically capable of wireless communication and are significantly constrained in the amount of available resources such as energy, storage and computation. Such constraints make the design and operation of sensor networks considerably different from contemporary wireless networks, and necessitate the development of resource conscious protocols and management techniques.

10. Course Outcomes

At the end of the course, the students will be able to

By the completion of the course, you should be able to:

- 1. Architect sensor networks for various application setups.
- 2. Explore the design space and conduct trade-off analysis between performance and resources.
- 3. Assess coverage and conduct node deployment planning.
- 4. Devise appropriate data dissemination protocols and model links cost.
- 5. Determine suitable medium access protocols and radio hardware.
- 6. Prototype sensor networks using commercial components.
- 7. Provision quality of service, fault-tolerance, security and other dependability requirements while coping with resource constraints.
- 8. Evaluate the performance of sensor networks and identify bottlenecks.

17.	Unit wise detail	ed content				
Unit-1	Number of lectures = 12	Applications and Design Model				
Examples of available sensor nodes, Sample sensor networks applications, Design challenges, Contemporary network architectures, Operational and computational models, Performance metric Software and hardware setups.						
Unit – 2	Number of lectures =12	Network Bootstrapping				
Sensor deployment mechanisms, Issues of coverage, Node discovery protocols, Localization schemes, Network clustering,						
Unit – 3	Number of lectures = 10	Data dissemination and routing				
Query models, I	Query models, In-network data aggregation, robust route setup, coping with energy constraints,					
Unit – 4	Number of lectures = 08	Physical and Link layers & Dependability Issues				
Radio energy co	onsumption model, Pow	ver management, Medium access arbitration, Optimization				

mechanisms;

Dependability Issues: Security challenges, Threat and attack models, Quality of service provisioning, Clock synchronization, Supporting fault tolerant operation

18. Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

19.

Books Recommended Text Books

Protocols and Architectures for Wireless Sensor Networks; 1.

Holger Karl, Technical University of Berlin,, Andreas Willig, University of Potsdam, Wiley, ISBN: 0-470-09510-5, June 2005

1.	Name of the Department : El	ectronics and Co	mmunication Engi	neering
2. Subject	Digital System design with	L	Т	Р

Name	Programming logic					
a a b b		2	0			
3. Subject Code		3	0		0	
4. Type of C	ourse (use tick mark)	Core ($$)	PE()		OE ()	
5. Pre-	Digital Design	6. Frequency	Even ()	Odd	Either	Every Sem
requisite (if		(use tick		(√)	Sem ()	0
any)		marks)				
7. Total Nun	<u>iber of Lectures, Tutorials, Pra</u>	actical (assuming	<u>g 14 weeks</u>	of one se	emester)	
Lectures = 00		Tutorials = 00	Practical	= 10		
8. Brief Sylla	ibus					
The VHSIC H	lardware Description Language	(VHDL) is an in	dustry star	ndard lan	guage used	l to describe
hardware from	the abstract to the concrete lev	el. VHDL usage	has risen r	apidly si	nce its ince	eption and is
used by literal	y tens of thousands of engineers	around the globe	to create so	ophistica	ted electron	ic products.
9. Course Ol	ojectives:					
1. To gain	an in-depth understanding of VI	HDL and to realize	ze different	circuits	using it bo	th sequential
and combination	onal.			11.0	11 7	• •
2. To gain (FPGAs).	an understanding of applications	s of VHDL in PL	LDs and Fi	eld Prog	rammable I	Logic Arrays
10. Course Ou	itcomes					
On completion	of this course, the students will	be able to				
1. Explain VI	HDL as a programming language					
2. Gain profi	ciency with VHDL software pa	ckage and utilize	software j	package	to solve pr	oblems on a
wide range of	digital logic circuits.					
11. Unit wise	detailed content					
Unit-1	Number of lectures = 12	Introduction				
Introduction t	o Hardware Description Lang	uages (HDL) an	d HDL ba	sed desi	ign, VHDL	- Variables,
Signals and c	onstants, Arrays, VHDL operation	tors, VHDL fun	ctions, VH	IDL pro	cedures, P	ackages and
libraries, VHD	DL description of combinational	networks, Model	ing flip-flo	ps using	VHDL, VI	HDL models
for a multiple	xer, Compilation and simulation	n of VHDL code	e, Modelin	g a sequ	ential mac	hine, VHDL
model for a co	unter.					
Unit – 2	Number of lectures =12	VHDL Synthes	is and Mo	dels		
Attributes. Tra	ansport and Inertial delays. One	rator overloading	g, Multival	ued logi	c and signa	l resolution.
IEEE-1164 sta	indard logic. Generics. Generate	statements. Svnt	thesis of V	HDL co	de. Svnthes	is examples.
Files and TEX	TIO. Introduction to data path an	d control path sy	nthesis.		, J	I /
	-					
Unit – 3	Number of lectures = 10	Digital Design	with State	Machine	e Charts	
State machine	charts, Derivation of SM charts,	Realization of SI	M charts. In	nplemen	tation of th	e dice game,
Alternative rea	lization for SM charts using mi	croprogramming,	linked stat	e machii	nes, Asynch	ronous state
machine based	design.	1 0 0				
Unit – 4	Number of lectures = 08	Programmable	Logic dev	ices (PL)	Ds)	
Designing Wit	h Programmable Logic Devices	· Read-only mem	ories (RON	I EPRO	M EEPRC	M/FLASH)
Programmable	logic arrays (PLAs) Program	mable array logi	c (PLAs)	other se	quential pr	ogrammable
logic devices (PLDs). Design of a keypad scan	ier.	- (Jaconian bi	- 8
Design Of Net	works For Arithmetic Operation	s: Design of a ser	ial adder w	ith accur	nulator. Sta	te graphs for
control netwo	rks, Design of a binary multipl	ier, Multiplicatio	on of signe	d binarv	numbers.	Design of a
binary divider.		. 1	0	2	7	C I
-						
12. Brief Desc	ription of self learning / E-lear	ning component				

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

13. Books Recommended

Text Books

1. Stephen Brown and Zvonko Vranesic," Fundamentals of Digital Logic with VHDL Design", Mc-Graw-Hill (2nd edition).*ISBN*-10: 0077211642

Reference Books

1. Peter J. Ashenden, "Designers guide to VHDL ", Morgan Kaufman Publishers. 3rd edition, *ISBN*-10: 0120887851

Open Elective - II

VA course - II

1. Name of the Department : Electronics and Communication Engineering

2.Subject Name	Microwave & Radar Lab	L	Т		Р	
3.Subject		0	0		2	
Code						
4.Type of Cours	e (use tick	Core (V)	PE()		OE ()	
mark)						
5.Pre-requisite	Electromagne	1. Frequency	Even ()	Od	Eithe	Every Sem ()
(if any)	tic Fields and	(use tick marks)		d	r	
	waves.			(√)	Sem	
					0	
6.Total Number	of Lectures, Tu	torials, Practical (ass	uming 14 wee	eks of	one sem	nester)

Lectures = 00Tutorials = 00Practical = 10

7.Brief Syllabus

A key part of the microwave laboratory experience is to learn how to use microwave test equipment to make measurements of power, frequency, S parameters, SWR, return loss, and insertion loss. We are fortunate to have a very well-equipped microwave laboratory, but most of the equipment is probably not familiar to students. Here we briefly describe the most important pieces of test equipment that will be used in the laboratory experiments.

8.Course Objectives

- 1. Know about the behavior of microwave components.
- 2. Understand the radiation pattern of horn antenna.

9.Course Outcomes

On completion of this course, the students will be able to

- 1. Demonstrate the characteristics of Microwave sources
- 2. Demonstrate the characteristics of directional Couplers
- 3. To test the characteristics of microwave components
- 4. To analyze the radiation pattern of antenna
- 5. To measure antenna gain
- 6. Practice microwave measurement procedures

10.List of Experiments

- 1. To study microwave test bench.
- 2. To study the characteristics of reflex klystron tube and to determine its electronic tuning range.

3. To determine the frequency and wavelength in a rectangular waveguide working on TE01 mode. 4. To study measurement of reflection coefficient and standing wave ratio using double minima method.

- 5. To study V-I characteristic of Gunn diode.
- 6. To measure an unknown impedance with Smith chart.
- 7. Study of Circulator/Isolator.
- 8. Study of Attenuator (Fixed and Variable type).

9. To study simple dipole / antenna and to calculate beam-width, front / back ratio, and gain of the antenna.

10. To study folded dipole antenna and to calculate beam-width, front / back ratio, and gain of the antenna.

11. To study / phase array end-fire antenna and to calculate beam-width, front / back ratio, and gain of the antenna.

12. To study broadside array antenna and to calculate beam-width, front / back ratio, and gain of the antenna.

11.Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant

lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

12.Books Recommended

1. James Wigle, Microwave Engineering Laboratory Manual, 3rd Edition, ISBN-10: 1105690377, ISBN-13: 978-1105690372

VLSI Design Lab 0 0 2 3.Subject Code 0 0 2 4.Type of Course (use tick mark) Core (\city) PE() OE() 5.Pre-requisite Digital Design 2. Frequency (if any) 0 0 Frequency Ven () Od Fithe Every Sem () 6.Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester) Lectures = 0 Tutorials = 00 Practical = 12 7.Brief Syllabus A course in VLSI design laboratory will provide a practical knowledge for the implementation of analog and digital VLSI circuits. Sem On completion of this course. Sem 8.Course Objectives The student will learn and understand I. Transistor-Level CMOS Logic Design. Sem Sem On completion of this course. the students will be able to I. Or completion of this course. On completion of this course. On on the course. On on the other circuits using NMOS technology. Sem of the different defer circuits using CMOS technology. Design the different adder circuits using CMOS technology. Design the different Adder circuits using CMOS technology. Design the diduder using CMOS Technology. Design the diduder u	2.Subject Name		L	Т		Р				
Lab Lab 0 0 2 3.Subject Code 0 0 0 2 4.Type of Course (use tick mark) Core (v) PE() OE() 5.Pre-requisite Digital Design 2. Frequency Even () Od d r 6.Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester) Lectures = 00 Practical = 12 7.7.8ricf Syllabus A course in VLSI design laboratory will provide a practical knowledge for the implementation of analog and digital VLSI circuits. 8.Course Objectives 8. Transistor-Level CMOS Logic Design. 9.Course Outcomes On completion of this course, the students will be able to . . . 1. Cerate models of moderately sized CMOS circuits that realize specified digital functions. . . . 1. Design the schematic for the different logic gates using NMOS technology. 2. Design the schematic for the different logic gates using CMOS technology. 	Ū	VLSI Design								
Jum Jum Jum 3Subject Code 0 0 2 4Type of Course (use fick mark) Core (*) PE() OE() 5.Pre-requisite Digital Design 2: Frequency Even () 0d Eithe Every Sem () 6.Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester) Lectures = 00 Tutorials = 00 Practical = 12 7.Brief Syllabus A course in VLSI design laboratory will provide a practical knowledge for the implementation of analog and digital VLSI circuits. Scourse Objectives The student will learn and understand 1 Transistor-Level CMOS Logic Design. Scourse Objectives The student will learn and Optimization of combinational circuits. 9. Scourse Objectives On completion of this course, the students will be able to 1. Create models of moderately sized CMOS circuits that realize specified digital functions. 10. List of Experiments 1. Design the schematic for the different logic gates using CMOS technology. 2. Design the different ded circuits using CMOS technology. 3. Design the different logic gates using CMOS technology. 3. Design the different logic gates using CMOS technology. Do the Transient		Lab								
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Image: Spre-requisite in the spread of th	4.Type of Course (use tick mark)	Core (V)	PEO		OE ()				
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Lectures = 00 Tutorials = 00 Practical = 12 7.Brief Syllabus A course in VLSI design laboratory will provide a practical knowledge for the implementation of analog and digital VLSI circuits. 8.Course Objectives The student will learn and understand 1. Transistor-Level CMOS Logic Design. Estimation and Optimization of combinational circuits. 9.Course Outcomes On completion of this course, the students will be able to 1. Create models of moderately sized CMOS circuits that realize specified digital functions. 10.List of Experiments 1. Design the schematic for the different logic gates using NMOS technology. 2. Design the schematic for the different logic gates using CMOS technology. 3. Design the schematic for the different logic gates using CMOS technology. 4. Design the different adder circuits using CMOS technology. 5. Do the Transient, AC & DC analysis for the NMOS & CMOS full adder. 7. Design the layout for Universal logic gates using NMOS Technology. 8. Design the layout for Universal logic gates using CMOS Technology. 9. Design the layout for Half Adder using CMOS Technology. 9. Design the layout for Half Adder using CMOS Technology. 9. Design the layout for Half Adder using CMOS Technology. 10. Design the layout for Setterning CMOS Technology. 10. Design the layout for Setechnologies. </th <th>6.Total Number of</th> <th>f Lectures, Tutor</th> <th>rials, Practical (assum</th> <th>ning 14 weeks</th> <th>of on</th> <th>e semes</th> <th>ster)</th>	6.Total Number of	f Lectures, Tutor	rials, Practical (assum	ning 14 weeks	of on	e semes	ster)			
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Text Book: 1. Sung-Mo Kang & Yusuf Leblebici, "CMOS Digital Integrated Circuits – Analysis and Design", 3rd Edition, Tata McGraw-Hill, New Delhi, 2003.	12 Books Recomm	ended :								
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Edition, Tata McGraw-Hill, New Delhi, 2003.	1. Sung-Mo Kang &	& Yusuf Leblebic	i, "CMOS Digital Inte	grated Circuits	s – An	alysis a	nd Design", 3rd			
	Edition, Tata McGr	aw-Hill, New De	lhi, 2003.			5	5 /			

1. Name of the Department : Electronics and Communication Engineering

2.Subject Name		L	Т		P	
	Major Project	_	-			
	phase - II					
	1					
3.Subject Code		0	0		4	
4.Type of Course (use tick mark)	Core ($$)	PE()		OE ()	
5.Pre-requisite	Minor Project	3. Frequency	Even ()	Od	Eithe	Every Sem ()
(if any)		(use tick marks)		d	r	
				(٧)	Sem	
6 Total Number of	Lectures Tutor	ials Practical (assum	 ning 14 weeks	s of on	l U le semes	ter)
$\frac{0.10 \text{ tar (under of)}}{\text{Lectures} = 00}$	Dectures, rutor	Tutorials = 00	Practical :	=04		
7.Brief Syllabus		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
Major projects are s	generally large-sc	ale infrastructure proje	ects in Engine	ering	environ	ment and other sectors
such as education, e	energy or ICT. Th	ey also concern big pi	oductive inve	stmen	ts and re	esearch & development
projects.						
8.Course Objective	es					
The objectives of th	e Major Project F	hase I include:				
1. To give stud	lents the opportun	ity to apply the know	ledge and skill	ls they	have ac	equired on campus into
an idea that they wa	int to developed.		1	•	6	
2. To provide s	students with opp	ortunities for practical	, hands-on lea	rning	from pra	actitioners in the
3 To enhance	the practical skill	s of the students so he	becomes read	ly for	work	
5. To enhance	the practical skill	s of the students so he	becomes read	<i>i</i> y 101	work.	
9.Course Outcome	s					
The learning outcor	nes can be as folle	ows:				
7. Apply theory	etical knowledge	in practical applicatio	ns.			
8. Acquire skil	ls in communicat	ion, management and	team work.			
10 L ist of Experim	onte					
1. The students	s are required to d	levelop a product form	the idea & k	nowlea	dge he h	as.
 Students will 	ll be allotted to a	guide throughout the v	whole work fo	r the g	uidance	and supervision.
3. The final Vi	va-voca of this w	ill be conducted by the	e external exa	miner	and one	internal examiner
appointed by the ins	stitute. External e	xaminer will be from	penal of exam	iner.		
4. Assessment	of this will be bas	sed on viva-voca, repo	ort and present	tation	of the w	ork.
		r / F looming com-	nont			
11 Priof Decemintic	n of colf loomin		nent		h 41	
11.Brief Description	on of self learning	earn using the SGT FI	earning norta	land	'nnnee ii	he relevant lectures
11.Brief Description The students will be delivered by subject	on of self learning e encouraged to learning t experts of SGT l	earn using the SGT EL	earning porta	1 and c	rnoose u tal	ne relevant lectures
11.Brief Description The students will be delivered by subject https://elearning.set	on of self learning e encouraged to le t experts of SGT	earn using the SGT EL University. The link to ourse-category/	earning porta the E-Learni	l and c ng por	tal	ne relevant lectures
11.Brief Description The students will be delivered by subject https://elearning.sgt	on of self learning e encouraged to le t experts of SGT suniversity.ac.in/c	earn using the SGT EL University. The link to ourse-category/	earning porta the E-Learni	l and c ng por	tal	ne relevant lectures
11.Brief Description The students will be delivered by subject https://elearning.sgt 12.Books Recomm	on of self learning e encouraged to le t experts of SGT university.ac.in/c ended (3 Text Be	earn using the SGT EL University. The link to ourse-category/ ooks + 2-3 Reference	earning porta the E-Learni Books)	l and c ng por	tal	ne relevant lectures
11.Brief Description The students will be delivered by subject <u>https://elearning.sgt</u> 12.Books Recomm	on of self learning e encouraged to le t experts of SGT cuniversity.ac.in/c ended (3 Text Be	earn using the SGT EL University. The link to ourse-category/ ooks + 2-3 Reference	earning porta the E-Learni Books)	l and c ng por	rtal	ne relevant lectures
 11.Brief Description The students will be delivered by subject https://elearning.sgt 12.Books Recomm 	on of self learning e encouraged to le t experts of SGT university.ac.in/c ended (3 Text Be	earn using the SGT EL University. The link to ourse-category/ ooks + 2-3 Reference	earning porta the E-Learni Books)	l and c ng por	rtal	ne relevant lectures

2.Subject		L	T P					
Name	GL-II Lab							
3.Subject		0	0		2			
Code								
4.Type of Course	e (use tick mark)	Core $()$	PE()		OE ()			
5.Pre-requisite	Bio-Medical	4. Freque	Even ()	Od	Eithe	Every Sem ()		
(if any)	Instrumentation,	ncy (use tick		d	r			
	Digital Processo	r, marks)		(√)	Sem			
	Scientific				0			
	Computing an	d						
	Information Theor	y						
6 Total Number	of Lectures Tutoria	ls Practical (assur	l ning 14 weeks	s of or	e seme	ster)		
$\frac{0.10 \text{ tar (table)}}{\text{Lectures} = 00}$		rutorials = 00	Practical :	<u>=00</u>				
7.Brief Syllabus				00				
A course covers t	he Bio-Medical Instru	mentation, Digital	Processor, Sci	entific	Compu	ting and		
Information Theo	ory & Coding.		,		I	U		
8 Course Object	ives							
The student will 1	earn and understand							
4 Basics of	Rio-Medical Instrume	entation Digital Pro	cessor Scient	ific Co	montin	g and Information		
Theory & Coding		Jinution, Digitui 110			mpuun	g und information		
5. Needs and	significance of diffe	rent peripherals for	the developme	ent of	applicati	ions		
6. To testing	the programming ski	lls.	1		11			
9.Course Outcor	nes							
The students will	be able to							
2. Design &	develop a PIC microo	controller based pro	duct prototype	for a	n applica	ation.		
Perform Bio-Med	lical Instrumentation	experiments.						
10. Section A: Bi	io-Medical Instrume	ntation						
List of Experime	ents:							
1. Blood Pre	essure Measurement							
2. Real time	e monitoring of Echoc	ardiography	to study					
S. WOIKING C	e Diethermy ii Illtres	ound Disthermy iii	is – study Surgical Diat	hormy				
4 ECG wave and	alveis using simulator	ound Diameniny in.	Surgical Diat	nerniy				
5. Real time patie	ent monitoring system							
Section B: Digita	al Processor							
List of Experime	ents:							
1. Computat	ion of N- Point DFT of	of a Given Sequence	•					
2. Implemen	tation of FFT of Give	n Sequence						
3. Power Sp	pectrum							
4. Implement	ntation of LP FIR Filt	er for Given Sequen	ce & Impleme	entatic	n of HP	FIR Filter for		
Given Sequence								
5. Implemen	5. Implementation of LP IIR Filter for Given Sequence & Implementation of HP IIR Filter for							
Given Sequence								
Section C: Scien	Section C: Scientific Computing							
List of Experime	ents:	۸D						
1. Study of I 2 Study of k	nitioduction to MATL	AD						
$\frac{2}{3}$ To solve 1	inear equation	J						
4. Solution	of Linear equations for	or Underdetermined	and Over dete	ermine	d cases			
5. Determin	ation of Eigen values	and Eigen vectors of	of a Square ma	trix 6	. Solutio	on of Difference		
Equations.	0	6	1					
110								

Section D: Information Theory & Coding

List of Experiments:

- 1. Applied the encoding.
- 2. Discrete entropy for probability
- 3. Implement entropy for parts of message.
- 4. Compute the entropy of message/text
- 5. Noiseless (no noise) binary channel
- 6. Binary symmetric channel bsc capacity
- 7. Binary symmetric channelcapacity: private case
- 8. Shannon-fano code algorithm
- 9. The huffman-coding algorithm

11.Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal https://elearning.sgtuniversity.ac.in/course-category/

12.Books Recommended (3 Text Books + 2-3 Reference Books)

2.Subject Name	GL-III	L	Т		Р		
3.Subject Code		0	0		2		
4.Type of Cours mark)	e (use tick	Core (√)	PE()		OE ()		
5.Pre-requisite (if any)	Control System, ARM Processor, Speech processing & Recognition, Wireless sensor Network and DSD with programmabl e logic	5. Frequency (use tick marks)	Even ()	Od d (√)	Eithe r Sem ()	Every Sem ()	
6.Total Number	of Lectures, Tu	torials, Practical (ass	uming 14 wee	ks of	one sen	nester)	
$\frac{\text{Lectures} = 00}{7 \text{ Brief Syllebus}}$		Tutorials = 00	Practical =	=00			
 7.Brief Syllabus The Industrial Training indicates to a program which aims to provide a managed good practical training within a particular time frame. The main objectives of the industrial training are to provide the best and relevant theoretical knowledge to gain in a particular time period. 8.Course Objectives The student will learn and understand 7. Basics of PIC microcontroller features. 8. Needs and significance of different peripherals for the development of applications 9. To testing the programming skills. 							
9.Course Outcomes On completion of this course, the students will be able to get the structure of industry. He will know the various departments of industry & how industry works.							
10. Course conte	ents:						
A course covers the Bio-Medical Instrumentation, Digital Processor, Scientific Computing and Information Theory & Coding.							

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal. <u>https://elearning.sgtuniversity.ac.in/course-category/</u>

12.Books Recommended (3 Text Books + 2-3 Reference Books)

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020 B. Tech. – VII Semester

Sr.	Subject	Course title Schedule					Mar	k	
No.	Code	Course the	L	Т	Р	С	Int.	Ext.	Total
1		Wireless Communication	3	0	0	3	40	60	100
2		Program Elective-IV	3	0	0	3	40	60	100
3		Open Elective III	3	0	0	3	40	60	100
4		Open Elective IV	3	0	0	3	40	60	100
5		Professional Ethics for Electronics Engineers	2	0	0	2	40	60	100
6		Review Article Phase-I	0	0	6	3	40	60	100
7		Wireless Communication Lab	0	0	2	1	40	60	100
9		Industrial Training – III	0	0	0	1	40	60	100
10		GL-IV	0	0	2	1	40	60	100
		Total Contact Hours	14	0	10	20	100	600	1000
		Total Colliact Hours		24		20	400	000	1000

Program Elective-IV
Computational Electromagnetic
DIP with simulation
IoT Architecture
RF VLSI

1. Name of the Department – ELECTRONICS & COMMUNICATION ENGINEERING									
2. Course Name Wireless		L – 3	T – 1	T – 1					
	Communication								
3.Course Code									
4. Type of Course (use tick mark)		Core $()$	PE()		OE ()				
5. Pre-requisite (if	Digital	6. Frequency (use	Even	Odd	Either	Every			
any)	Communication	tick marks)	0	()	Sem ()	Sem ()			
7. Total Number of Lectures, Tutorials, Practical									
Lectures = 38Tutorials =0Practical =0									

8. Brief Syllabus

This course deals with spectrum allocation in a cell and design of cell size. It focuses on the architecture of advanced cellular technology. The learners will be in a position to appreciate the advantages and limitations of RF wireless as a medium of communication. After the course students will be in a position to understand the wireless communication abnormalities in data and voice receptions and will be able to provide possible solutions to overcome such abnormalities.

9. Learning objectives:

1. Educate students to understand the bandwidth of operation of cellular technology and plan spectrum deployment for cellular systems to provide better customer services as well as earn revenue of service provider

2. Apply the mobile and wireless principles for creating solutions for data and voice communication in various Industries like Banking, Marketing and Automobile.

10. Course Outcomes (COs):

On completion of this course, the students will be able to

1. Design a cellular system in a specific radio and geographic environment with specific frequency range

2. Solve numerical problems pertaining to cell design, GSM and CDMA (IS 95) system designs

11. Unit wise detailed	content					
Unit-1	Number of	Introduction of Wireless Communication				
	lectures = 8					
History and evolution	of mobile radio s	ystems. Types of mobile wireless services/systems-Cellular,				
WLL, Paging, Satellite systems, Future trends in personal wireless systems.						
	•					
Unit – 2	Number of	Cellular Concepts and System Design Fundamentals				
	lectures = 10					
Cellular concept and f	requency reuse, cha	annel assignment, handoff strategies. Interference and system				
capacity. Trunking and	GOS. cell splitting	. cell sectoring.				
	ees, on spining	,				
Unit – 3	Number of	Mobile radio Propagation Models				
	lectures – 8	niobie rudio riopuguion models				
Radio wave propagatio	$\frac{1}{1}$	wireless systems. Propagation models. Multipath fading and				
Page band impulse re	anond models nor	ameters of mobile multipath channels. Antenna systems in				
Base band impulse le	spolid models, par	ameters of mobile multipaur channels, Antenna systems m				
mobile radio.						
Unit – 4	Number of	Modulation, Equalization & Diversity Techniques				
	lectures $= 12$					

Overview analog and digital modulation techniques, GMSK,QAM,OFDM, Spread spectrum modulation, Equalization, Rake receiver concepts, Diversity Techniques, Linear predictive coders and channel coding; Mmultiple Access Techniques, Wireless Systems & Standards: FDMA, TDMA and CDMA systems, Introduction to 2G,3G Wireless systems and standards.

12. Brief Description of self-learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

13. Books Recommended

- 1. Theodore S. Rappaport, "wireless communications Principles and Practices", PHI, 2005
- 2. Jochen Schiller, "Mobile Communications", Pearson Education, second edition, 2009.

Reference Book

- 1. Lee W.C.Y, "Mobile communication Engineering
- 2. Theory and Applications", 2/e McGraw-Hill, New York, 2003
- 3. Andreas F. Molisch, "Wideband Wireless Digital Communication", Pearson Education 2001.

1. Name of the Department – ELECTRONICS & COMMUNICATION ENGINEERING									
2. Course Name	Computational	L – 3	T – 0	T – 0		P -0			
	Electromagnetics								
3.Course Code									
4. Type of Course (us	se tick mark)	Core (√)	PE()		OE ()	OE ()			
5. Pre-requisite (if	Electromagnetic	6. Frequency (use	Even	Odd	Either	Every			
any)	Field Theory	tick marks)	0	()	Sem	Sem ()			
					0				
7. Total Number of L	ectures, Tutorials,	Practical							
Lectures = 39		Tutorials =	Practio	cal =					
8. Brief Syllabus									
Subject deals with stu	Subject deals with study of Numerical analysis of Electromagnetic Theory for Cartesian, Cylindrical								
and Spherical System	n distributed in Ur	nits I. II and III. Un	it IV pro	ovides s	tudy of N	Microwave			

Perturbation and Variation Techniques.

9. Learning objectives:

1. To explain the plane waves functions and analyze the various rectangular shaped microwave components and their properties for different modes in rectangular coordinate system.

2. To develop an ability to analyze the cylinder wave functions and various cylindrical shaped microwave components and their properties for different modes in cylindrical coordinate systems.

3. To develop and ability to evaluate different parameters of microwave components using perturbation and variation techniques.

10. Course Outcomes (COs):

On completion of this course, the students will be able to

1. Demonstrate understanding on the plane waves functions and calculation of various performance parameters of different kinds of rectangular microwave components such as; rectangular waveguide, rectangular cavity, partially filled waveguide and dielectric slab waveguide apart from the concepts of surface guided waves and modal expansion of fields

2. Have an ability to analyze the cylindrical wave functions and calculation of various performance parameters of different kinds of cylindrical microwave components such as; circular waveguide, circular cavity and parallel plate, partially filled, dielectric slab coated and corrugated radial waveguides apart from the concepts of sources of cylindrical waves, two dimensional radiation and wave transformations.

Demonstrate insight to use the perturbation and variation techniques to evaluate the different 3. parameters due to perturbations on cavity walls, cavity materials and waveguide apart from the knowledge of stationary formulas for cavity.

11. Unit wise detailed content							
Unit-1	Number of	Plane Wave Functions I & II					
	lectures = 10						
The Ways Eunstions	Diana Waxaa Daata	noular Waysouida Alternative Made Sate The Destangular					

The Wave Functions, Plane Waves, Rectangular Waveguide, Alternative Mode Sets, The Rectangular Cavity. Partially Filled Waveguide, Dielectric Slab Waveguide, Surface Guided Waves, Modal Expansion of Fields.

Unit – 2	Number of lectures = 10	Cylindrical Wave Functions I & II

The Wave Functions, Circular Waveguide, Radial Waveguides, Circular Cavity, Other Guided Waves. Cylindrical Wave Functions II: Sources of Cylindrical Waves, Two Dimensional Radiation, Wave Transformations, Scattering by Cylinders.

Unit – 3	Number of	Spherical Wave Functions I & II
	lectures = 10	

The Wave Functions, Spherical Cavity, Orthogonality Relationships, Space as a Waveguide. Spherical Wave Functions II: Other Radial Waveguides, Other Resonators, Sources of Spherical Waves, Wave

Transformations, Scat	tering by Spheres.	
TT 1 /		
Unit – 4	Number of	Perturbational and Variational Techniques
	lectures =9	
Perturbation of Cavit	ty Walls, Cavity N	Aterial Perturbations, Waveguide Perturbations, Stationary
Formulas for Cavities.		-
12. Brief Description	of self-learning / E	-learning component
The students will be en	ncouraged to learn u	sing the SGT ELearning portal and choose the relevant
lectures delivered by s	ubject experts of SG	T University.
The link to the E-Lear	ning portal.	·
https://elearning.sgtun	iversity.ac.in/course	-category/
Journal papers: Patent	s in the respective field	eld.
r r r r		
13. Books Recommer	nded	
1. Time Harmonic El	ectromagnetic Field	s; By Roger F. Harrington; McGraw Hill Book Company;
1961.		

1. Name of the	<u>Department – ELEC</u> TR	<u>ONICS & COMMU</u> NIC	<u>CATION ENC</u>	<u>GINEERING</u>				
2. Course	Digital Image	L - 3	$T-\overline{1}$	P -0				
Name	Processing with							
	Simulation							
3. Course								
Code								
4. Type of Cou	urse (use tick mark)	Core $()$	ΡΕΟ	ΟΕΟ				
5 Pre-	Signal Processing	6 Frequency	Even Odd	Fither Every				
requisite (if any)		(use tick marks)	0 (γ)	Sem () Sem ()				
7 Total Numb	er of Lectures Tutorials	Practical (assuming 14	weeks of one	semester)				
$I_{\text{octures}} = 36$	er of Dectures, Tutorials,	Tutorials –	Practical -	semester)				
8 Brief Sylleb		1 utoriais –	Tactical –					
Digital imaga proces	Digital image processing is a fascinating subject in several aspects. Human beings perceive most of the							
information about th	sing is a fascinating subjective	beir visual sonsa While f	inian beings p	images could only				
he contured by phot	en environment unough t	he adap of another teach	of a long time	ution which allows				
image data to be captured	ography, we are now at in	he edge of another techni valuated algotropically w	ological levol	With broothtoling				
nnage data to be cap	hasoming more nowarful	valuated electronically w		a that wides prod				
pace, computers are	becoming more powerium	i and at the same time ie	ss expensive,	so that widespread				
applications for digit		ge.						
9. Learning of	Jectives:							
1. To impart the	basic concepts of image se	gmentation and snaping						
2. To apply differ	rent types signal processin	g techniques in image pro	ocessing					
10. Course Outo	comes (COs):							
On completion of the	is course, the students will	be able to						
1. Know Basics of	Image formation and trans	formation using sampling	g and quantizat	tion				
2. Define different	types of signal processing	techniques used for imag	e sharpening a	and smoothing				
3. Perform and dem	nonstrate the compression	and coding techniques us	ed for image d	ata				
11. Unit wise de	tailed content							
Unit-1	Number of lectures =	Introduction to Image	Processing					
T C ····	8		· · · ·	1 6				
Image formation, im	age geometry perspective	and other transformation,	sterio imaging	g elements of				
visual perception. D	Igital Image-sampling and	quantization serial & par	allel Image pro	ocessing.				
Unit -2	Number of lectures =	Signal Processing						
			** . 11	<u> </u>				
Signal Processing	- Fourier, Walsh-Hadma	rd discrete cosine and	Hotelling tra	nsforms and their				
properties, filters, c	orrelators and convolvers	s. Image enhancement-C	contrast modif	ication. Histogram				
specification, smoot	ning, sharpening, frequenc	y domain enhancement, p	oseudo-colour	Enhancement.				
Unit – 3	Number of lectures =	Image Restoration						
	10							
Image Restoration-	Constrained and unconstr	ained restoration Wiene	er filter, mo	tion blur remover,				
geometric and radio	ometric correction Image	data compression-Huff	man and othe	er codes transform				
compression, predict	tive compression two tone	Image compression, bloc	ck coding, run	length coding, and				
contour coding.								
Unit – 4	Number of lectures =8	Segmentation Techniq	ues					
Image Segmentation	: fundmentals, point, line :	and edge detection, region	n based segme	ntation				
12 Rrief Deceri	ntion of self learning / F.	learning component	-					
The students will be	encouraged to learn using	the SGT EL earning port	al and choose t	he relevant				
lectures delivered by	subject experts of CCT I	niversity						
lectures delivered by subject experts of SGT University.								
The link to the E-Learning portal. https://elearning.sgtuniversity.ac.in/course-category/								
The link to the E-Le	arning portal. <u>https://eleari</u>	<u>11ng.sgtuniversity.ac.in/co</u>	ourse-category	<u>/</u>				
The link to the E-Le	arning portal. <u>https://eleari</u> nmended (3 Text Books	+ 2-3 Reference Books)	oo2	<u>/</u>				
The link to the E-Le 13. Books Reco 1. Ganzalez and Wo	arning portal. <u>https://elean</u> mmended (3 Text Books od, "Digital Image Process	+ 2-3 Reference Books) sing", Addison Wesley, 1	993	<u>/</u>				
The link to the E-Le13.Books Record1. Ganzalez and Wo2. Anil K. Jain, "Fur	arning portal. <u>https://elean</u> mmended (3 Text Books od, "Digital Image Process idamental of Image Proces	+ 2-3 Reference Books) sing", Addison Wesley, 1 sing", Prentice Hall of In	993 dia	<u>/</u>				

1. Rosenf	eld and Kak	, "Digital Picture Processing	vol. I & vol. II, Ac	ademic, 1982	
2. Ballard	and Brown	, "Computer Vision", Prentio	ce Hall, 1982.	,	
3. Wayne	Niblack, "A	An Introduction to Digital Im	age Processing", Pre	ntice Hall, 1986	
1. Na	ame of the	Department- ELECTRON	ICS & COMMUNI	CATION ENG	INEERING
2. Co	ourse	IoT Architecture and	L	Т	Р
Name		Protocols			
3. Code	ourse		3	0	2
	vne of Cou	rse (use tick mark)	✓ Core ()	PE()	OEO
5 Pr	·e-	NII	6 Frequency	Even Odd	Either Every
requisite	(if any)		(use tick marks)	0 $(\sqrt{)}$	Sem () Sem ()
7 To	tal Numbe	er of Lectures Tutorials Pr	actical (assuming 1	4 weeks of one	semester)
Lectures	-48	i of Lectures, Futorials, Fr	Tutorials – 00	Practical –	semester)
8 Bi	<u> </u>	C	1 41011415 = 00	Tractical =	
An overvi	iou of prote	b a a la involved in Internet of	Things devices and	annications Us	In clarify with IoT
An overvi	lew of prote	book and head to head assured	Things devices and a	applications. He	eip clarify with 101
layer tech	inology stat	ck and nead-to-nead compar	isons. The Internet	of Things cover	rs a nuge range of
industries	and use c	ases that scale from a sing	gle constrained dev	ice up to mass	ive cross-platform
deployme	ints of emb	edded technologies and clou	id systems connectir	ig in real-time.	At the same time,
dozens of	alliances	and coalitions are forming	in hopes of unifying	ng the fractured	and organic lot
landscape					
9. Lea	rning obje	ctives: The objective of this	course is to impart ki	nowledge on Io'l	Architecture and
various pr	otocols, stu	dy their implementations			
10. Cot	irse Outcoi	nes: On completion of this c	ourse, the students w	ill be able to	
1. Unders	tand the Are	chitectural Overview of IoT			
2. Unders	tand the Io7	Reference Architecture and	Real World Design	Constraints.	
3. Unders	tand the var	ious IoT Protocols (Datalinl	k, Network, Transpor	t, Session, Serv	ice)
11. U	nit wise det	ailed content			
Unit-1		Number of lectures = 12	Overview		
IoT-An A	Architectura	al Overview- Building an	architecture, Main	n design princ	iples and needed
capabilitie	es, An Io	Γ architecture outline, sta	ndards consideration	ns. M2M and	IoT Technology
Fundamen	ntals- Devid	ces and gateways, Local and	d wide area networl	king, Data man	agement, Business
processes	in IoT, Eve	rything as a Service(XaaS), I	M2M and IoT Analy	tics, Knowledge	Management
Unit - 2		Number of lectures = 12	Reference Archite	cture	
IoT Arch	nitecture-Sta	te of the Art – Introduc	tion. State of the	art. Reference	Model and
architectu	re. IoT ref	erence Model - IoT Refere	nce ArchitectureIntr	oduction. Func	tional View.
Informatio	on View. D	eployment and Operational	View. Other Releva	nt architectural	views Real-
World De	esign Const	aints- Introduction Technic	al Design constraint	s-hardware is p	opular again
Data repre	esentation a	nd visualization Interaction	and remote control		opular again,
Unit - 3		Number of lectures $= 12$	IOT Data Link La	ver & Network	Laver Protocols
	C Laver(30	$\frac{1}{12} \frac{1}{12} \frac$	EEE 802 15 Wirel	$_{\rm SSHART}$ 7-W	we Bluetooth I ow
Energy 7	C Layon (SC	τ Energy DASH7 - Network	$\therefore 1 \text{ over}_I \text{Pu}/I \text{ ID}_V \text{ over}_I \text{Pu}/I \text{ over}_I \text{Pu}/$	$6I \circ WPAN \in T$	SCHND DHCD
ICMD DI		CADD	K Layu-11 v4, 11 v0,	OLUWIAN, OI	DICI, ND, DICF,
Unit 4	L, COKPL	Number of lectures – 12	Tunnanout & Same	on Loven Ducto	aala
	Lover (TC	$\frac{1}{10} \text{ MDTCD } \frac{1}{100} \text{ DCCD}$	CTD) (TI C DTI C	DI Layer Proto	
I ransport	Layer (IC	T INT V SERVICE I	NED DROTOCOLS	$\gamma = \text{Session La}$	(12 hours) S ==:
AMPP, A	MQP, MQ	$\begin{array}{c} \mathbf{I} \mathbf{I} \mathbf{U} \mathbf{N} \mathbf{I} \mathbf{I} \mathbf{V} - \mathbf{SEKVICE LA} \\ \mathbf{SI} \mathbf{M} \mathbf{M} \mathbf{O} \mathbf{V} \mathbf{A} \mathbf{D} \mathbf{D} \mathbf{D} \mathbf{D} \mathbf{C} \end{array}$	IEK PKUIUCULS	& SECUKITY	(12 nours) Service
Layer -on		SI MZM, UMA, BBF – Sec	curity in IoT Protoco	MAC 802	13.4, $6LOWPAN$,
KPL, App	Distion La	yer.	•		
12. Bi	net Descrip	otion of self learning / E-lea	rning component		
The stude	nts will be e	encouraged to learn using the	e SGT ELearning por	tal and choose t	he relevant
lectures d	elivered by	subject experts of SGT Univ	ersity. The link to the	e E-Learning po	ortal.
https://ele	arning.sgtu	niversity.ac.in/course-catego	<u>ry/</u>		

13. Books Recommended

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.

2. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM - MUMBAI

3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer

4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118- 47347-4, Willy Publications

5. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1 st Edition, VPT, 2014.

1. Name of the Department-ELECTRONICS & COMMUNICATION ENGINEERING									
2. Course	e Name	RF Circuit	L		Т		P		
		Design							
3. Course Code			3		0		0		
4. Type of Course (use tick mark)		~	Core ()	PE()		OE ()			
5. Pre-re	quisite	Microwave	6.	Frequency	Even	Odd	Either	Every	
(if any)		Engineering,	(use t	ick marks)	0	()	Sem ()	Sem	
		Circuit Theory						0	
7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)									
Lectures = 39Tutorials = 00Practical =									

Brief Syllabus:

Introduction to RF Design and Wireless Technology: Design and Applications, Complexity and Choice of Technology. Basic concepts in RF design: Nonlinearly and Time Variance, Inter symbol interference, random processes and noise. Sensitivity and dynamic range, conversion of gains and distortion RF Modulation: Analog and digital modulation of RF circuits, Comparison of various techniques for power efficiency, Coherent and non-coherent detection, Mobile RF communication and basics of Multiple Access techniques. Receiver and Transmitter architectures, Direct conversion and two-step transmitters RF Testing: RF testing for heterodyne, Homodyne, Image reject, Direct IF and sub sampled receivers.

8. Learning objectives:

1. To explain radio frequency design concept and impart knowledge on design and implementation of high frequency transceiver system.

2. To develop an ability to analyze various components of radio frequency communication system architecture.

3. To develop an ability to analyze different design parameters of transceiver circuit design, besides developing an insight to make use of several high frequency design techniques.

4. To utilize the various RF circuit design concepts in designing the RF transceiver systems.

5. To review and refer the literature related to RF Circuit design and reporting it ethically.

9. Course Outcomes:

The students will be able to

1. Demonstrate understanding on the Radio frequency design concept and impart knowledge on design and implementation of high frequency Transceiver system.

2. Have an ability to analyze various components of Radio frequency communication system architecture.

3. Have an ability to analyze the impact of different design parameters in transceiver circuit design, besides developing an insight to make use of several high frequency design techniques.

4. Have an ability to utilize the various RF circuit design concepts in designing the RF transceiver systems.

5. Have an ability to review and refer the literature related to RF circuit design and report it ethically.

10. Unit wise detaile	ed content					
Unit-1	Number of	Introduction, An Overview of RF Filter Design I				
	lectures = 10					
Introduction: Importance of RF Design, RF Behavior of Passive Components: High Frequency						
Resistors, High-Frequency Capacitors, High-Frequency Inductors. Chip Components and Circuit Board						
Considerations: Chip R	esistors, Chip Capa	citors, Surface-Mounted Inductors. An Overview of RF				
Filter Design I: Basic	Resonator and Filter	Configurations: Filter Type and Parameters, Low-Pass				
Filter, High Pass Filter,	, Bandpass and Ban	dstop Filters, Insertion Loss, Special Filter Realizations:				
Butterworth – Type, Chebyshev and Denormalization of Standard Low-Pass Design.						
Unit - 2	Number of	An Overview of RF Filter Design II				
	lectures = 10					

Filter Implementations: Unit Elements, Kuroda's Identities and Examples of Microstrip Filter Design. Coupled Filter: Odd and Even Mode Excitation, Bandpass Filter Section, Cascading Bandpass Filter Elements, and Design Examples.

Unit - 3	Number of	Matching and Biasing Network
	lectures = 10	

Impedance Matching using Discrete Components: Two Component Matching Networks, Forbidden regions, Frequency Response and Quality Factor, Microstrip Line Matching Networks: From Discrete Components to Microstrip Lines, Single-Stub Matching Networks, Double-Stub Matching Networks, Amplifier Classes of Operation and Biasing Network: Classes of Operation and Efficiency of Amplifiers, Bipolar Transistor Biasing Networks, Field Effect Transistor Biasing Networks.

Unit - 4		Numb lecture	er of es = 9)		RF Transistor	Amplifie	r Design		
~	a .	11.01		44.04	1			_		

Characteristics of Amplifiers, Amplifier Power Relations: RF source, Transducer Power Gain, Additional Power Relations, Stability Considerations: Satbility Circles, Unconditional Stability, Stabilization Methods.

11. Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal.

https://elearning.sgtuniversity.ac.in/course-category/

Journal papers; Patents in the respective field.

12. Books Recommended

1. B. Razavi, "RF Microelectronics" PHI 1998 2. R. Jacob Baker, H.W. Li, D.E. Boyce "CMOS Circuit Design, layout and Simulation",

2. Thomas H. Lee "Design of CMOS RF Integrated Circuits" Cambridge University press 1998.

3. Y.P. Tsividis, "Mixed Analog and Digital Devices and Technology", TMH 1996

4. RF Circuit Design Theory and Application, Reinhold Ludwig and Pavel Bretchko, Ed. 2004, Pearson Education.

1. Name of	f the Departme	ent- ELECTRONICS & COMM	UNICAT	ION			
ENGINEERING		▼	m		D		
2. Subjec	Professiona	L	T		P		
t Name	I Ethics for						
2 Subias	Electronics	2	0		0		
5. Subjec		3	0		0		
1 Code 1 Type of	Course (use	$Core(\mathbf{x})$	DEO		ΟΕΟ		
tick mark)	Course (use		IL()		OE()		
5. Pre-	NIL	6. Frequenc	Eve (Od	Eithe	Ever	
requisite (if any)	1.122	v (use tick marks)	n()	d	r Sem	V	
				(✓)	0	Sem	
					v	0	
7. Total N	umber of Lectu	ures, Tutorials, Practical (assumin	ng 14 wee	eks of	fone		
semester)			-				
Lectures = 42		Tutorials = 0	Practic	al =			
8. Brief Sy	llabus						
Intensive study of moral issues	and conflicts t	hat arise when one attempts to record	ncile the j	priori	ties of		
professional responsibilities an	d the world of	business with those of an ethical fra	me of mi	nd. E	mphasis	s on	
issues surrounding the concept	s of duty, rights	s, autonomy, justice, and regulation	of busine	ess, to	gether v	with	
extended reflections on the rela	ationship betwe	en moral responsibility and the pro-	fessions (draw	ing from	ı	
specific fields such as engineer	ring, medicine,	and law)					
9. Learnin	g objectives:						
1. To create awareness on	professional et	thics for engineers					
2. To respect the rights of	others and dev	elop a global perspective					
10.Course	Outcomes (CO	os):					
At the end of this course stude	nts will demons	strate the ability to					
1. 1. Identify and analyze	an ethical issue	e in the subject matter under investig	gation or	in a r	elevant	field	
2. Identify the multiple e	thical interests a	at stake in a real-world situation or	practice				
3. Articulate what makes	a particular cou	irse of action ethically defensible					
4. Assess their own ethica	l values and the	e social context of problems					
11 Unit wie	a datailad con	tont					
II. Unit_1	Number of						
Cint-1	loctures -						
	12						
Understanding Professional F	hics and Hume	an Values Current scenario — contr	adictions	_ dil	emmag	_ need	
for value education and self es	teem – Human	values $-$ morals $-$ values $-$ integrity	v = civic v	virtue	s - worl	c ethice	
- respect for others $-$ living	peacefully –	caring – honesty – courage – val	y civic luino tim	e – i	co oper	ation $-$	
commitment - empathy - self	confidence - ch	aracter	iung inn		co open	ation	
communent empany sen							
Unit – 2	Number of						
	lectures =12						
Ethics for Engineers Ethics – i	ts importance –	code of ethics – person and virtues	– habits	and n	norals –	4 main	
virtues – ethical theories – Kohlberg's theory – Gilligan's theory – towards a comprehensive approach to							
moral behavior – truth – appro	ach to knowled	ge in technology	L				
Unit – 3	Number of						
	lectures =						
	12						
Environmental Ethics and sus	tainability pro	blems of environmental ethics in	engineeri	ng -	enginee	ring as	
people serving profession – en	gineer's respon	sibility to environment – principles	s of sustai	inabil	ity - ind	lustrial,	
economic, environmental, agricultural and urban sustainability - Sustainable development.							

lectures =								
12								
14								
Social Experimentation, Responsibility and Rights Engineers as responsible experiments – safety and risk – confidentiality – knowledge gained confidentiality – experimental nature of engineering – Intellectual Property Rights – professional rights – employee rights – occupational crime								
12. Brief Description of self learning / E-learning component								
The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures								
delivered by subject experts of SGT University.								
The link to the E-Learning portal.								
https://elearning.sgtuniversity.ac.in/course-category/								
Journal papers; Patents in the respective field.								
13.Books Recommended (3 Text Books + 2-3 Reference Books)								
1 Mike W Martin, Roland Schinzinger, "Ethics in Engineering", Tata McGraw -Hill, 2003								
Reference Books								
1. Govindarajan M, Natarajan S, Senthil Kumar V S, "Engineering Ethics" PHI India, 2004								
2. P Aarne Vesblind, Alastair S Gunn, "Engineering Ethics and the Enviornment"								
3. Edmund G Seebauer, Robert L Barry, "Fundamentals of Ethics for scientists and engineers" Oxford								
University Press 2001								

1. Name of Engineering	f the Departn	nent- ELECTRONICS & COMM	IUNICA	ATIO	N			
2. Course Name	Review Article phase I	L	Т		Р			
3. Course		0	0		6			
4. Type of (use tick mark)	Course	Core (✓)	PE ()		OE ()			
5. Pre- requisite (if any)	Practical knowledge of all labs	6. Frequency (use tick marks)	Even ()	Odd (✓)	Either Sem ()	Every Sem ()		
7. Total N	umber of Lec	tures, Tutorials, Practical (assum	ing 14 v	weeks	of one			
Lectures = 42		Tutorials = 0	Pract	ical =				
This course deals with the different type of sensors, transducers and their interfacing with microcontrollers. This also describes their role to know the domain status. It also deals with the process to further processing of sensing elements. 9. Learning objectives: 1. To gain first-hand experience of publication.								
3. To know the right publ	ication to pres	sent your work in globally acceptabl	e organ	ization				
10. Course Outcomes (COs): On completion of this course, the students will be able to select the right publication for present & how to select the correct domain to work.								
11.Course Content 1. Select the domain to apply your whole knowledge & skills to improve engineering 2. Choose correct field to work further. 3. Select the few papers & review them either on same software or through different emulator/simulator. 4. Summarize the work and present in national/international conference at least. 12.Brief Description of self learning / E-learning component The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. https://elearning.sgtuniversity.ac.in/course-category/ Journal papers; Patents in the respective field.								
13.Books Recommended (3 Text Books + 2-3 Reference Books)								

1. Name of the Department : Electronics and Communication Engineering									
2.	Subject	Winalage I ab	L		Т		Р		
Name		wireless Lab							
3.	Subject		0		0		2		
Code									
4.	4. Type of Course (use tick		Core $()$		PE ()		OE ()		
mark))								
5.	Pre-	-	6.	Frequency	Even ()	Od	Eithe	Every Sem ()	
requis	site (if any)		(use t	tick marks)		d	r		
						()	Sem		
							0		
7.	7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)								
Lectures = 00 Tutorials = 00 Practical = 10									

Lectures = 00

8. **Brief Syllabus**

The course addresses the fundamentals of wireless communications and provides an overview of existing and emerging wireless communications networks. It covers radio propagation and fading models, fundamentals of cellular communications, multiple access technologies, and various wireless networks, including past and future generation networks. Simulation of wireless systems under different channel environments will be integral part of this course.

Course Objectives 9.

To provide an overview of Wireless Communication networks area and its applications in 1. communication engineering.

To appreciate the contribution of Wireless Communication networks to overall technological growth. 2.

To understand the various terminology, principles, devices, schemes, concepts, algorithms and 3.

different methodologies used in Wireless Communication Networks.

Course Outcomes 10.

- 1. To understand the basics of Wireless Communication Networks.
- 2. To motivate the students to pursue research in the area of wireless communication.

11. List of Experiments

1. To set up a satellite communication link & study of change in uplink & downlink frequency.

2. To Study Transmission of Audio & Video Signals & Data communication over satellite link.

3. To Study Transmission of telemetry data like temperature & light intensity over satellite link

4. To measure the propagation delays of signal in a Satellite communication Link.

5. To study different GPS data like longitude, latitude & different types of dilute of precision using GPS receiver.

6. To study selection of various PN codes like Gold, Barker & MLS in CDMA technology.

7. To study generation (spreading) & demodulation (Despreading) of DSSS modulated signal

8. To study Voice communication over DSSS.

9. To study Minimum shift keying modulation & de modulation.

10. To study radiation pattern & calculate beam width for Yagi uda & Folded dipole antenna.

11. To study radiation pattern & calculate beam width for Circular & Triangular Patch Antenna.

12. To study FHSS Modulation & demodulation & transfer of numeric data.

12. Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University. The link to the E-Learning portal. https://elearning.sgtuniversity.ac.in/course-category/

13. **Books Recommended (3 Text Books + 2-3 Reference Books)**

1.Haesik Kim, "Wireless Communications System Design", John Wiley & Sons, 2015

2. Andreas F Molisch, "Wireless Communications", John Wiley & Sons, 2012.

3. Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2007.

1. Name of the Department : Electronics and Communication Engineering									
2.Subject Name	Industrial Training -III	L	Т			Р			
3.Subject Code		0	0			0			
4.Type of Course (use tick mark)		Core ($$)	PE()		OE ()				
5.Pre-requisite	Courses up to	15. Frequency	Even ()	Od	Eithe	Every Sem ()			
(if any)	6 th sem	(use tick marks)		d	r				
				(√)	Sem				
					0				
6.Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)									
Lectures = 00		Tutorials = 00	Practical = 10						
7.Brief Syllabus									

The Industrial Training indicates to a program which aims to provide a managed good practical training within a particular time frame. The main objectives of the industrial training are to provide the best and relevant theoretical knowledge to gain in a particular time period.

8.Course Objectives

4. To gain first-hand experience of working as an engineering professional, including the technical application of engineering knowledge.

- 5. To experience the discipline of working in a professional organization and multidisciplinary team.
- 6. To develop technical, interpersonal and communication skills.

9.Course Outcomes

On completion of this course, the students will be able to get the structure of industry. He will know the various departments of industry & how industry works.

10. Course Content

- 1. After 6th semester & before 7th semester.
- 2. Duration for training should be 2 Months.
- 3. It must be in Industry for study the working process & determine problems & propose solution.
- 4. Students have to submit to one spiral binding report & PPT presentation in internal examination.
- 5. Students have to submit three Hard binding report & PPT presentation in final end term examination

11.Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal. <u>https://elearning.sgtuniversity.ac.in/course-category/</u>

12.Books Recommended (3 Text Books + 2-3 Reference Books

1. Name of the De	partment : Elect	ronics and Communi	cation Engin	eering						
2.Subject Name	GL IV Lab	L	T		Р					
3.Subject Code		0	0 0							
4.Type of Course	(use tick mark)	Core $()$	PE()		OE()					
5.Pre-requisite	Courses up to	16. Frequency	Even ()	Od	Eithe	Every Sem ()				
(if any)	4 th Sem	(use tick marks)		d	r					
				()	Sem					
6.Total Number of	f Lectures, Tutor	rials, Practical (assun	ning 14 week	s of on	e semes	ster)				
Lectures = 00		Tutorials = 00	Practical	=00						
7.Brief Syllabus										
A course covers the	e Computational E	Electromagnetic, DIP v	with simulatio	on, IoT	Archite	cture and RF VLSI.				
8.Course Objectiv	es The student wi	Il learn and understand	d							
1. Basics of Dis	play of Gray scale	e Images.								
2. Needs and sig	gnificance of Histo	ogram Equalization.								
3. To testing the	e programming sk	ills.								
9.Course Outcome	es									
The students will b	e able to									
1. Design the sc	hematic for the di	fferent logic gates using	ng NMOS tec	hnolog	gy.					
2. Design the di	fferent adder circu	uits using NMOs techn	nology.							
3. Design the sc	hematic for the di	fferent logic gates using	ng CMOS tec	hnolog	y.					
10. Section A: Cor	nputational Elec	tromagnetic								
List of Experimen	ts:									
1. To verify Far	aday's law of indu	iction.								
2. To obtain the	magnetic field du	e to current in a straig	t conductor	as a fu	nction o	of the current and as a				
function of the nor	nal distance from	the conductor.								
3. To verify the	relationship betw	een the voltage, the el	ectric field an	d the s	pacing of	of a parallel plate				
capacitor.										
4. To demonstra	ate the phenomena	a of reflection and tran	smission of e	lectron	nagnetic	e fields.				
Section B: DIP with	th simulation									
List of Experimen	ts:									
4. Display of G	ray scale Images.									
5. Histogram Ed	Jualization									
6. Design of No	n-linear Filtering									
7. Determination	DCT	on using Operators								
0. Z-D DFT and D Filtering in fr	DCI									
9. Filtering III II 10 Display of co	lour images									
10. Display of co	etween colour sna	aces								
12 DWT of image	res	ices.								
13. Segmentation	using watershed	transform								
Section C: IoT Ar	chitecture									
List of Experimen	ts:									
1. SectionDesig	ning a non standa	rd communication into	erface for an l	IoT sys	tem					
2. $H/w - S/w co$	design: Clock bu	dgeting and power sa	ving							
3. PDR with s	hoe-mounted iner	tial sensors	0							
4. Positioning	and motion sensi	ng using ultra low cost	t motion sense	or						
D: RF VLSI										
List of Experiments:										

- 4. Design the schematic for the different logic gates using NMOS technology.
- 5. Design the different adder circuits using NMOs technology.
- 6. Design the schematic for the different logic gates using CMOS technology.
- 7. Design the different adder circuits using CMOS technology.
- 8. Do the Transient, AC & DC analysis for the NMOS & CMOS Logic Gates.

11.Brief Description of self learning / E-learning component

The students will be encouraged to learn using the SGT ELearning portal and choose the relevant lectures delivered by subject experts of SGT University.

The link to the E-Learning portal. https://elearning.sgtuniversity.ac.in/course-category/

12.Books Recommended (3 Text Books + 2-3 Reference Books)

SGT UNIVERSITY FACULTY OF ENGINEERING & TECHNOLOGY DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING CURRICULUM- 2019-2020 B. Tech. – VIII Semester

Sr.	Subject	Course title		Schedule			Mark			
No.	Code	Course the	L	Т	Р	С	Int.	Ext.	Total	
1		Program Elective-V	3	0	0	3	40	60	100	
2		Program Elective-VI		0	0	3	40	60	100	
3		Review Article phase-II		0	6	3	40	60	100	
4		General Lab-V		0	2	1	40	60	100	
5		General Lab-VI		0	2	1	40	60	100	
Total Contact Hours		6 0 10		10	11 200		200	500		
		16			11	200	300	300		

Program Elective-V					
	Microwave in MIC's				
	Optical Communication				
	Arduino Programming & Introduction to Raspberry Pi				
	Verilog Programming				

Program Elective-VI					
	Satellite communication				
	RF component Design: Simulator Approved				
	Modern Comm. Technologies				
	High Speed Electronics				

1. Name of the Department: Electronics and Communication Engineering								
2. Subject Name	Microwave in	L		Т		Р		
	MIC's							
3. Course Code		3		1		0		
4. Type of Course (u	ise tick mark)	Core ()		PE(✓)		OE ()		
5. Pre-		6.	Frequency	Even	Odd	Either	EverySem ()	
requisite (if any)		(use t	ick marks)	0	(•	Sem()	-	
7. Total Number of Lectures, Tutorials, Practical (assuming 14 weeks of one semester)								
Lectures – 42 Tutorials – 14 Practical – 0								

8. Brief Syllabus

Optical fibre systems include long distance backbone or trunk networks, metropolitan and access networks, passive optical networks and radio on fibre or fibre wireless systems. Fibre networks are also used to distribute signals for broadband wireless access networks.

The design of an optical fibre system involves many design factors and trade-offs. The characteristics and limitations of system components (laser diodes, optical modulators, optical fibre, optical amplifiers and optical receivers) and the factors affecting the performance of different optical fibre communication systems will be studied.

9. Course Objectives:

1. To explain the monolithic microwave integrated circuits, its applications, advantages over discrete circuit and different fabrication techniques apart from encapsulation and mounting of active devices.

2. To develop an ability to analyze the microstrip transmission lines and slot lines.

3. To develop an ability to evaluate and analyze the various fin lines and coplanar waveguides apart from the various uses of lumped elements in microwave integrated circuits.

4. To develop an ability to evaluate the performance of microwave integrated circuits by using different measurements and testing techniques.

10. Course Outcomes:

1. Demonstrate understanding on the Monolithic Microwave Integrated Circuits their applications, advantages, various fabrication techniques such as thin and thick films technologies, encapsulation and mounting of active devices and performance of microstrip on semiconductor substrate.

2. Demonstrate insight to develop an ability to evaluate the performance of microwave integrated circuits by using different measurements and testing techniques.

11. Unit wise detailed content							
Unit-1	Number of	Introduction					
	lectures = 12						
Introduction to Mono	lithic Microwave In	ntegrated Circuits (MMICs), their advantages over discrete circuits,					
MMIC fabrication tec	chniques, Thick and	I Thin film technologies and materials, encapsulation and mounting					
of active devices. Mie	crostrips on semicor	nductor substrates.					
Unit - 2	Number of	Transmission Lines					
	lectures = 12						
Planar transmission l	ines for MICs. Me	thod of Conformal transformation for microstrip analysis, concept					
of effective dielectric	constant, Effective	dielectric constant for microstrip, Losses in Microstrip.					
Unit - 3	Number of	Slot Line					
	lectures = 8						
Slot Line Approxima	te analysis and fiel	d distribution, Transverse resonance method and evaluation of slot					
line impedance, comp	parison with micros	trip line.					
Unit - 4	Number of	Fin & Coplanar Lines & MIC Measurement					
	lectures = 8						
Fin lines & Coplanar Lines. Introduction, Analysis of Fin lines by Transverse Resonance Method,							
Conductor loss in Fi	n lines. Introduction	n to coplanar wave guide and coplanar strips. MIC Measurement.					

Testing and Applications: MIC measurement system, measurement techniques – S parameter measurement, noise measurement, MIC applications.

12. Brief Description of self learning / E-learning component

13. Books Recommended (3 Text Books + 2-3 Reference Books)

Text Book:

1. Microwave Integrated circuit, K. C. Gupta.

2. Microwave Devices & Circuits 3/e, Samuel Y. Liao.

3. Microstrip lines and Slot lines, K.C. Gupta, R. Garg., I. Bahl, P. Bhartia, Artech House, Boston, 1996.

Reference Books:

1. Stripline-like Transmission lines for Microwave Integrated circuits, B. Bhat, S. K. Koul, Wiley Eastern Ltd., New Delhi.

2. Microwave Integrated Circuits, By Ivan Kneppo, J. Fabian, P. Bezousek

1. Name of the Depa	artment: Electroni	cs and Communication	Engineering			
2. Subject Name	Optical	L	Т	Р		
U	Communication					
3. Course Code		3	1	0		
4. Type of Course (u	ise tick mark)	Core (✓)	PE()	OE ()		
5. Pre-		6. Frequency	Even Odd	Either EverySem ()		
requisite (if any)		(use tick marks)	() (✔)	Sem()		
7. Total Number	er of Lectures, Tut	orials, Practical (assun	ning 14 weeks o	of one semester)		
Lectures = 42		Tutorials = 14	Practical =			
8. Brief Syllabu	IS					
9. Learning ob	jectives:					
By the completion of	the course, you sho	ould be able to:				
1. To learn the	basic elements of c	ptical fiber transmission	n link, fiber mo	des configurations and		
structures.						
2. To learn the	fiber optical receive	ers such as PIN APD di	odes, noise per	formance in photo detector,		
receiver operation an	d configuration.					
3. To learn the f	fiber optical networ	k components, variety c	of networking as	spects, FDDI, SONET/SDH		
and operational princ	iples WDM.					
10. Course Outc	omes:					
On completion of thi	s course you should	be able to:				
1. Explain the p	rinciples of operation	on of various optical fibr	e communicatio	n systems.		
2. Calculate var	ious key parameter	s of optical fibre system	ns. These incluc	le the system optical power		
budget and system ri	se time budget, rec	eiver noise power, Q fa	ctor, bit error ra	te and maximum usable bit		
rate of a digital optic	al fibre system.	.1 1				
3. Communicate	e laboratory finding	s through written reports	5.			
II. Unit wise def	tailed content					
Unit-1 Number	of lectures = 12	Overview of Optical 1	Fiber Wavegui	les		
General system, trans	smission link, advar	ntage of optical fiber cor	nmunication. Ba	asic structure of optical		
fiber waveguide, ray	theory transmission	n, optical fiber modes an	d configuration,	step index & graded index		
fiber, single mode fit	ber, fiber materials	, fiber fabrication.	-			
Unit - 2 Number	of lectures = 12	Signal Degradation of	f Optical Fiber			
Introduction, attenua	ation, intrinsic & e	extrinsic absorption los	ses, linear & 1	nonlinear scattering losses,		
bending losses, disto	ortion in optical wa	ve guide, intramodal ar	nd intermodal d	ispersion. Power launching		
and coupling Source	to fiber power lau	inching, power calculat	ion, lensing scl	nemes, fiber to fiber joints,		
fiber splicing techniq	ue, fiber connectors	8.				
Unit - 3 Number	of lectures = 8	Optical Sources and	Receiver			
LASER: Basic concepts of laser, Optical emission from semiconductors, Semiconductor injection laser						
(ILD), Injection laser characteristics.LED: power and efficiency, LED structures, LED characteristics.						
Optical detectors: p-	n photodiodes, p-i-i	n photodiodes, Avalancl	he photodiodes,	Quantum efficiency, speed		
of response, Phototransistor; Optical receiver: Receiver operation, digital receiver noise , shot noise , pre-						
amplifier types, Digital receiver performance, introduction to analog receivers.						
Unit - 4 Numb	er of lectures = 8	Digital Transmission	Systems			
Point to point links, system considerations, link power budget, rise time budget, modulation formats for						
analog communication system, introduction to WDM concepts, Introduction to advanced multiplexing						
strategies.						
12. Brief Description of self learning / E-learning component						
13. Books Recommended (3 Text Books + 2-3 Reference Books)						
Text Books						
1. 1.G.Keiser: C	ptical Fiber Comm	unication – MGH				
[2.] Jenkins & W]	nite : Fundamentals	Of Optics – MGH				

1 Name of the D	enartment. Electronics ar	nd Comm	unication	n Engine	ering				
2. Subject	Arduino Programming		unication			Р	Р		
Name	and Introduction to	-		-		-			
	raspberry pi								
3. Course Code		3		1		0			
4. Type of Cours	e (use tick mark)	Core ()		PE (✓)		OE ()			
5 Pre-		6. Free	Juency	Even	Odd	Either	EverySem ()		
requisite (if any)				0	(•	Sem()			
7. Total Nu	mber of Lectures, Tutorial	ls, Practi	cal (assur	ning 14 v	weeks of	one sem	lester)		
Lectures = 42	Tu	torials =	14	Practic	al = 0				
8. Course Des	scription								
With Arduino, or	e can get to know the basi	cs of mic	ro-control	llers and	sensors	very qui	ckly and can start		
building prototyp	e with very little investmer	nt. This co	ourse is in	tended t	o make <u>y</u>	you comf	fortable in getting		
started with Ardu	ino, Introduction to Raspbe	erry Pi , I	Linux She	ll progra	mming,	GPIO, C	programming on		
Pi,using Python, I	oT Design using Raspberry	Pi.							
0 Course Ob	ioctivos								
1 To provide	practical know-how and	hands-o	n experie	ence wh	ich is o	prossly r	nissing from the		
engineering currie	culum	inditus 0	n experie	mee, wh	ien 15 g	510331y 1	missing nom the		
2. Learning he	ow to use Arduino and Ra	spberry P	i means l	earning	how har	dware ar	nd software come		
together to create	interesting and useful devic	ces.		6					
10. Course Outo	comes: Upon the completion	n of this c	ourse, stu	dents wi	ll able to	demons	trate the ability to		
1. Create sketches	s, libraries inside the Arduir	no Develo	pment En	vironme	nt.		2		
2. Measure variou	s physical parameters using	g sensors.	•						
5. Implement vari	ous communication protoco	ols for wi	red and wi	ireless co	mmunic	ation.			
11. Unit wise	detailed content								
Unit-1	Number of lectures =	10 Ir	troductio	on to Ar	duino				
The Arduino Plat	form, Block diagram, Arch	itecture,	Pin functi	ons, over	rview of	main fea	atures such as I/O		
Ports, Timers, in	iterrupts serial port, PWM	I, ADC,	etc. Intro	duction	to Ardu	ino IDE,	writing, saving,		
compiling and up	loading sketches.								
Unit - 2	Number of lectures =	8 Ir	nterfacing	5					
Interfacing discre	ete LEDs, Binary counter,	Seven S	Segment 1	LEDs. In	nterfacin	g LCD,	switch Interface.		
Interfacing with d	lifferent type of sensors and	commun	ication mo	odules.					
Unit - 3	Number of lectures =	8 Ir	ntroductio	on to Ras	spberry	Pi			
Raspberry Pi –	Introduction-Basics, applie	cations, i	nstallatio	n. Prepa	ring SD	Card for	or Raspberry Pi.		
different OS ver	sions. First boot, Configur	ration, tir	ne setting	g, keybo	ard layo	ut, disk	expand, etc. Pre		
installed apps. Ra	spi-config. Connecting with	n Wi-Fi/ L	LAN. Basi	cs of the	Linux C	S used o	n the Pi.		
Introduction to s	shell/Programming on Lin	ux: Basic	c shell cor	nmand. I	Editor V	i, Nano, e	etc. Accessing the		
Man Pages. Pipin	g Shell Commands. Perform	ning APT	Package	updates.	Remote	SSH Acc	ess + VNC.		
GPIO Shell Prog	ramming for blinking LED). Introdu	ction To V	Wiring p	i Library	(C Prog	gramming) Using		
wiring Pi Library	tor GPIO Access								

Unit - 4Number of lectures = 8Introduction to Programming on Pi using Python

Variables, Condition Statement. Loops, Importing Libraries. Functions, Classes. Python and Hardware Access. LED Blinking using Python Raspberry pi library. Temperature sensing using 1-wire temp sensor. Motion detection using Raspberry pi. Sending email alerts when Motion detected using PIR sensor. Configuring web server. Using own Cloud on Raspberry Pi

IoT Design using Raspberry Pi: Introduction to IoT. IoT Applications based on Pi. Installing and configuration IoT Framework. GPIO Control over Web Browser. Creating Custom Web Page for Lamp. Interfacing light emitting diodes (LEDs), switch, buzzer. Raspberry Pi sensor interfacing

12. Brief Description of self learning / E-learning component

13.	Books Recommended (3 Text Books + 2-3 Reference Books)				
Reference Books					
1	Arduing Cookbook 2nd Edition by Michael Margolis				

Edition, by Michael Marg 143

2. Getting Started	with Arduino: The	Open Source Electronics	s Prototy	oing Platf	form (Ma	ke) 3rd Eo		
1. Name of the D	epartment: Electro	onics and Communicat	ion Engi	neering	-			
2. Course	Verilog	L	Т		Р			
Name	Programming							
3. Course Code		3	1		0			
4. Type of Cours	e (use tick mark)	Core ()	PE (✓)		OE ()			
5. Pre-requisite	Digital Logic	6. Frequency	Even	Odd ()	Either	Every		
(if any)	Design	(use tick marks)	(Y)		Sem ()	Sem		
						0		
7. Total Number	of Lectures, Tutor	rials, Practical (assumin	ng 14 wee	eks of on	e semeste	er)		
Lectures = 40		Tutorials = 0	Practic	al = 12				
8. Course Descrip	tion	·						
Course cover the VLS	I design technology	for the development of a	analog an	d digital o	design. D	etailed		
applications of verilog	design.	Ĩ	U	C	U			
9. Course Object	tives: The student w	vill learn and understand						
1. The evolution of	of VLSI technologie	es for the development of	f Integrate	ed circuit				
2. The significance	e of VLSI design in	the electronics application	ion.					
3. Design procedu	ure of VLSI design 1	using verilog.						
10. Course Outco	mes: The students v	vill be able to						
1. Develop VLSI	IC's for the use of a	nalog circuits in compac	et form.					
2. Design the digi	tal circuits using Ve	erilog VLSI technologies	5.					
0 0	C	6 6						
11. Unit wise deta	iled content							
Unit-1 Number of	f lectures = 13	Overview of Digital D	esign wi	th Verilo	g HDL			
Overview of Digital	Design with Verilo	g HDL, Evolution of C	CAD, em	ergence of	of HDLs,	typical		
HDL-flow, Hierarchi	cal Modeling Cor	ncepts, Top-down and	bottom-	up desig	gn metho	odology,		
differences between n	nodules and modul	e instances, parts of a	simulatio	n, design	block, s	stimulus		
block.				e e				
Unit - 2 Number of	f lectures = 14	Basic Concepts						
Basic Concepts, Lexi	cal conventions, da	ta types, system tasks,	compile	directiv	es, Modu	iles and		
Ports, Module definition	on, port declaration,	connecting ports, hierard	chical nai	ne refere	ncing.			
					C			
Unit - 3 Number of	f lectures =12	Gate-Level Modeling						
Gate-Level Modeling,	Modeling using b	asic Verilog gate primit	tives, des	cription	of AND/	OR and		
BUF/NOT type gates,	rise, fall and turn-of	ff delays, min, max, and	typical d	elays, Da	taflow M	odeling,		
Continuous assignmen	ts, delay specification	on, expressions, operator	s, operan	ds, opera	tor types.	U,		
Unit - 4 Number of	f lectures = 8	Behavioral Modeling	· •	· •				
Behavioral Modeling	, Structured proce	dures, initial and alw	ays, blo	ocking a	nd non-l	olocking		
statements, delay con	ntrol, generate stat	ement, event control,	condition	nal stater	nents, M	Iultiway		
branching, loops, sequ	ential and parallel b	locks.			,	5		
12. Books Recom	mended (3 Text Bo	oks + 2-3 Reference Bo	oks)					
1. A Verilog HDL Pri	mer, J. Bhasker							
2. Verilog HDL · A Gu	ide to Digital Desig	n and Synthesis Second	Edition	Samir Pa	lnitkar P	rentice		
Hall PTR	ide to Digital Desig	ii and 5 yndiesis, 500010	Lonion,	Summ 1 a	minan, 1			
1.	Name of the	Department: Elect	ronics and Communica	ation Eng	gineerin	ıg		
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2.	Course	Satellite	L	Т		Р		
Name		Communication						
			3	0		0	0	
3. Code	Course							
4.	Type of Cour	se (use tick	Core ()	PE(✓)		OE ()		
mark))							
5.	Pre-	Digital	6. Frequency	Even	Odd	Either	EverySem	
requis	site (if any)	Communication	(use tick marks)	() (✓) Sem() ()				
7.	Total Numbe	r of Lectures, Tuto	prials, Practical (assum	ing 14 w	veeks of	one sem	ester)	
Lectu	$\frac{\text{res} = 42}{2}$		Tutorials = 0	Practic	al = 0			
8.	Brief Syllabu	S	C 11'		•.•			
The co	ourses cover th	e most relevant as	pects of satellite comm	unication	ns, with	emphasi	s on recent	
applica	ations and deve	lopments. The cour	rse begins with a review	on the h	iistory a	nd basic	concepts of	
satellit	te communicati	ons. Next it covers	the orbital aspects, with	n emphas	as on the	e geostat	ionary orbit	
Iollow	red by a discu	ssion of satellite s	ubsystem and launchin	g metho	as. The	design	or a digital	
satellit	te link is discu	issed in detail, inc.	luding link budget, mo	dulation,	, error c	control a	nd multiple	
access	methods. Freq	uency assignments	and propagation aspects	s that arro	ect the s		nk are then	
discus	sed. Antennas	and earth station te	echnology are presented	, includi	ng the c	lesign of	very small	
apertu	re terminals (V	SAIS).						
0	I coming chi	antimore						
9.	Learning obj	ecuves:	niam of cotallitad					
	The multiple des	crides ordital mecha	anism of satellites.		mination		diagonad	
2.	The multiplexin	ig and multiple acce	ess techniques of Satellit	e commu	inication	1 are also	discussed.	
3. (10	GPS and other a	applications of sater	inte communication are	covered 1	in this co	burse.		
10. i)	Discuss veries	<u>JIIIes:</u>	multiple access technics					
1) ;;;)	Discuss variou	to uplink and down	ink under verieus condi	tiona				
11) ;;;;)	Design saterni Domonstrato t	the GPS concents for	r athical usage in societ					
111	Unit wise det	ailed content	i etilleai usage ili societ	у				
II. Unit 1		Number of	Principles Of Satellit	Comm	unicotic	n		
Unit-1	L	lectures – 10	T finciples Of Satellit	Comm	umcauo) 11		
Evolut	tion & growth	of communication x	satellite Synchronous s	atellite S	atellite	frequenc	v allocation	
& Bar	nd spectrum	dvantages of satel	lite communication A	$\frac{1}{1}$	Passiva	satellite	Modem &	
Codec	• Applications	of satellite commun	ication			satemic,	Widdelin &	
	. reprications (1 0 11011.					
COM	MUNICATION	SATELLITE LIN	VK DESIGN: Introduct	ion, Gen	neral lin	k design	equations,	
System	n noise temper	rature, C/N & G/T	ratio, Atmospheric &	Ionosph	eric eff	ects on l	ink design,	
Comp	lete link design	, Earth station parar	neters.	-			-	
		-						
Unit -	2	Number of	Analog and Digital Sa	atellite C	Commur	nication		
		lectures = 8		~ ~ ~				
Introd	uction, Baseba	nd analog(Voice)	signal, FDM technique	es, S/N	& C/N	ratio in	frequency	
modul	ation in satellit	e link, S/N ratio in I	FM with multiplexed tel	ephone s	signal in	satellite	link, Single	
channe	el per carrier(S	CPC) systems, Con	nmanded single sideban	d (CSSB) system	is, Analo	g FM/FDM	
TV sa	TV satellite link, Inter modulation products & their effects in FM/FDM systems, Energy disposal in							
FM/FI	DM systems.							
Digita	l Satellite Com	munication · Advar	stages of digital commu	nication	Flemer	its of dia	ital satellite	
Comm	unication eveta	me Digital basebar	nages of utgital continu	lation te	chnique	s like M	SK GMSK/	
$0 \Delta M$	Satellite digita	il link design Time	Division Multinleving		ennque	5 IIKC IVIK	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
QAM, Salenne digital link design, Time Division Multiplexing.								

Unit - 3	Number of	Multiple Access Techniques
	lectures = 10	

Introduction, TDMA, TDMA-Frame structure, TDMA-Burst structure, TDMA-Frame efficiency, TDMA-superframe, TDMAFrame acquisition & Synchronization, TDMA compared to FDMA, TDMA Burst Time Plan, Multiple Beam (Satellite switched) TDMA satellite system, Beam Hopping(Transponder Hopping) TDMA, CDMA & hybrid access techniques.

Satellite Orbits: Introduction, Synchronous orbit, Orbital parameters, Satellite location with respect to earth, Look angles, Earth coverage & slant range, Eclipse effect, Satellite placement in geostationary orbit, station keeping, Satellite stabilization.

Unit - 4	Number of	Special Purpose Communication Satellite
	lectures = 12	

BDS, INMARSAT, INTELSAT, VSAT(data broadband satellite), MSAT(Mobile Satellite Communication technique), Sarsat (Search & Rescue satellite) & LEOs (Lower earth orbit satellite), Satellite communication with respect to Fiber Optic Communication, LANDSAT, Defense satellite.

Laser Satellite Communication: Introduction, Link analysis, Optical satellite link transmitter, Optical satellite link receiver, Satellite Beam Acquisition, Tracking & Positioning, Deep Space Optical Communication Link.

12. Brief Description of self learning / E-learning component

13. Books Recommended (3 Text Books + 2-3 Reference Books)

Text Books

1. Wilbur L. Pritchard, H.G. Suyderhoud, Robert A.Nelson, Satellite Communication Systems Engineering, Prentice Hall, New Jersey, 2006. ISBN-013-791468-7

2. Timothy Pratt and Charles W. Bostain, Satellite Communications, John Wiley and Sons, 2003. ISBN- 047137007X

3. D. Roddy, Satellite Communication, McGrawHill, 2006 ISBN- 0071486895

Reference Books

1. Tri T Ha, Digital Satellite Communication, McGrawHill, 1990. ISBN-978-0-07-007752-2

2. B. N. Agarwal, Design of Geosynchronous Spacecraft, Prentice Hall, 1993. ISBN- 0132001144

1 Name of the I	Department: Elect	ronics and Communica	tion En	gineerin	g	
2 Course		L	Т	0	P	
Name	RF Circuit Dosign					
	Design	3	0		0	
3 Course						
Code		a			0.5.0	
4 Type of Cour	se (use tick	Core ()	PE(♥)		OE()	
mark) 5 Pro-	Microwaya	6 Frequency	Even	Odd	Fither	EverySem
requisite (if any)	Engineering	(use tick marks)		Ouu (✔)	Sem()	
requisite (if any)	Circuit Theory	(use tiek marks)	V	(,)	Sem()	V
7 Total Number	r of Lectures, Tuto	orials, Practical (assum	ing 14 w	veeks of	one sem	ester)
Lectures = 36	,	Tutorials = 0	Practic	al = 0		,
8 Brief Syllabus	5					
Radio frequency des	ign concept and i	mpart knowledge on a	lesign a	nd impl	ementati	on of high
frequency transceiver	system, to analyz	e various components	of radio	freque	ncy com	munication
system architecture, d	lesign parameters o	f transceiver circuit des	ign, besi	des deve	eloping a	n insight to
make use of several h	igh frequency desig	n techniques.				
9 Course Objectives:	•					
1. To explain radio fro	equency design con	cept and impart knowle	dge on d	esign an	d implen	nentation of
high frequency transc	eiver system.					
2. To develop an abi	lity to analyze vari	ous components of rad	io freque	ency cor	nmunica	tion system
architecture.			_			
3. To develop an abil	ity to analyze diffe	rent design parameters	of transc	eiver ci	rcuit desi	gn, besides
developing an insight	to make use of seve	eral high frequency desig	gn techni	ques.		
4. To utilize the vario	us RF circuit design	concepts in designing t	he RF tra	ansceive	r systems	5.
5. To review and refer	the literature relate	ed to RF Circuit design a	and repor	rting it e	thically	
10 Course Outcomes						
I. Demonstrate unde	rstanding on the k	Radio frequency design	concept	t and in	npart kno	owledge on
design and implement	ation of high freque	ency Transceiver system	l. C		• ,	• ,
2. Have an ability f	to analyze various	components of Radio	freque	ncy con	nmunicat	ion system
architecture.		DE ciaccit deciences			41. DE	
4. Have an ability to	utilize the various	RF circuit design conc	epts in c	lesigning	g the RF	transceiver
Systems.	····	l'écuré de la la DE		• • • • • • • • • • • • • • • • • • • •	1	
5. Have an ability to r	eview and refer the	interature related to RF	circuit de	esign and	1 report 1	t ethically.
11 Unit wise det	ailed content					
II Ont wise ded	Number of	Introduction An Ove	rview of	RF Filt	er Desig	n I
	lectures $= 10$				er besig	
Introduction: Importa	ince of RF Design	n. RF Behavior of Pas	sive Co	mponen	ts: High	Frequency
Resistors, High-Frequ	uency Capacitors,	High-Frequency Induct	ors. Chi	ip Com	onents a	and Circuit
Board Considerations	: Chip Resistors, C	hip Capacitors, Surface-	Mountee	Inducto	ors. An C	Overview of
RF Filter Design I: Ba	asic Resonator and	Filter Configurations: F	ilter Typ	e and Pa	arameters	s, Low-Pass
Filter, High Pass Filte	er, Band-pass and F	Band-stop Filters, Inserti	ion Loss	, Special	l Filter R	ealizations:
Butterworth –Type, C	hebyshev and De-n	ormalization of Standar	d Low-P	ass Desi	gn.	
Unit - 2	Number of	An Overview of RF F	ilter Des	sign II		
	lectures = 10					
Filter Implementation	s: Unit Elements, K	uroda's Identities and E	xamples	of Micr	ostrip Fi	Iter Design.
Coupled Filter: Odd a	ind Even Mode Exe	citation, Bandpass Filter	r Section	, Cascac	ung Ban	apass Filter
Elements, Design Examples.						

Unit - 3	Number of	Matching and Biasing Network
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	lectures = 7			
Impedance Matching using Discrete Components: Two Component Matching Networks, Forbidden				
regions, Frequency R	esponse and Quality	y Factor, Microstrip Line Matching Networks: From Discrete		
Components to Micro	strip Lines, Single-	-Stub Matching Networks, Double-Stub Matching Networks,		
Amplifier Classes of	f Operation and B	Biasing Network: Classes of Operation and Efficiency of		
Amplifiers, Bipolar T	ransistor Biasing N	etworks, Field Effect Transistor Biasing Networks.		
Unit - 4	Number of	RF Transistor Amplifier Design		
	lectures = 9			
Characteristics of A	mplifiers, Amplifie	er Power Relations: RF source, Transducer Power Gain,		
Additional Power R	elations, Stability	Considerations: Satbility Circles, Unconditional Stability,		
Stabilization Methods	5.			
12 Brief Descrip	tion of self learnin	g / E-learning component		
13 Books Recommended (3 Text Books + 2-3 Reference Books)				
Text Book:				
1. RF Circuit Design Theory and Application, Reinhold Ludwig and Pavel Bretchko, Ed. 2004,				
Pearson Education				

1 Name of the Department: Electronics and Communication Engineering						
2 Course	Modern Digital	L	Т	P		
Name	Communication					
	Techniques	3	0	0		
3 Course						
Code						
4 Type of Cour	rse (use tick	Core ()	PE(✓)	OE ()		
mark)	Γ					
5 Pre-	Digital	6 Frequency	Even Odd	Either EverySem		
requisite (if any)	Communication	(use tick marks)	() (✔)	Sem() ()		
7 Total Number	er of Lectures, Tute	prials, Practical (assumi	ng 14 weeks of	one semester)		
Lectures = 46		Tutorials = 0	$\mathbf{Practical} = \mathbf{(}$			
8 Course Description This course describe the digital modulation techniques used in the major wireless and wire line communication systems in use today and for those being planned for the near future. We will discuss the space, time and frequency diversity techniques used in new wireless systems including the						
BLAST and MIMO t	echniques, and their	combination with OFDN	И.			
9 Course Objectives	1					
1. To analyze th	e feasibility and cos	t-effectiveness of using 1	modern media o	f communication for		
teaching:						
2. To analyze th	e response to teach	ers and students about the	he introduction	of modern media in		
higher education, and	 					
5. To explore t	ne modanties of t	bridging communication	gap in educat	ion and developing		
	gii moderni media.					
10 Course Outcome	<u>c</u>					
On completion of the	s is course vou should	be able to:				
1. Apply advanced d	lata communicating	methods and networking	g protocols for	wireless and mobile		
environments			5 F			
2. Creatively analyze	mobile and wireles	s networks				
3. Critically analyse s	security issues of mo	bile and wireless compu	ting systems			
11 Unit wise det	ailed content	Γ				
Unit-1	Number of	Coherent and Non-Co	herent Commu	nication		
	lectures = 12					
Coherent receivers –	Optimum receivers	in WGN – IQ modulati	on & demodula	tion – Non coherent		
receivers in random	phase channels; M	-FSK receivers – Rayler	igh and Rician	channels – Partially		
coherent receives – L	PSK; M-PSK; M-L	PSK,-BER Performance	Analysis.			
Unit - 2	Number of	Band limited Channel	s and Digital M	adulations		
Cint - 2	lectures $=$ 10		s and Digital M			
Eve pattern: demod	$\frac{1}{1}$ ulation in the pres	sence of ISI and AWC	GN: Equalization	n techniques – IO		
modulations: OPSK:	OAM; OBOM: -B	ER Performance Analys	is. – Continuou	s phase modulation:		
CPFM; CPFSK; MSI	K, OFDM.	j.		I ,		
Unit - 3	Number of	Block Coded Digital C	ommunication			
	lectures = 12	8				
Architecture and per	formance – Binary	block codes; Orthogona	l; Biorthogonal	; Transorthogonal –		
Shannon's channel c	oding theorem; Cha	annel capacity; Matched	filter; Concepts	of Spread spectrum		
communication – Co	oded BPSK and DF	PSK demodulators – Lin	ear block codes	; Hamming; Golay;		
Cyclic; BCH ; Reed -	- Solomon codes					
Unit - 4	Number of	Convolutional Coded	Digital Commu	nication		
	lectures = 12					
Representation of co	odes using Polynon	nial, State diagram, Tre	ee diagram, and	l Trellis diagram –		
Decoding technique	s using Maximum	likelihood, Viterbi alg	orithm, Sequer	tial and Threshold		
methods – Error probability performance for BPSK and Viterbi algorithm, Turbo Coding.						

12 Brief Description of self learning / E-learning component

13 Books Recommended (3 Text Books + 2-3 Reference Books)

Text Books

1. John Proakis, "Digital Communications" 4th edition, Mc.Graw.Hill -2007

2. M.K.Simon, S.M.Hinedi and W.C.Lindsey, Digital communication techniques; Signaling and detection, Prentice Hall India, New Delhi. 1995.

Reference Books

1. Simon Haykin, Digital communications, John Wiley and sons, 1998.

2. Wayne Tomasi, Advanced electronic communication systems, 4th Edition Pearson Education Asia, 1998.

3. B.P.Lathi, Modern digital and analog communication systems, 3rd Edition, Oxford University press 1998.

1 Name of the 1	Department: Electro	onics and Communi	cation Engineerii	ıg		
2 Course		L	Т	P		
Name	Fign Speed					
	Electronics	3	0	0		
3 Course						
Code						
4 Type of Cour	se (use tick mark)	Core ()	PE (✓)	OE ()		
5 Pre-		6 Frequency	Even Odd	Either EverySem		
requisite (if any)		(use tick marks)	() (1)	Sem() ()		
7 Total Numbe	r of Lectures, Tutor	ials, Practical (assu	ming 14 weeks of	one semester)		
Lectures = 44]	Futorials = 0	Practical = (
8 Course Desci	ription					
This course describe	the high speed electro	onics techniques used	in the major elect	tronics, wireless and		
wire line communicat	tion systems in use to	day and for those bei	ng planned for the	e near future.		
9 Course Objectives						
1. Develop the s	kills to gain a basic u	nderstanding of high-	speed electronics	circuits.		
2. Introduce stud	lents to properties of	various components	used in high speed	electronics		
10 Course Outcome	s: At the end of the c	ourse, students will c	emonstrate the ab	ility to:		
1. Understand signific	cance and the areas of	f application of high-	speed electronics	circuits.		
2. Understand the pro	perties of various cor	nponents used in hig	h speed electronic	S		
3. Design High-speed	electronic system us	ing appropriate comp	onents.			
11 Unit wise det	ailed content					
Unit-1	Number of lectures	s = 10 Introdu	iction			
Transmission line the	ory (basics) crosstalk	and non ideal effect	s; signal integrity:	impact of packages,		
vias, traces, connecto	rs; non-ideal return c	urrent paths, high fre	quency power deli	ivery, methodologies		
for design of high sp	peed buses; radiated	emissions and mini	nizing system no	ise; Noise Analysis:		
Sources, Noise Figur	e, Gain compression	, Harmonic distortio	n, Intermodulation	n, Cross-modulation,		
Dynamic range						
Unit - 2	Number of lectures	s = 10 Dev	vices			
Devices: Passive an	d active, Lumped p	passive devices (mo	dels), Active (m	odels, low vs high		
frequency)						
Unit 2	Number of lecture	n = 12 DE /	mulifian Design			
DE Amplifier Design	Stability Low N	$\mathbf{S} = \mathbf{I}\mathbf{Z} \qquad \mathbf{K}\mathbf{\Gamma} \mathbf{F} $	adhand Amplifia	ra (and Distributed)		
RF Amplifier Design	1: Stadility, Low N	D E Integrated air	Daddand Amphile	Trans and Distributed)		
Fower Amplifiers, C	lass A, D, AD allu C	, D E integrated cir	cuit realizations, C	Conversion asin and		
entriciency KF power	output stages Mixer	S – Up conversion D	tooturos	Conversion gain and		
spurious response. Os	semators rinciples.r.		lectures			
Unit - 4	Number of lecture	s = 12	Printed Circuit B	oard		
Printed Circuit Board	: Anatomy, CAD too	ols for PCB design.	standard fabrication	on. Microvia Boards.		
Board Assembly: Su	urface Mount Techn	ology, Through Ho	le Technology, H	Process Control and		
Design challenges.						
12 Brief Description of self learning / E-learning component						
13 Books Recommended (3 Text Books + 2-3 Reference Books)						
Text Books						
1. Stephen H. Hall,	Garrett W. Hall, Ja	mes A. McCall "H	igh-Speed Digital	System Design: A		
Handbook of Intercor	nect Theory and Des	ign Practices", Augu	ıst 2000, Wiley-IE	EEE Press		
2. Behzad Razavi, "R	F Microelectronics",	Prentice-Hall 1998,	SBN 0-13-88757	1-5.		
3. Guillermo Gonzale	z, "Microwave Trans	sistor Amplifiers", 2n	d Edition, Prentice	e Hall		

1 Name of the Department: Electronics and Communication Engineering							
2 Course	D.T. Signal	L-3	T-0	P-0			
Name	Processing						
3 Course							
Code		~ ^		0.7.0			
4 Type of Cour	se (use tick	Core ()	PE(✓)	OE ()			
mark)	C! 1.0		E 011				
5 Pre-	Signal &	6 Frequency	Even Odd	Either EverySem			
requisite (if any)	Systems	(use tick marks)	() (¥)	Sem() ()			
$\frac{7}{10tal Numbe}$	r of Lectures, 100	Tutoriols – 0	Dractical – 0	one semester)			
8 Course Description	.	1 utor rais = 0	TTactical – 0				
The goal of discrete t	ime signal process	ing course is to provide	a comprehensiv	e coverage of signal			
processing methods	and tools including	g leading algorithms for	or various appli	cations. The course			
objectives include a	n introduction to	the theory of statistic	al signal proce	ssing methods and			
application developm	nent as related to	signal processing, opt	timal linear filte	er theory, recursive			
methods for optimal f	ilters, classical and	modern spectrum analys	sis, and adaptive	filtering.			
9 Course Objectives		**	_				
1. To introduce variou	is techniques of dig	ital signal processing that	at are fundament	al to various			
industrial applications	8.						
2. To know third gene	eration DSP archited	ctures and interfacing of	memory and I/O	peripherals to the			
DSP processors.							
10 Course Outcomes	At the end of the	course, the student shou	ld be able to				
1 Apply DFT for the	analysis of digital s	ignals and systems.					
2 Apply adaptiv	e filters appropriate	ely in communication sys	stems				
II Unit wise detailed	l content	D:	C. C				
Unit-1 Number Summary of analysis	$\frac{1}{2}$ of lectures = 10	Discrete Fourier Trat	<u>isiorm</u>				
Smmary of analysis	& synthesis equality	ons for FI & DIFI, fi	E DET poriodicity	i sampling, Discrete			
convolution Linear f	iltering using DFT II	Filtering long data segu	DFT periodicity	ave and overlap add			
method Fast comput	ation of DFT Radi	rificing long data sequences 2 Decimation_in_time	(DIT) Fast Four	ier transform (FFT)			
DIF-FFT Linear filte	ring using FFT	x 2 Decimation in time	(DII) I dist I out	ter transform (111),			
Unit - 2 Number	of lectures = 10	Infinite Impulse	Response Filters				
Characteristics of pra	ctical frequency sel	ective filters. Characteris	stics of common	v used analog filters			
Butterworth filters, C	Thebyshev filters, I	Design of IIR filters from	m analog filters) Approximation of			
derivatives, Impulse	invariance method	, Bilinear transformatic	on, Frequency tr	ansformation in the			
analog domain, Struct	ture of IIR filter dir	ect form I, direct form II	, Cascade, parall	el realizations.			
Unit - 3 Number	of lectures = 12	Finite Impulse R	esponse Filters				
Design of FIR filters	, symmetric and A	nti-symmetric FIR filter	rs, design of line	ear phase FIR filters			
using Fourier series n	nethod, FIR filter of	design using windows (I	Rectangular, Hai	nming and Hanning			
window),Frequency	window), Frequency sampling method, FIR filter structures, linear phase structure, direct form						
realizations.							
Unit - 4 Number	of lectures = 12	Finite Word Leng	gth Effects				
Fixed point and float	ing point number	representation, ADC, qu	antization, trunc	cation and rounding,			
quantization noise, input / output quantization, coefficient quantization error, product quantization							
error, overflow error,	limit cycle oscilla	tions due to product qua	antization and su	immation, scaling to			
12 Drief Description	tion of colf loams	a / E looming commence	ant				
12 Drief Description of sen learning / E-learning component							

13 Books Recommended TEXT BOOK

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth Edition, Pearson Education / Prentice Hall, 2007. **REFERENCES**

1. Emmanuel C. Ifeachor & Barrie. W. Jervis, "Digital Signal Processing", Second Edition, Pearson Education / Prentice Hall, 2002.

2. A. V. Oppenheim, R.W. Schafer and J.R. Buck, "Discrete-Time Signal Processing", 8th Indian Reprint, Pearson, 2004.

3. Andreas Antoniou, "Digital Signal Processing", Tata Mc Graw Hill, 2006.

1 . Name of the Department: Electronics and Communication Engineering							
2. Course	Review Article	L-0	T-0	P-6			
Name	phase-II						
	-						
3. Course							
Code							
4. Type of C	Course (use tick	Core ()	PE(✓)	OE ()			
mark)			E 0.11				
5. Pre-	Industrial	6. Frequency	Even Odd	Either EverySem			
requisite (if any)	Exposure &	(use tick marks)	() (*)	Sem() ()			
	Project Work						
7. Total Nu	mber of Lectures, Tu	orials, Practical (assum	ing 14 weeks of	one semester)			
Lectures = 44		Tutorials = 0	$\mathbf{Practical} = 0$				
8 Course Descri	ption						
The students are	required to undergo In	Research Project work of	duration not les	s than 4 months in a			
reputed organizat	ion or concerned instit	ute. The student who wish	hes to undergo Ir	idustrial project, the			
industry chosen f	or should be a private l	imited company.					
9 Course Object	ives						
The objectives of	the Research Article p	hase -II include:					
1. To give st	udents the opportunity	to apply the knowledge a	and skills they ha	ive acquired on			
campus in a real-	life work situation.						
2. To provid	e students with opportu	inities for practical, hands	s-on learning fro	m practitioners in			
the students' area	s of specialization.	• •					
3. To expose	e students to a work en	vironment, common pract	tices, employment	nt opportunities and			
work ethics in the	eir relevant field.	11 0.1 . 1 .					
4. To enhance	the employability sk	ills of the students.		• 1•1 /1			
5. To provid	e opportunities for stuc	lents to be offered jobs in	the organization	is in which they			
undergo their Ind	ustrial Training.	1 (11					
10 Course Outco	omes: The learning out	comes can be as follows:					
1. Apply the	oretical knowledge in i	ndustrial applications.					
2. Acquire s	this in communication	, management and team v	VOIK.				
3. Practice e	et Haalth and Safaty nr	work culture.					
4. Implementer	nt Health and Salety pr	actices in work place.					
1 The stude	uis: nts are required to und	argo In Decemph Droject	work of duration	not loss than 1			
months in a reput	ad organization or con	arnod instituto	work of duration	not less than 4			
2 The stude	nt who wishes to under	control monitorial project the	industry chosen	for should be a			
2. The stude	mpany	go muusunai project, inc	industry chosen	TOT SHOULD UC a			
3 The final	Viva-voca of this will l	ne conducted by the exter	nal examiner and	d one internal			
evaminer appoint	ed by the institute Ext	ernal examiner will be fro	om penal of evan	niner			
	nt of this will be based	on Seminar viva-voca r	eport and certific	cate of completion			
hv work		on Semmar, viva-voca, l	eport and certific				
5 The teach	er engaged for this wo	k shall have a workload o	of 6 hours per gr	oun			
	or ongagod for this wor		on o nours per gr	oup.			

1	Name of the l	Department: Elect	tronics and Communica	tion En	gineerin	Ig	
2	Course	General Lab V	L-0	T-0		P-2	
Name							
3	Course						
Code							
4	Type of Cour	se (use tick	Core ()	PE(✓)		OE ()	
mark)	1						
5	Pre-	Industrial	6 Frequency	Even	Odd	Either	EverySem
requis	ite (if any)	Exposure &	(use tick marks)	0	(✔)	Sem()	0
		Project Work					
7	Total Numbe	r of Lectures, Tut	orials, Practical (assum	<u>ing 14 w</u>	eeks of	one sem	ester)
Lectur	res = 44		Tutorials = 0	Practic	cal = 0		
8.	Course Desc	ription					
Course	e for General La	ab covers the expen	riments of program election	ve. Stude	ents have	e to perfo	orm the
experi	ment from the I	List.					
9.	Course Object	ctives					
The ob	ojectives of the	General Lab includ	le:				
1.	To give studer	nts the opportunity	to learn experiments from	n progra	m electi	ves	
2.	To provide stu	idents with opportu	inities for practical, hand	s-on lear	ning on	the stude	ents' areas
of spec	cialization.						
3.	To enhance th	e employability sk	ills of the students.				
10.	Course Outco	omes: The learning	outcomes can be as follo	ows:			
1	Apply theoret	tical knowledge in	industrial applications.				
2	Acquire techn	ical skills on the st	udents' areas of specializ	ation.			
11 La	b Experiments	•					
Sectio	n A: Microwa	ve in MIC's					
1.	Characteristics	s of Gunn diode, F	requency and wavelength	measure	ement		
2.	Characteristics	s of Reflex Klystro	n				
3.	Characteristics	s of Multi-hole dire	ectional coupler				
4.	Characteristics	s of Circulator and	Isolator				
5.	Micro strip an	tenna design using	HFSS				
Sectio	n B: Optical C	Communication					
6.	To establish a	nalog link using O _l	otical Fiber				
7.	To Transmit a	nd receive Pulse A	mplitude Modulated (PA	M) signa	al using	OF.	
8.	To measure Pr	ropagation loss in o	optical fiber.				
9.	To measure be	ending loss in optic	al fiber.				
10.	To measure nu	umerical aperture o	f optical fiber.				
11.	To study splic	ing & connecteriza	tion.				
Sectio	n C: ARduino	Programming &	Introduction to Respbe	rry Pi			
12.	Introduction to	o Arduino Program	ming				
13.	Introduction to	o Python Programm	ning				
14.	Implementatio	on of IoT with Rasp	oberry Pi				
15.	Study of Conn	nectivity and config	guration of Raspberry-Pi	Beagle l	board cir	cuit with	n basic
periph	erals, LEDS.						
Sectio	n D: Verilog P	rogramming					
16. FPGA	To learn desig	ning basic combination	ational circuits in Verilog	g and imp	olementi	ng them	on an
17.	Understanding	g the ASIC/FPGA	design flow.				
18.	Learn writing	and using test bend	ches in Verilog.				
19.	To develop a h	basic SNAKE gam	e by interfacing a PS/2 K	evboard	and VG	A display	v with the
board	20 ac relop a t	cusic si i iiii guili				onspid	

1 Name of	1 Name of the Department: Electronics and Communication Engineering						
2 Course		General Lab V	L	Т	8	P	
Name							
			0	0		2	
3 Course							
Code	~		~ ^			0.7.0	
4 Type of (Cour	se (use tick	Core ()	PE(✓)		OE()	
mark)		Industrial	6 Engagonary	Even	044	Lithon	Evenvee
5 Pre-	•		o Frequency	Even		Either Som()	EverySem
requisite (if any)	Project Work	(use lick marks)	0	(•)	Sem()	0
7 Total Nu	mhe	r of Lectures Tut	orials Practical (assum	ing 14 w	veeks of	one sem	ester)
$\frac{7}{10001100}$	moe	i of Dectures, rut	Tutorials = 0	Practic	ral = 0		ester)
8. Course I)escr	rintion		Tuch	.ui – 0		
Course for Gener	al L	ab covers the exper	iments of program electiv	ve. Stude	ents have	e to perfo	orm the
experiment from	the l	List.	finients of program creed	i el studi		e to perio	
9. Course ()bie	ctives					
The objectives of	f the	General Lab includ	le:				
4. To give s	tude	nts the opportunity	to learn experiments from	n progra	m electi	ves	
5. To provid	le sti	idents with opportu	inities for practical, hand	s-on lear	ning on	the stude	ents' areas
of specialization.		11	I ,		U		
6. To enhan	ce th	e employability ski	ills of the students.				
		1 5 5					
10. Course (Jutco	omes: The learning	outcomes can be as follo	ows:			
3 Apply th	eore	tical knowledge in	industrial applications.				
4 Acquire t	echn	ical skills on the st	udents' areas of specializ	ation.			
11 Lab Experim	ents	• •					
Section A: Satel	lite o	communication					
1. To set up	a ac	tive & passive sate	llite communication link	and stud	y their d	lifference	2.
2. To measu	re th	e baseband analog	(voice) signal parameters	s in a sat	ellite lin	k.	
3. To transm	nit &	receive the Function	on Generator waveforms	through	a satcor	n link.	
4. To send t	eleco	ommand and receiv	e the telemetry Data.				
5. To study	the p	henomenon of Line	ear and Circular polarizat	tion of a	ntennas.		
Section B: RF c	omp	onent Design : Sin	nulator Approved				
1. Study of the	ne sti	ructure and opera	tion of wired, aperture,	planar	and arr	ay anten	nas.
2. Measurem	ent	of radiation patter	n of planar antennas				
3. Design and	d sin	nulation of micro s	strip antenna using CST	[tool. 1(). Measu	urement	of antenna
parameters usin	ig No	etwork Analyzer					
Section C. Med		Comm Technolog	lag				
Section C: Mou		Comm. Technolog	165 - 4 ¹	. .	1-4	4	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	amp	ing and reconstru	icuon of Pulse Amplitu		nan hata	ystem.	
2. 10 study sensitivity, selectivity, and ildenty characteristics of super heterodyne receiver.							
5. 10 plot the radiation pattern of dipole, r agi-uda and calculate its beam width.							
Section D. High	Sne	ed Electronics					
1 To study	sing!	e phase as voltars	regulator with registive a	nd indu	otive los	de	
1. To study 2 To study	sing	le phase au voltage	ioguiaioi wiiii iosisiivo d		Juve 10a	us.	
2. To study	To study single phase cyclo-converter To study triggering of (i) ICPT (ii) MOSEET (iii) newer transistor						

- To study triggering of (i) IGBT (ii) MOSFET (iii) power transistor To study operation of IGBT/MOSFET chopper circuit
- 3. 4.