

ERODE SENGUNTHAR ENGINEERING COLLEGE



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

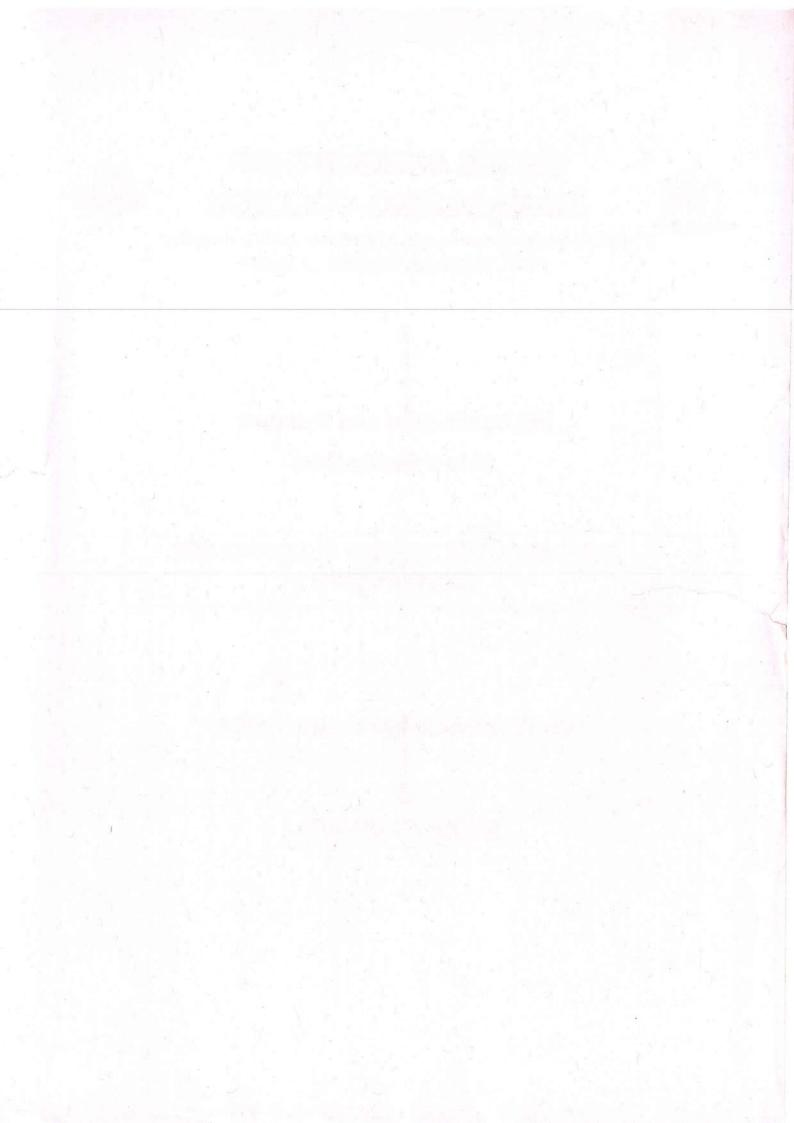
UG Curriculum and Syllabus

(1 to 8 Semesters)

B.E – ELECTRICAL AND ELECTRONICS ENGINEERING

Choice Based Credit System (CBCS)

REGULATION 2019



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

REGULATION – 2019

CHOICE BASED CREDIT SYSTEM

I TO VIII SEMESTERS CURRICULUM

Induction Program (Mandatory)	3 weeks duration
	 Physical activity Creative Arts Universal Human Values
Induction program for students to be offered right at the start of the first year	 Literary Proficiency Modules Lecture by Eminent People Visits to local Areas Familiarization to Dept. / Branch & Innovations

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Code No.	Course	PEOs	ves & Ou POs	PSOs	L	Т	P	С	CA	ES	Marks Total	Cate
19BS101	Calculus and its Applications	1,11	1,2,3,4,	-	3	1	0	4	40	60	100	BS
19BS102	Engineering Physics	١,١	1,2,4,5, 6,8,9	1,2	2	0	2	3	40	60	100	BS
19BS103	Engineering Chemistry	1,1	1,2,3,4, 5,7,12	-	3	0	0	3	40	60	100	BS
19HS101	Communicative English	III	2,3,6,9, 10,12	3	3	0	0	3	40	60	100	HS
19ES101	Python Programming	I,IV	1,2,3, 4,12	2	3	0	0	3	40	60	100	ES
19TP101	Life Skills	III	8,9,10, 12	3	2	0	0	0	40	60	100	EEC
***	and the second se		PI	RACTIC	AL					1.2		
19ES104	Python Programming Laboratory	- 11	1,2,3,4, 5, 12	2	0	0	2	1	60	40	100	ES
19BS105	Chemistry Laboratory	1,11	1,2,3,4, 5,12	-	0	0	4	2	60	40	100	BS
19ES107	Workshop Practices	. 11	1,3,9,12	-	0	0	2	1	60	40	100	ES
			A Dames	TOTAL	16	1	10	20	420	480	900	-

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		Ohiecti	ves & Ou			-	T	-	Max	imum	Marks	
Code No	Course	PEOs	POs	PSOs	L	Т	Ρ	С	CA	ES	Total	Cate gory
19BS201	Vector Calculus and Complex Variables	1,11	1,2,3,4 ,12	<u>.</u>	3	1	0	4	40	60	100	BS
19BS205	Physics for Electronics Engineering	1,11	1,2,3,4 ,5,7	-	3	0	0	3	40	60	100	BS
	Language Elective	III	2,3,6,9, 10,12		3	0	0	3	40	60	100	HS
19ES207	Electronic Devices and Circuits	- 1	1,2,3,4 ,5,12	-	3	0	0	3	40	60	100	ES
19ES210	Principles of Civil and Mechanical Engineering	Ш	1,6	2	3	0	0	3	40	60	100	ES
19MC201	Environmental Science and Engineering	1,11	1,2,3,4 ,5,6, 7, 8,12		3	0	0	0	40	60	100	MC
19TP201	Quantitative Aptitude, Logical Reasoning and Verbal Ability - I	Ш	1,2,9, 10,12	3	2	0	0	0	40	60	100	EEC
			PF	RACTICA	AL.							
19ES218	Electronic Devices and Circuits Laboratory	I	1,3,4,5, 9,12		0	0	2	1	60	40	100	ES
19ES221	Engineering Drawing Laboratory	П	1,2,3,5, 10,12	-	0	0	4	2	60	40	100	ES
				Total	20	1	6	19	400	500	900	

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				THEORY	1	1.1	1.1					
	D	Objecti	ives & O	utcomes				5.05	Max	imum	Marks	Categ
Code No	Course	PEOs	POs	PSOs	L	т	Р	С	CA	ES	Total	ory
19BS304	Transform Techniques and their Applications	1,1	1,2,3,4	1	3	1	0	4	40	60	100	BS
19EE301	Electro Magnetic Theory	U	1,2,3,4, 12	1	3	1	0	4	40	60	100	PC
19EE302	DC Machines and Transformers	1, 11	1,2,3,4, 5	1	3	0	0	3	40	60	100	PC
19EE303	Measurements and Instrumentation	1,11	1,2,3,4, 5,12	1	3	0	0	3	40	60	100	PC

Chairman - BoS Dept. of EEE - ESEC

19EE304	Electric Power Generation	1, 11	1,2,3,4, 12	1	3	0	0	3	40	60	100	PC
19EE305	Circuit Theory	Ш	1,2,3,4, 5,12	1	3	1	0	4	40	60	100	PC
19MC301	Indian Constitution	IV	6,8,10, 11,12	-	2	0	0	0	40	60	100	MC
19TP301	Quantitative Aptitude, Logical Reasoning and Verbal Ability - II	III,IV	1,2,9,10 ,12	3	2	0	0	0	40	60	100	EEC
			PR	ACTICA	AL	1.11			6			
19EE306	DC Machines and Transformers Laboratory	_1,11	1,2,3,4, 9,10,12	1,3	0	0	2	1	60	40	100	PC
19EE307	Electric Circuits Laboratory	Ш	1,2,3, 9,10,12	1,3	0	0	2	1	60	40	100	PC
				Total	22	3	4	23	440	560	1000	

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		Objecti	ves & Ou			1			Max	imum	Marks	Categ
Code No.	Course	PEOs	POs	PSOs	L	Т	Ρ	С	CA	ES	Total	ory
19BS402	Numerical Methods	1,1	1,2,3,4	1	3	1	0	4	40	60	100	BS
19EE401	AC Machines	1,11	1,2,3,4, 5,7,12	1	3	0	0	3	40	60	100	PC
19EE402	Digital Logic Circuits	,	1,2,3	1,2	3	0	0	3	40	60	100	PC
19EE403	Transmission and Distribution	1,1	1,2,3,4, 5,12	1	3	0	0	3	40	60	100	PC
19EE404	Linear Integrated Circuits	1,11	1,2,3,5	1,2	3	0	0	3	40	60	100	PC
19ES402	Data Structures and Algorithm	П	1,2,3,4, 12	2	3	0	0	3	40	60	100	ES
19TP401	Quantitative Aptitude, Logical Reasoning and Verbal Ability - III	IV	1,2,9, 10,12	3	2	0	0	0	40	60	100	EEC
÷.			PR	ACTICA	L							
19EE405	AC Machines Laboratory	I, II	1,2,3,4, 9,12	1,3	0	0	2	1	60	40	100	PC
19EE406	Linear and Digital Integrated Circuits Laboratory	IV	1,2,3,9, 10,11,12	1,3	0	0	2	1	60	40	100	PC
19HS401	Language Skills	IV	5,9,10, 12	3	0	0	2	0	100	0	100	EEC
	vi i i i i i i i i			Total	20	r 1	6	21	500	500	1000	-

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	and the second second			MESTER							_	
- 1 - 1		Objecti	ves & Out	HEORY		1		1	Max	imum	Marks	
Code No.	Course	PEOs	POs	PSOs	Ę	Т	Р	С	CA	ES	Total	Cate gory
19EE501	Power Electronics	1,1	1,2,3,5, 12	1	3	0	0	3	40	60	100	PC
19EE502	Power System Analysis	1,11	1,2,3,4,5 ,7,12	1	3	1	0	4	40	60	100	PC
19EE503	Control Systems	I,II, IV	1,2,3,4, 5,12	1,2	3	1	0	4	40	60	100	PC
19ES501	Microcontroller and Embedded System	I,II, IV	1,2,5, 11,12	2	3	0	0	3	40	60	100	ES
1.5	Professional Elective-I	2.4		1	3	0	0	3	40	60	100	PE
0	Open Elective-I				3	0	0	3	40	60	100	OE
19TP501	Quantitative Aptitude, Logical Reasoning and Verbal Ability - IV	II,IV	1,2,9, 10, 12	3	2	0	0	0	40	60	100	EEC
			PR	ACTICA	L			-				
19EE504	Power Electronics Laboratory	1, 11	1,2,3,5,9	1,3	0	0	2	1	60	40	100	PC
19EE505	Control Systems Laboratory	I, II, IV	1,2,3,4, 5,9	1,3	0	0	2	1	60	40	100	PC
19ES502	Microcontroller and Embedded Programming Laboratory	П	1,2,5,9, 10,11,12	2	0	0	2	1	60	40	100	ES
19EE506	Internship/ Industrial Training	I, II, IV	1,2,3,4,5 ,6,7,8,9, 10,11,12	1,3	0	0	2	1	100	0	100	EEC
				Total	20	2	8	25	560	540	1100	-

			SEN	IESTER	VI		1		1.1			
		-	Т	HEORY		- 20				100-02		
		Object	ives & Ou	tcomes					Maxi	mum	Marks	Cate
Code No.	Course	PEOs	POs	PSOs	L	Т	Ρ	C	CA	ES	Total	gory
19EE601	Power System Protection and Switchgear	1,11	1,2,3,4, 5,7,12	1	3	0	0	3	40	60	100	PC
19EE602	Solid State Drives	1,11	1,2,3,5,7	1	3	0	0	3	40	60	100	PC
19EE603	Renewable Energy Sources	11	2,3,6,7, 12	2	3	0	0	3	40	60	100	PC
19EE604	Design of Electrical Machines	1,11	1,2,3,4,5	1,2	3	0	0	3	40	60	100	PC

19TP601	Quantitative Aptitude, Logical Reasoning and Verbal Ability – V & Recruitment Process	III, IV	1,2,9, 10, 12	3	2	0	0	0	40	60	100	EEC
			PRA	CTICAL	S						1	
19EE605	Renewable Energy Laboratory	П	1,2,3,5,6 ,7,9,12	2	0	0	2	1	60	40	100	PC
19EE606	Mini Project	I,II, IV	1,2,3,4,5 ,6,7,8,9, 10,11,12	1,2,3	0	0	2	1	100	0	100	EEC
19HS601	Career Skills	II, IV	1,5,7,8, 9,12	1,2	0	0	2	0	100	0	100	EEC
	(f			Total	20	0	6	21	540	460	1000	-

			SEM	ESTER \	/11			11		14		
		14	Т	HEORY				N.			1.1.1.	
		Object	ives & Ou	tcomes				-	Maxi	mum l	Marks	Categ
Code No.	Course	PEOs	POs	PSOs	L	Т	Р	С	CA	ES	Total	ory
19ES701	Research Methodology	-1	1,3,4,7, 12	1,2	3	0	0	3 ·	40	60	100	ES
19EE701	Power System Operation and Control	1, 11	1,3,4,9, 10,11,12	1,3	3	0	0	3	40	60	100	PC
19EE702	Electric Power Utilization and Energy Auditing	. 11	1,2,6,7, 8,10,11, 12	1,2	3	0	0	3	40	60	100	PC
	Professional Elective- III				3	0	0	3	40	60	100	PE
	Professional Elective- IV		1-101). 	3	0	0	3	40	60	100	PE
	Open Elective - III				3	0	0	3	40	60	100	OE
			PRA	CTICAL	S						11	
19EE703	Power System Simulation Laboratory	1, 11	1,3,4,9, 10,11,12	1,3	0	0	2	1	60	40	100	PC
19EE704	Project work Phase-I	I,II, IV	1,2,3,4,5 ,6,7,8,9, 10,11,12	1,2,3	0	0	2	1	60	40	100	EEC
19EE705	Comprehensive Review	II, IV	1,5,9	1,2	0	0	2	0	100	0	100	EEC
				Total	18	0	6	20	460	440	900	-

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2			TH	IEORY							2.	
		Objecti	ves & Out	tcomes			-		Maxi	mum l	Marks	Cate
Code No.	Course	PEOs	POs	PSOs	L	Т	Ρ	С	CA	ES	Total	gory
19HS801	Professional Ethics and Human Values	III, IV	1,2,4,7, 8,11,12	3	3	0	0	3	40	60	100	HS
	Professional Elective - V				3	0	0	3	40	60	100	PE
	Professional Elective - VI				3	0	0	3	40	60	100	PE
			PRA	CTICAL	S			24.5				
19EE802	Project Work	1,11,111,1 V	1,2,3,4,5 6,7,8,9, 10,11,12	1,2,3	0	0	12	6	60	40	100	EEC
				Total	9	0	12	15	180	220	400	-

ELECTIVES

		LANGU	AGE ELECTIVE			•		
Code No	Course	Ob	jectives & Outco	omes		T	D	0
Code No.	Course	PEOs	POs	PSOs	L		Р	U
19HX201	English for Engineers	III	2,3,6,9,10,12	3	3	0	0	3
19HX202	Hindi	III	2,3,6,9,10,12	3	3	.0	0	3
19HX203	Japanese	111	2,3,6,9,10,12	3	3	0	0	3
19HX204	French		2,3,6,9,10,12	3	3	0	0	3

1.1.5	F F	ROFESSI	ONAL ELECTIV	/ES		1.14	-1.1	
Code No.	Course	Obj	ectives & Outo	omes	1.1	T	Р	с
Code No.	Course	PEOs POs PSOs		PSOs			F	C
a	Р	ROFESSIC	NAL ELECTIV	Έ-Ι				
19EEX01	Biomedical Instrumentation	1,11	1,2,3,6	2	3	0	0	3
19EEX02	VLSI Design	1,11	1,2,3,6	2	3	0	0	3
19EEX03	Principles of Sensor Technology	I,II	1,2,3,6	2	3	0	0	3
19EEX04	Communication Engineering	-1,11	1,2,3	2	3	0	0	3
19EEX05	Hybrid Electric Vehicles	1,11	1,2,3,4,6	2	3	0	0	3
	PI	ROFESSIC	NAL ELECTIV	E - II		-ll	2.16	
19EEX06	CAD of Electrical Machines	. 1,11	1,2,3,4,5	2	3	0	0	3
19EEX07	Power Electronics Applications to Renewable Energy	1,11	1,2,3,4	1	3	0	0	3
19EEX08	Special Electrical Machines	1,11	1,3,4,5	1	3	0	0	3
19EEX09	Intellectual Property Rights	Ш	1,6,10,12	3	3	0	0	3

19EEX10	System Identification and Adaptive Control	П	1,2,3,4,5	1,2	3	0	0	3
		OFESSI	ONAL ELECTIVE	- 111				
19EEX11	MEMS Technology	1,11	1,2,6	2	3	0	0	3
19EEX12	Digital Signal Processing	1,11	1,2,3,4,5,12	2	3	0	0	3
19EEX13	Digital Instrumentation	1,11	1,2,5,6,9	2	3	0	0	3
19EEX14	EHVAC Transmission	1,11	1,3,4,12	1	3	0	0	3
19EEX15	System Theory	1,11	1,2,3,4,5,12	1,2	3	0	0	3
	PRO	OFESSI	ONAL ELECTIVE	– IV				
19EEX16	Smart Grid	1,11	1,2,3,5,12	2	3	0	0	3
19EEX17	Fibre Optics and Laser Instruments	 , 	1,2,3,5	2	3	0	0	3
19EEX18	Microcontroller based system design	1,11	1,2,5,9,12	2	3	0	0	3
19EEX19	Neural Network & Fuzzy Logic	, 1,11	1,2,3	1,2	3	0	0	3
19EEX20	Energy Management and Auditing	II,IV	1,2,11,12	2,3	3	0	0	3
	PR	OFESSI	ONAL ELECTIVE	1.0445				
19EEX21	High Voltage Engineering	1,11	1,2,3,5,9,10,12	1	3	0	0	3
19EEX22	Power Quality	1,11	1,3,5,12	1	3	0	0	3
19EEX23	Power System Transients	1,11	1,2,3	1	3	0	0	3
19EEX24	Advanced Power System Analysis	1,11	1,3,4,5	1	3	0	0	3
19EEX25	Soft Computing Techniques	11	1,2,3,5	2	3	0	0	3
	PRO	OFESSI	ONAL ELECTIVE	- VI				
19EEX26	High Voltage Direct Current Transmission	1,11	1,2,3,5	1	3	0	0	3
19EEX27	Energy Conservation and Management	1,11	2,5,6,7,8,11,12	1	3	0	0	3
19EEX28	Robotics and Control	1,11	1,2,3,5,12	2	3	0	0	3
19EEX29	Flexible AC Transmission Systems	١,١١	1,2,4,5	1	3	0	0	3
19EEX30	Restructured Power System	1,11	1,2,3,5,9,10,12	1	3	0	0.	3

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Course		Ob	jectives & Outco	mes	1	T	D	C
Code No.	Course	PEOs	POs	PSOs	-	1. C. 1.	F .	U U
19MC201	Environmental Science and Engineering	1,11	1,2,5,6,7,8,12	-	3	0	0	0
19MC301	Indian Constitution	IV	6,8,10,11,12		2	0	0	0

CadaNa		Ob	jectives & Outco	omes	ENT	T	P	0
Code No.	Course	PEOs	POs	PSOs	L		. F	U
19EEY01	Wind Energy conversion systems	Ш	1,2,4,5,11, 12	2	3	0	0	3
19EEY02	Illumination Systems	1	1,2,3,4,5,12	2	3	0	0	3
19EEY03	Power plant Engineering	11	1,2,5,6	1	3	0	0	3

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19EEY04	Electrical Materials	11	1,2,6	2	3	0	0	3
19EEY05	Robotics and Automation	П	1,2,3,5	2	3	0	0	3
19EEY06	Industrial Drives and Control	- 11 -	1,2,4,5,6	2	3	0	0	3
19EEY07	Medical Electronics instrumentation	11	1,2,5,6,7,12	1	3	0	0	3
19EEY08	Automotive Electronics	11	1,2,4,5,6	2	3	0	0	3
19EEY09	Solar Energy conversion Systems	1,11	1,2,4,5,6,7,12	2	3	0	0	3
19EEY10	Concept of Engineering Design	П	1,2,3,4,5,6,7,8	2	3	0	0	3

		1			A		and the second second			l Outco	URSES	1		1.	1
Code	No.		C	ourse			PEOs		PO		PSOs	- L	Т	Ρ	C
19EE	Z01	and the second second	trical a uit Des	and Ele sian	ectron	ics	1,11		1,2,5		2	1	0	0	1
19EE	Z02		Desig			-	1,11		1,2,5	12	2	1	0	0	1
19EE	Z03	10.510.000.45gs	Inverter And Converter Design			r	1,11		1,2,	5	1	1	0	0	1
19EE	Z04			el Desi	gn		1,11		1,2,5	,6	1	1	0	0	1
19EE	Z05		rical S mobile	Systen	ns in		1,11		1,2,5,	12	2	1	0	0	1
19EE	Z06				ing	1,11		1,2,	5	2	1	0	0	1	
19EE2			n	1,11		1,2,	5	2	1	0	0	1			
19EE2	Enorgy Audit in Industrias		ries	1,11	1	,2,6,7, 11,1		2	1	0	0	1			
19EE2	Z09	SCA	DA an	d DCS	3		1,11	1	1,2,4		2	1	0	0	1
19EE2	Z10	1909114	or Elec neers	ctrical			I,II		1,2,5,		2	1	0	0	1
19EE2	Z11	Labview and its Applications			1,11		1,2,	5	2	1	0	0	1		
19EE2	Z12	Robo	otics		11		1,11		1,2,5,7	,12	2	1	0	0	1
S.No.	Cat	egory		15	Crec	lits P	Per Semester Total Credits			Ra	nge o Cred	f Total its			
			1	11		IV	V	VI	VII	VIII	Credit	in %	Mi	n	Max
1	1	BS	12	7	4	4	0	0	0	0	27	16.36	15%	6	20%
2		ES	5	9	0	3	4	0	3	0	24	14.54	10%	6	15%
3		HS	3	3	0	3	0	0	0	3	12	7.27	5%	ò	10%
4		PC	0	0	19	11	12	14	7	0	63	38.18	35%	2.7.	45%
5		PE	0	0	0	0	3	3	6	6	18	10.90	10%	6	15%
6		DE	0	0	0	0	3	3	3	0	9	5.45	5%		10%
7	E	EC	1.5	1.5	0	0	1	1	1	6	12	7.27	5%	5	10%
		Total	21.5	20.5	23	21	23	21	20	15	165	100	85%	6	125%

BS- Basic Science **PE**- Professional Elective ES-Engineering Science

OE- Open Elective

MC – Mandatory course

ES- End semester Examination

CA – Continuous Assessment

EEC-Employability Enhancement Course

Bbr

HS-Humanities and Social Science

PC- Professional Core

1		1	Houi	rs/	GINEERIN Credit	1. 2.	019	Semester
Course Code	Course Name	L	Wee T	P	Credit	Total Hours	Ma	iximum Mark
19BS101	CALCULUS AND ITS APPLICATIONS	3	1	0	4	60		100
 Interpret the in Interpret the inphenomena in Find eigen valarising in the fillent 	(s): The purpose of learning this controductory concepts of Limit and controductory concepts of calculus, involving continuous change of variables and eigen vectors which is offield of engineering.	ontinuit this wi ables one of t	ty ill en the p	owe	rful tools	to handle	e pra	ctical problen
variables.Develop enou	gh confidence to identify surface a	nd area	a the	re by	solving u	using inte	gratio	on
 Apply different differentiation t Identify and m solve the highe Analyze the ch Characterize th 	: At the end of this course, learners iation to solve maxima and minim to differentiate functions odel the real time problems using er order ordinary differential equation aracteristics of a linear system with the functions of several variables and	na prob first oro ons. n Eigen id get ti	der li valu	s use near ues a plutio	different and Eigen ons of the	ial equati vectors.		
	Inctions for evaluating the surface a AND CONTINUITY	area ar	nd vo	lume	9.			12
	a function-Limit of a function-Co	ontinuty	-Der	ivativ	ves-Differ	entiation	rule	and the second se
Ainima of one varia			_					
	RY DIFFERENTIAL EQUATIONS equations of second and higher	ordor	with	cor	stant co	officients	Lin	12
equations of highe	er order with variable coefficients ters for second order differential ec	: Cauc	chy's	line	ar differe	ential equ	uation	n - Method c its
	ARIABLE CALCULUS		-6 :					12
naxima and minim	Variables - Total Differential - Dei a	rivative	OT I	mplic	cit functio	ons- Jaco	bian	s- constraine
		N	6					12
Double integration	with constant and variable limits-Regral in cartesian coordinates. Triple							
	ALUES AND EIGEN VECTORS	e megi	aini	Gan	esian cou	Junales.	- 10	12
ALCONO DE LA CONTRACTA DE LA C	Eigen Vectors of a real matrix - Pro	perties	of E	igen	Values-	Cayley -	Ham	10,735
	Diagonalisation-Quadratic form: R	eductio	on of	a qu	adratic fo	orm to a c	anor	nical form.
EFERENCE(S):				1		67/10 11 P		1.1.21.20
	ulus, 14th Edition by Pearson							
^{2.} Delhi 2015.	g , Advanced Engineering Mathem	in to f	1	181	1 Sector	S		
3. Peter V. O Ne Limited, 2018	eil , Advanced Engineering Mathem	natics,	Eigh	t Edi	tion , Cer	ngage Lea	arnin	g India Private
0 0 101 11	and C Louis Barrett, Advanced Er	ngineer	ing M	Math	ematics,	Sixth Edit	tion,	Tata McGraw
A · ·	Company Ltd, 2003.							



Department	ELECTRICAL AND E				and the second se	R 2019	Semester	
Course Code	Course Name	Hour	s/Wee T	к Р	Credit C	Total Hours	Maximum	warks
19BS102	ENGINEERING PHYSIC	S 2	0	2	3	60	100	
Course Object	ive (s): The purpose of lear	rning this co	ourse is	to:				
	the fundamental knowledge	e in Physics	and its	s app	lications	relevant to	o various stre	eams o
	ing and Technology							
	asic knowledge on the prop							
	nowledge in Ultrasonics, La		ers	÷				
	the knowledge in quantum	A REPORT OF A R						
	nd basic concepts of therm					-		_
	mes: At the end of this cour					S		
	edge on the basics of prope				and the second			
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 Get knowle microscope 	edge on advanced Physics of	concepts of	quantu	m the	eory and	its applica	ations in tunn	eiing
	t knowledge on the concept	te of thorma	Inrono	rtion	of materi	als and th	oir applicatio	ne in
	of joints and heat exchange		i piope	rue5	ormaten	ais and th	ieli applicatio	115 111
	PERTIES OF MATTER	515		-	1	-		6
	ss-strain diagram and its u	uses - torsi	onal st	rece	and defe	rmations	- twisting co	nunle
	n: theory and experiment -							
	iform and non-uniform bend							ny an
		aind: theory			1em - 1-5	naped dire	uers.	
		aing: theory	anuex	perm	ient - i-si	naped gire	uers.	6
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Init II ULTF	ASONICS Issification of Sound- Ultras	onics Produ	iction -	Mag	netostrict	tion gener	ator - Piezo e	electri
Init II ULTF ntroduction–Cla enerator-cavita	RASONICS Issification of Sound- Ultras tions-ultrasonic cleaning-I	sonics Produ Non Destru	uction - uctive	Mag Test	netostrict ing- Pu	tion gener Ise echo	ator - Piezo e system tl	electri hroug
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S.No.	List of Experiments	PHYSICS (ANY FIVE)	Practical : 30Hrs.
1.	Determination of rigidity modulus - Torsid	on pendulum	
2.	Determination of Young's modulus by no	n-uniform bending method	ł
3.	Determination of Young's modulus by un	iform bending method	
4.	Determination of wavelength and particle	size using Laser	
5.	Determination of acceptance angle and n	numerical aperture in an o	ptical fiber
6.	Determination of thermal conductivity of a	a bad conductor – Lee's D	Disc method
7.	Determination of velocity of sound and co	ompressibility of liquid – U	Itrasonic interferometer
8.	Determination of wavelength of mercury s	spectrum - spectrometer	grating
9.	Determination of band gap of a semicond		
10.	Determination of thickness of a thin wire -		

Exp No.	Name of Equipment	Quantity
1	Torsion pendulum Setup.	06
2	Non-Uniform bending Setup.	06
3	Laser experiment kit.	06
4	Lee's Disc apparatus.	06
5	Ultrasonic interferometer.	06
6	Spectrometer grating	06
7	Post office box for band gap determination	06
8	Air wedge set up.	06

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Department	ELECTRICAL AND ELECTRO					A CONTRACTOR OF A CONTRACTOR OF A	Semester I	
Course Code	Course Name	Hou			Credit	Total Hours	Maximum	ı
		L	Т	Р	С		Marks	
19BS103	ENGINEERING CHEMISTRY	3	0	0	3	45	100	-
	e (s): The purpose of learning this c			n and	tractment	mothodo		
	and the basic concepts of water ch					methods.		
	e fundamental concepts of electroc							
	and the principles and generation of	of energ	gy in i	batterie	es and nuc	clear reac	tors.	
	owledge on polymers.						•);	
	e types of fuels and the manufactur				nd gaseou	is fuels.		_
	es: At the end of this course, learne							
The second s	e students conversant with water tre			a contraction of the second second		4.4		
	e reaction involved in corrosion and						-	
	nowledge on renewable energy sou	urces li	ke nu	clear a	ind to imp	art knowle	edge on	
	storage devices							
Aware the second s	ne synthesis & industrial application	of poly	/mers) 				
	nowledge on different types of fue	IS (SOII	a liqu	ia, gas	, primary,	secondar	y and synthe	eti
	bustion process.		1			1		
	R CHEMISTRY				DTA	had 5		
	er - types - Estimation of hardno							
	troubles (scales,sludge,priming,foa							
Reverse Osmosi	phate, sodium aluminate and calgo	SU) 'EX	terna	treat	nent – De	emineraliz	ation proces	SS
						-	11	
			Mar		unting (de		und unablaus	
	cell - redox reaction, electrode po							
Electro Chemic	al aprice Standard bydragon ale	otrodo	-Calo	mel F	lectrode	Corrogio	n chemica	
	al series-Standard hydrogen ele			and the second sec				
	corrosion (galvanic, differential a			and the second sec				
electrochemical		aeratio	n) -	types-	factors in	fluencing		
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Chabman - Bo3 Dept. of EER - ESEC

Departme	ent EL	ECTRICAL AND ELE					R 2019	Semester I ES
Course Code		Course Name	Hou	T	Neek P	Credit C	Total Hours	Maximum Marks
19ES10				0	2	1	30	100
Course O	bjective (s)			-				
		ng this course is to						
		d debug simple Pytho	on progr	ams.				
		thon programs with co				DS.		
		for structuring Pythor						
		mpound data using P			ples.	dictionaries		
		te data from/to files in			·····	9		
	utcomes:		THUIDIT	1	1.1.			
At the end	of this cour	se, learners will be ab	le to					
		nd debug simple Pytho		ams.				
0 In	plement Py	thon programs with co	ondition	als a	nd loo	ps.		
		on programs step-wis					lling them.	
		sts, tuples, dictionarie						
		te data from/to files in						
	periments		i yulon					
		st among three numb	oro with	out u	cina th	aird voriable		
			ers with	outu	ising u	inu vanabie	•	
		ts of a Number rime Numbers						
		quential search						
	lore string fu	ator program						
	lement Sele							
	lement Stac							
	ad and write							
		age of basic regular e	vorocci	ion				
10. Der 11. Der	nonstrate us	e of advanced regula	r ovnrog	eion	e for d	ata validatio	n	
	nonstrate us		capies	551011	5 101 0		211.	
		e of Dictionaries						
		Separate Files (CSV)	Load (CSV	files in	to internal [Data Struc	ture
TEXT BO								
1. Dav	vid Riley and	d Kenny Hunt, "Comp	utationa	al Thi	nking	for the Mod	ern Proble	em Solver", Chapma
10 million - 12 http://		Problem Solving and F	a Cenated State (1980) is a					and the second se
	hi, 2011.					Annal Conta	apa te de la	a second a second provide the
REFERE					199			Process and the second second
	Distant and	Introduction to Progra	mming	Usin	g Pyth	on", Mount	St. Mary's	University, 2013.
	FORM DECERTIFICATION CONTRACTORS IN	n ,"Python Programm						
3. Alle		Green Tea Press I	-					
000		donuocito.						
	nningham, s	ams teach yourself py	thon in	24 ho	ours, S	Second editi	ion Pearsc	n, 2014

S.No.	Name of the Equipment	Quantity
1.	Hardware : Computer Systems	35
2.	Software : Linux/Windows Python 2.7 and above Version	Available

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	rtment	ELECTRICAL AND ELEC					R 2019	
Cours	e Code	Course Name	Hours			Credit	Total	Maximum
19B	S105	CHEMISTRY LABORATOR		T	P	C	Hours	Marks
	Ohlasthus		0	0	4	2	60	100
		(s): The purpose of learning t					thed	
		total, temporary & permanent l					ethod.	
		chloride content of water samp	· · · · · · · · · · · · · · · · · · ·				7.1	
		on content of the given solutior strength of given hydrochloric	· · · ·			•		
					eter			
		netric titration of strong acid vs s: At the end of this course, le			le to			
		tudent to acquire practical skill					quality	
		s through volumetric analysis.	o ni ni o u o			, or mator	quanty	
		e knowledge about chloride co	ntent in wa	ter sa	mple	Э.		
		student to acquire practical skil					potentiom	etric titrations.
		d the how to estimate hydroch						
0 0	ain the ki	nowledge about conductance of	of ions.	and intern	a sues	C. Secondario	Cold & Strand La	ing the second second second
Exp No.		Name of Experiments			4			
1		nation of Total, Temporary & F						nethod.
2		nation of chloride content of w						
3		nation of Dissolved oxygen co		ter sa	mple	e using W	inklers Me	ethod
4		nation of Alkalinity in Water Sa	CANADARA INCREMENT			1.1	distant.	
5		nation of strength of given hyd						10
6		nation of strength of acids in a			usin	g conduc	tivity mete	er.
7		tometric titration of Weak acid					nd course	Line commu
8		on of iron content of the given			otent	iometer.		
9 '	and the second sec	tometric titration of strong acid					N. Ball	Ser Thereby
10		nation of Molecular weight of p					T THE THE THE THE TO BE THE	er
11	Estimati	on of iron content of the water	sample us	ing sp	ectro	ophotome	ter	
12	Entimati	on of Copper in Brass						

LIST OF EQUIPMENT (CHEMISTRY)

S.No.	Name of Equipment	Quantity
1	Potentiometer	10 Nos.
2	pH meter	10 Nos.
3	Conductivity meter	10 Nos.
4	Spectrophotometer	2 Nos.
5	Oswald viscometer	30 Nos.

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Chairman - BoS Dept. of EEE - ESEC

Chairman - BoS Dept. of Chemistry - ESEC

Depar	tment	ELECTRICAL AND ELECTRO	NICS E	NGI	NEEF	RING	R 2019	Semester I ES
Course		Course Name	Hou	rs /W	leek	Credit	Total	Maximum Marks
19ES	107	WORKSHOP PRACTICES	L	T	P	С	Hours	
and the second		re(s): The purpose of learning this of	0	0	2	1	30	100
Course	elding equire the evelop the evelop the evelop the Outcome bricate s	nds-on training in fabrication of co uipment / tools. e skill for making fitting joints and ho e skill for preparing the green sand nds-on training in assembling and c e skill for making wood/sheet metal e(s): At the end of this course, learn imple components using carpentry, joints and household pipe line con een sand mould. and dismantle petrol engines, gear le e models using wood and sheet me	usehol mould. lismant models ners will sheet r nection	d pip ling c s usir be a netal s usi	e line of peting suitable to able to and ng suitable	connecti rol engine itable too o: welding e itable too	ions using es, gear t ls. equipmen	g suitable tools. boxes and pumps.
xp. No.			of Expe					
1.		g of simple object in sheet metal us						
2.		tion of a simple component using the						
3.	Making Letter b	a simple component using carp ox)	entry p	ower	tool	s. (Exam	ple: Per	n stand/Tool box/
4.	Prepare	a "V", Half-round or Square joint f	om the	give	n milo	d steel fla	t plate.	V. H WERE
5.	union,	ict a household pipe line connect bend, gateway and taps (or) Co ugal pump) using pipes, bend, gate	nstruct	a pi	pe co	onnection	for dor	way joint, elbow, nestic application
6.		a green sand mould using solid pa					Shir ost	
7.		tling and assembly of Centrifugal G						
8.	Disman	tling and assembly of two-stroke ar	nd four-	strok	e pet	rol engine	Э.	
9.	a) Prepa	aration of butt joints, lap joints and Welding practice.						

10	Mini-Project (Fabrication of small components)	í.

S.No.	NAME OF THE EQUIPMENT	QUANTITY
1.	Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings	15 sets
2.	Carpentry Vice (fitted to work bench)	15 Nos.
3.	Standard woodworking tools	15 Sets.
4.	Models of industrial trusses, door joints, furniture joints	5 each
	Power Tools: (a) Rotary Hammer	2 Nos.
	(b) Demolition Hammer	2 Nos.
-	(c) Circular Saw	2 Nos.
5.	(d) Planer	2 Nos.
	(e) Hand Drilling Machine	2 Nos.
1	(f) Jigsaw	2 Nos.
5.	Arc welding transformer with cables and holders	5 Nos.
	Welding booth with exhaust facility	2 Nos.
l.	Welding accessories like welding shield, chipping hammer, wire brush, etc.	5 Sets.
).	Oxygen and acetylene gas cylinders, blow pipe and other welding outfits	2 Nos.
0.	Centre lathe	2 Nos.
1.	Hearth furnace, anvil and smithy tools	2 Sets.
2.	Moulding table, foundry tools	2 Sets.
3.	Power Tool: Angle Grinder	2 Nos.
4.	Study-purpose items: Centrifugal pump, Air-conditioner	One each.

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~	partment	ELECTRICAL AND ELECTRONICS	-			the second se	R 2019	Semester I	I BS
Cour	rse Code	Course Name	Ho	urs/	Week P	Credit C	Total Hours	Maximum I	Marks
19	BS201	VECTOR CALCULUS AND COMPLEX VARIABLES	3		0	4	60	100	
Cou	rse Objec	tive (s): The purpose of learning this cou	rse	is to			1.1)	-
0	Summa	rize and apply the methodologies involved	d in	solv	ring pr	oblems r	elated to	fundamental	Ê.
	principle	es of Calculus viz: Vector, Vector Different	tiatio	on ar	nd Ved	ctor Integ	ration.	1.1	
٥	Impleme electros	ent the Complex Analysis, an elegant met tatics.	hod	in th	ne stu	dy of hea	at flow, fl	uid dynamics	and
0	Develop	enough confidence to identify and mode	I ma	ather	matica	l pattern	s in real	world and off	er
		iate solutions, using the skills learned in th					porting e	environment.	
0	Defining	a complex function and solving through	com	plex	integ	ration			
Cour	se Outco	mes: At the end of this course, learners w	vill k	be at	ole to:		1. 1. 1	201-5	CAL NO
0	Charact	erize the calculus of vectors.							
0	Apply th	e theoretical aspects of vector integral ca	lcul	us ir	h their	core are	as.		
0		ize the differentiation properties of comple							
0		the complex functions and their mapping				plex plar	nes.	ing an arriter of	
П		concepts of integration to complex function							
Unit		ERENTIATION OF VECTORS			onconn	conorro.			12
Vecto	or point fu	nction- Directional derivative - Gradient -	Dive	erge	nce -C	Curl - Sc	lenoidal	- Irrotational	vecto
fields	-Scalar p	ootential						and the second second	
Unit	II INTI	EGRATION OF VECTORS							1.4.0
						13			12
	Contraction of the second second second		the	eore	m in	a plane	- Stoke's	s Theorem-	
Work	done - I gence the	ine Integral - Surface integral- Green's orem- Applications involving cubes and pa	the arall	elep	m in piped.	a plane	- Stoke's	s Theorem-	10 January 11
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	artment	ELECTRICAL AND ELECTRO					R 2019	Semester II	1000
	ourse	Course Name	Hours	s/W T	P	Credit C	Total Hours	Maximu Marks	
U	ode	PHYSICS FOR ELECTRONICS		-	F				
	9BS205	ENGINEERING	3	0	0	3	45	100	
	se Objec	tive (s): The purpose of learning thi	s course	is to					
٥		stand the essential principles of elec							
0		stand the properties of magnetic magnetic	aterials an	nd its	app	lications.			
0	Becon	ne skillful in semiconductors.							
0	Becon	ne proficient in dielectric materials.							
Π	Streng	then the basic knowledge on the na	no-mate	rials	and	quantum	concepts.		
Cour		mes: At the end of this course, lear							
		nowledge on classical and quantum							
0	Acquir	e knowledge on basics of semicond	uctor phy	/sics	and	its applic	cations in v	various device	s
0	Get kn	owledge on magnetic and dielectric	properti	es of	mat	erials,			
0		he necessary understanding on the					rials for op	otoelectronics	
0		stand the basics of quantum structu							
	nano t				a 1 4 - 4 - 74				
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tates	s - metal	s, semiconductors and insulators -	Energy	band	ds in	solids-	tight bind	ing approxim	ation
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Jnit I		ICONDUCTOR PHYSICS							9
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	nction dio ers, Voltag	de & its characteristics- Rectifiers(Quantita ge Multiplier, clippers and clampers, Seri	ative	stuc				
Unit II		T AND ITS APPLICATIONS		-				9
	577.670	on and operation - CE, CB, CC configur	ation	is a	nd its	compa	risons-	
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Unit II	COL. SCOW POR	LD EFFECT TRANSISTORS AND UJT		- 6	1.5			9
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Unit IV	/ FEE	EDBACK AMPLIFERS AND OSCILLATOR	RS					9
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Unit V	Contraction of the second s	ITCHING CIRCUITS AND OPTOELECTR					1	9
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Department	ELECTRICAL AND ELECTRON						Semester II
Course Code	Course Name				Credit		Maximum Mar
19ES210	PRINCIPLES OF CIVIL AND	L	Т	P	C	Hours	400
and the second of	MECHANICAL ENGINEERING	3	0	0	3	45	100
Impart Familia Provide	learning this course is to basic knowledge on Civil and Mechar rize the materials and measurements the exposure on the fundamental ele	s used ir ements	n Civil of civi	Engii I engi	neering	structur	es.
	the students to distinguish the comp	onents	and v	vorkir	ng princi	ple of p	ower plant units
At the end of the At the end of the Apprec Explain Measure	the students to distinguish the compo	ering co nd prop	mpon er sele	ents c ection	of Project	cts. struction	materials.
	nd diesel engine						
0 Elabora	te the components of refrigeration ar				cycle.		
	PE OF CIVIL AND MECHANICAL EN I Engineering - Civil Engineering con						
Overview of Me Specialized sub Interdisciplinary	urces Engineering. chanical Engineering - Mechanical E -disciplines in Mechanical Engineer concepts in Civil and Mechanical Eng /EYING AND CIVIL ENGINEERING	ing - P gineerin	roduct g.	tion,	outions Automo	to the w bile, En	velfare of Societ ergy Engineerir
determination o cement - concre	ects – classification – principles – f areas– contours – examples. Civi ete – steel – timber – modern materia DING COMPONENTS AND STRUCT	il Engin Is	emen leering	ts of g Ma	distano terials:	æs – a Bricks -	ngles – levelin - stones – san
Foundations: Ty Civil Engineerin flooring – plaste supply – source	pes of foundations – Bearing capacit g Structures: Brick masonry – ston- ring – floor area, carpet area and floo s andqualityofwater – Rain water han RNAL COMBUSTION ENGINES AN	ty and s emasor or space vesting -	nry – e index – intro	beam k – Ty iductio	is – col /pes of on to hig	umns – Bridges	lintels – roofin and Dams – wa
	RIVAL COMIDUSTION ENGINES AN						
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	FERENCE(S):
1.	Masters, Gilbert M, —Introduction to Environmental Engineering and Sciencell, Second Edition, Pearson Education, New Delhi (2012).
2.	Santosh Kumar Garg, Rajeshwari garg, smf Ranjni Garg — Ecological and Environmental Studiesll Khanna Publishers, Nai Sarak, Delhi (2014).
3.	R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standard", Vol. I and II, Enviro Media.
4.	Dharmendra S. Sengar, "Environmental law", Prentice Hall of India PVT LTD, New Delhi, 2007. 4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press 2005
5.	Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2015.

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Departr	ment	ELECTRICAL AND ELECTR					R 2019	Semester II E
Course	Code	Course Name		Irs/W		Credit	Total	Maximum
19TPS	302	SOFT SKILLS – II		T	P 1	C 1.5	Hours 30	Marks 100
	the second s	tive (s): The purpose of learning		-		1.5	50	100
0		the Students on Group Discussio						
0		h the students on Interview Skills						
0		op Presentation Skills.						
0		op Business Etiquette.						
٥	Teach	n importance of Ethics and Value	S.					
Course	Outco	mes: At the end of this course, le	arners wi	ll be a	able t	o:		
0		ipate Group Discussion with Con				See Show and the second second		
0		d the interview with positive attitu		-			S.	
0		ent them very well by enhancing t						
0		ve very well in official gathering a						
		good ethics and values in their Pe	ersonal ar	nd Pro	ofess	ional Life	•	
UNIT I		UP DISCUSSION	distant and	W. C. C.	There	OD	0	
		nderstanding the objective and Do's & Don'ts – Mock GD & Fee		ested	in a	a GD -	General	types of GDs
UNIT II	and the second se	RVIEW SKILLS	UDACK.					6
	CONSIGNATION STATES	ng Skills – Self preparation chec	klist – Gr	oomir	na tir	s do's 8	don'ts -	
feedback			in or or	Contin	ig th		, don to	
UNIT III	PRES	SENTATION SKILLS						6
Presenta	ation Sk	ills - Stages involved in an effe	ective pre	senta	tion	- selectio	on of topi	c, content, aids
		dience – Time management – Me	ock Prese	entatic	ons &	Feedbac	sk.	
		ness Etiquette						6
		ette – Telephone & E-mail etiquet	te – Dinin	g etiq	uette	e – do's &	Don'ts in	a formal setting
how to in	Ethi	00		_				6
And the state of t	and the second s	ance of Ethics and Values – Ch	noices an	d Dile	mma	as faced	- Discus	
headline			loices an			13 10000	Discus	
REFERE								
		en Habits of Highly Effective Peo	ple - Ste	ephen	R. C	covey.		
2. /	All the b	ooks in the "Chicken Soup for the	Soul" se	ries.				1.2010-001-001
-		earch for meaning - Viktor Frankl						
		atest miracle in the world – Og Ma		Sec. etc. 1		- Andrews	والمعادية أستناد	a la francisco de la com
-		Eliyahu Goldratt.					index of parts	
-		with Emotional Intelligence - Day	vid Golem	an				
		English – Sundra Samuel, Samu		- 202 A.P.A				
		ing Communication Skills by Kr	and we contract the set	alette sarente	and	Meero P	norii: Mo	Millan India 14
	Develop	ing communication Skills by Kr	Isnna Ivio	nan a	and i	vieera ba	anerji, ivia	
9. E	Essentia	Is of Effective Communication, L	udlow and	d Pant	thon;	Prentice	Hall of In	dia.
10. E	Effective	Presentation Skills (A Fifty-Minu	te Series	Book) by \$	Steve Ma	ndel	
	Strategi	c interviewing" by Richaurd Can India Pvt. Ltd			1000			onetti – Publish
	Effectiv							



Depa	rtment	ELECTRICAL AND ELECTRON	ICS I	ENG	INEE	RING	R 2019	Semester II E
	se Code	Course Name	Hour	s/	Week			Maximum Mark
19E	S218	ELECTRONIC DEVICES AND	L	T	Ρ	С	Hours	
		CIRCUITS LABORATORY	0	0	2	1	30	100
Course		re (s): The purpose of learning this cou		s to				
0		the VI characteristics of different switch	nes					
0		alf wave and full wave rectifier						
0		he students to do experiment on transi				ons.		
D	Analyze	the frequency response oscillators and	amp	lifier	S.	÷		
٥		out PSPICE software and using this to	simu	late	clippe	er and cla	amper cir	cuit
٥	Learn at	out digital storage oscilloscope	1		-			
Course		es: At the end of this course, learners						
D		the turn on and turn off process of diffe						
D		he circuit which used to convert ac sig						
۵	Build a C	E/CB/CC amplifier and measure its vo	ltage	gair	٦.			
0	Determin	e the frequency and gain value of vari	ous ty	pes	of os	cillators a	and ampl	ifiers.
0	Study ar	d understand the operation of digital st	orage	e os	cillosc	ope.	1.1	Construction of the second
Exp No		Name of Expe					-	- Information
1	Verify t	ne characteristics of PN junction diode	and Z	Zene	er diod	e.		
2		ng to measure the ripple factor at the c ive filter.	output	of	Half wa	ave recti	fier with a	and without
	Design	ng to measure the ripple factor at the c	output	of				
3		Wave rectifier with and without filter ca		or				
		ge rectifier with and without filter capac		<u> </u>	2000V	100		
4	Verify t	he Input and Output characteristics of 0	CE an	d C	B Con	figuration	ns.	12 - C - C - C - C - C - C - C - C - C -
5		and verify the frequency response of s	ingle	stag	ge tran	isistor an	nplifier.	
6		he transfer characteristics of FET.	122			10.000		
7	Verify t	he V-I characteristic of photo diode.	1.1.1				1.216-1	
8	Design	and verify the frequency response of F	RC Ph	ase	shift a	and Weir	n bridge o	oscillator.
9	Simula	e clipper and clamper circuits				100	s fu shi	and the second
10	Study of	f digital storage oscilloscope.		-				Martin Martin
5. No.	List of	Equipment			, dei i			Quantity
1	Semico UJT, P	nductor devices like Diode, Zener E noto	Diode,	NF	PN Tra	ansistors	, JFET,	As required
2	Resisto	rs, Capacitors and inductors				and the second	E.	As required
3		ary digital IC 8	Transing in	2010	1.11	1	1.240	8
4		n Generators	10 A 10			STREET.		10
5		ted 3 output Power Supply 5, ± 15V		1-2-23				10
6	CRO		1.84	Shot.				10
7		e Oscilloscope	1.Com			26.00		01
8	Bread		195					As required
9	At leas	one demo module each for the listed one demo module each for the listed one nent data sheets to be provided.	equip Comp	men onei	nt dat	a sheet	s to be	As required

Chate an Bos Dept. of EEE - ESEC

Departme	nt ELECTRICAL AND EL	ECTRONICS EN	GIN	EER	ING	R 2019	Semester II	ES
Course Code	Course Name	Hours				Total Hours	Maximum N	larks
19ES22	ENGINEERING DRAW LABORATORY		T 0	P 4	C 2	60	100	
Course C	bjectives: The purpose of lea			- 1	2	00	100	
 Lea Dra Dra Dra Dra 	arn conventions and use of dra w orthographic projection of p w the projection of planes and w the section of solids and ob w the isometric projection of t	awing tools in ma oints and lines. I simple solids. tain the developr	king	engi			ids.	
I Re Dra	utcomes: At the end of this co cognize the conventions and a w the orthographic projection w the projection of planes and w the section of solid drawing w the isometric projection of the	pply dimensionin of points and line simple solids	g co s.	ncep	ts while d			
CONCEPT	S AND CONVENTIONS (Not	for Examination	1)					1
	e of graphics in engineering-a							ns and
	ons – Size, layout and folding o	of drawing sheets	- L	etter	ing and di	mensionii	ng.	Angelsens.
	LANE CURVES							12
	metrical constructions, Curves							
	and hyperbola by eccentricity						ruction of invo	lutes o
	uare and circle – Drawing of ta		nal t	o the	above cu	irves.	- 1	
	ROJECTION OF POINTS AN						Caralista Dasta	11
	nic projection- principles-Princ							
	es (only First angle projection		ootn	the	principal	planes -	Determination	of true
	d true inclinations by rotating li		-	1.1				110
	ROJECTION OF PLANES &		-		hath the	and a strend		12
	of planes (polygonal and circ	-0%						
	ds like prisms, pyramids, cylir		unca	ated	solias wn	en the ax	is is inclined to	o one o
	al planes by rotating object me					-		140
	ROJECTION OF SECTIONED							12
	of above solids in simple ver				NUMBER OF STREET			
	anes and perpendicular to th		-		and the second s		Jevelopment o	r latera
	simple and sectioned solids -	- Prisms, pyramic	is cy	linde	ers and co	nes.		1.10
	OMETRIC PROJECTIONS		-		a sector alla		Part and Part and	12
pyramids,	of isometric projection – iso cylinders, cones- combination							Prisms
TEXT BOO								
	atrajan K.V., "A text book of E							
	enugopal K. and Prabhu Raja 208.	a V., "Engineerir	ng G	iraph	ics", New	Age Inte	ernational (P) I	_imited,
REFEREN						1.1.1.1.1.1.1.1		
B	hatt N.D. and Panchal V.M., 010.	"Engineering Dra	awin	g", C	Charotar F	Publishing	House, 50th	Edition,
2. B	asant Agarwal and Agarwal C. mited, New Delhi, 2008.	M., "Engineering	Dra	wing	", Tata Mo	cGraw Hil	I Publishing Co	ompany
3. G	opalakrishna K.R., "Engineerir	ng Drawing" (Vol.	1&11	com	bined), Su	ubhas Sto	res, Bangalore	, 2007.
A N	S Parthasarathy and Vela Mu 015.			_	10 March 10			Si anno

	ELECTRICAL AND ELECTRO			Veek		Total	Semester III BS
Course Code	Course Name	L	T	P	C	Hours	Maximum Marks
19BS304	TRANSFORM TECHNIQUES AND THEIR APPLICATIONS	3	1	0	4	60	100
	tive (s): The purpose of learning this c						
I Find the	difference between the discrete and co	ontinuc	ous :	signal	s and for	mulae us	sing Z-Transform.
differen I Underst	place transform of a continuous fi tial equations and the concepts of Fourier series, Tra	ansform					
I Impleme	model and analyze the physical phenor ent the Fourier Transform and elegant n rize and apply the mathematical aspect quation	nethod			- C - C - C - C - C - C - C - C - C - C		of one dimension
Course Outc	omes: At the end of this course, learner	s will	be al	ole to			and a subscription of the state
 Formula Recogn using F Apply th 	s, into a complex frequency domain rep ate a function in frequency domain wher ize the periodicity of a function and forr ourier series. The Fourier transform, which converts th cies, each of which represents a freque	never f nulate e time	he fu the fun	unctio same ction	as a co into a su	mbinatio	n of sine and cosir
	nd solve the engineering problems in th					ations.	
	ANSFORM			out. I			12
Z-Transform -	Elementary Properties - Inverse Z-Tran	sform	- Co	nvolu	tion Met	nod- Part	ial fraction method
	erence Equations using Z-Transform.						
	ACE TRANSFORM						12
mpulse function	form- Existence Condition -Transforms on- Properties- Transforms of Derivative orm of Periodic Functions - Inverse Lap	es and	Inte	grals	- Initial a	nd Final	Value Theorems -
	RIER SERIES						12
	ditions - General Fourier series - Odd ar	nd eve	n fur	nction	s - Half r	ange cos	ine and sine series
Root mean s							
	RIER TRANSFORM		1000	100		1	12
Jnit IV FOU	I Theorem- Fourier Transform and Inve	rse Fc	urier	Tran	sform- S	ine and (Cosine
ourier Integra	roperties - I ransforms of Simple Function	ons - C				in raio	
ourier Integra ransforms - P	roperties - Transforms of Simple Function					in ruio	12
ourier Integra ransforms - P Jnit V APPI Classification Dimensional V eat Equation	ICATIONS OF PARTIAL DIFFERENT of Second Order Quasi Linear Partial D /ave Equation - One Dimensional Heat - Fourier Series Solutions in Cartesian (S):	IAL EC ifferer Equat Coordi	QUA tial I on - nate	TION: Equat Stead s.	S ions - Fo dy State	ourier Sei Solution	12 ries Solutions of O of Two-Dimensiona
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Chairman - BoS Dept. of Maths - ESEC Chairman - BoS Dept. of EEE - ESEC

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de Course Name 1 ELECTRO MAGNETIC THEORY jective (s): The purpose of learning this corrstand the concepts of electrostatics, elect		NGINE				Semester I	
jective (s): The purpose of learning this co	Ho	urs / W	-			Maximum	Marks
jective (s): The purpose of learning this co	L	T	P	C	Hours		
	3	1	0	4	60	100	
rstand the concepte of electrostation elect							
and the second se							
rstand the concepts of magneto statics, m	agneti	c flux c	lensi	ty, scalar	and vec	tor potentia	and
plications.							
Faraday's laws, induced EMF and their a							
ze concepts of electromagnetic waves and		-		1			
prate field modeling and computation with r				_			1.00
tcomes: At the end of this course, learner							
in the basic concepts of electric field lines		d arour	nd the	e space,	potentia	astribution	n due to
s charges and its applications using gauss							
the properties of conductors, dielectrics	and	capacit	ance	in vario	ous appli	cations and	basic
pts of Poisson's and Laplace equations.		La la la la	•				
ret the concept of magnetic field lines, o	density	and i	nten	sity by u	ising Bio	t- Savart la	aw and
re's circuital law.					- Particular	a provinse i monero	
narize the nature of magnetic materials,					onditions,	force and	torque
pt using Lorentz force equation, inductance							
he concept of Maxwell's equation in sta							
em and also show the relation between	circu	lit equa	ations	(Kirchr	off's lav	vs) and Ma	axwell's
		1			_		140
STATIC ELECTRIC FIELDS							12
n- scalar and vector fields-different coor							
law-electric field intensity-field due to diff							
plications (infinite line of charge, infinite sl							
tential- potential field due to different typ					rge, line	charge) -	potentia
e dipole-field due to dipole-energy densit				eld.			1
CONDUCTORS, DIELECTRICS AND C							12
d current density - continuity of current	- prop	perties	of co	onductor	s and di	electrics. B	oundary
(between two perfect dielectric and betw							
pacitance (parallel plate capacitors, coax							llel plate
capacitance of two wire line- method of im	ages -	- Poiss	on's a	and Lapl	ace equa	ations.	
STEADY MAGNETIC FIELDS	10	-					
law- applications (infinite and finite long			lucto				12
	cable					mpere circu	uital law
s (infinite long straight conductor, coaxial), curl	of ma			mpere circu	uital law
s (infinite long straight conductor, coaxial tic flux density- the scalar and vector magn	netic p), curl otentia	of ma			mpere circu	uital law etic flux
s (infinite long straight conductor, coaxial	netic p), curl otentia	of ma			mpere circu	uital law
s (infinite long straight conductor, coaxial tic flux density- the scalar and vector mage FORCE, TORQUE AND INDUCTANCE ce equation- force between differential cur	netic p rent el	otentia	of ma ls. s- for	agnetic f	ield inter	mpere circu nsity- magn a closed ci	uital law etic flux 12 rcuit- the
s (infinite long straight conductor, coaxial tic flux density- the scalar and vector mage FORCE, TORQUE AND INDUCTANCE ce equation- force between differential cur hagnetic materials- magnetization and per	netic p rent el	otentia	of ma ls. s- for	agnetic f	ield inter	mpere circu nsity- magn a closed ci	uital law etic flux 12 rcuit- the
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of g	enerator	- characteristics of DC generators - Co	ommu	tation	л — А	rmature	Reacti	ion and its e	ffects
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13h Chairman - BoS Dept. of EEE - ESEC

	Joseph A. Edminister, "	Theory	and Problems	of electromagnetics	Schaum's outline	series",3th
э.	edition, 2010.					

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Department	ELECTRICAL AND ELECTRONICS ENC	110 100 100	The second of	Neek	Credit	Semes	ter III P Maximu
Course Code	Course Name	L	T	P	C	Hours	and the second sec
19EE303	MEASUREMENTS AND INSTRUMENTATION	3	0	0	3	45	100
Course Object		- 1					
	learning this course is to						
	and general instrument system, error, calibration	etc.					
	e various operating principle of instruments which		to AC	Cand	DC mea	sureme	nts.
	nowledge on various bridges.						
	e discussion about storage & display devices.						
	n exposure for various transducers.						
Course Outcor		-		-	-		
	is course, learners will be able to:						
	the performance characteristics of functional eler	nents	ofa	n instr	ument.	standard	is and
Calibratio	The first and the second provide the second s						
	and DC and AC measuring instruments.						
	ng the R,L,C using bridges.						
	hate the functions of various storage and display	devic	es.				
	electrical and non electrical quantities by transdu						
	ASICS OF MEASUREMENTS AND INSTRUME			-		12.00	9
178 (State Back	ments of an instrument – static and dynamic		actor	istics	- errors	in mea	
statistical evalu	uation of measurement data - direct and indire	ct m	easu	remen	t metho	ds - cla	ssificatio
	tandards and calibration.	0	ouou	omor	it mound		
instruments - s							
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Unit II A Analog ammet instruments, ele – measuremen	NALOG METERS ers and voltmeters: Permanent Magnet Movir ectrodynamic instruments - Instrument transform t of power – energy meter - Electrodynamo meter	er: cu	irrent	trans	former, j	ootential	Moving I transforr
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Chairman - Bo3 Dept. of E65 - E560

Department	ELECTRICAL AND ELECTRON		and the second			R 2019	Semester III	PC
Course Code 19EE304	Course Name ELECTRIC POWER GENERATION	Hour	Hours / Week			Total	Maximum	
			T	P	C	Hours	Marks	
		No.	0	0	3	45	100	-
	ve (s): The purpose of learning this nd the concepts of thermal power g							
	the concepts of hydro and nuclear p			ion				
	ne concepts of solar system	ower ger	leral					
	the concepts of wind power generat	ion						
	nd the electric energy conversion fro			thor	nal hion	hase and	has-based	
	nes: At the end of this course, learn		-				gas-based.	
	the working of thermal power station				e line dis	aram		
	ydro energy conversion process and						agrams	
	rinciple of solar photovoltaic (PV)sys							ns
	Horizontal Axis Wind Turbine(HAW							10
	ate with single line diagram about							
	wer plants, biomass energy, ocean				0.	and the first second second second	The section of the se	
			- Crimine	neg.e	0 4. 4 3.		ene.37 states	10
and the second s	IAL POWER STATION on process for thermal power static	n with n	ant l		Coloct	ion oritori	in for site of th	9
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	Boiling Water Reactor (BWR) - Pres							
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Chairman - BoS Dept. of EEE - ESEC

Department	ELECTRICAL AND ELECTR					R 2019	Semester III PC
Course Code	Course Name				Credit	Total	Maximum
		L	T	P	C	Hours	Marks
19EE305	CIRCUIT THEORY	3	1	0	4	60	100
	(s): The purpose of learning this	course is to	12				
	electric circuits and its analysis						
	wledge on solving circuit equation				orems		
	he phenomenon of resonance in o		cuits	i.			
	n obtaining the transient response		12	165			
	Phasor diagrams and analysis of t	and the second sec					
	: At the end of this course, learne	ers will be a	ble	to:			
	ectrical circuits						
Apply circuit							
	nsients response of RL, RC and I						
	I the concepts of single and three						
Design of tag	ank circuit for given frequency and	d analyze th	e co	ouple	d circuits	s in series	
	CIRCUITS ANALYSIS	1. 1. A	1. Q.	5959	14	in the street	12
	- Ohm's Law - Resistor, Inductor,	Capacitor –	ser	ies ar	nd paralle	el circuits-	-Kirchhoff's laws -
Mesh current and n	ode voltage-methods of analysis.						
	RK REDUCTION AND THEORE						12
Network reduction:	voltage and current division, sou	rce transfor	mat	tion-s	star delta	a conversi	ion. Thevenins an
	-Super position Theorem-Maxi	imum powe	er ti	ransfe	er theor	em- Rec	iprocity Theorem
Villman's theorem.			10			No.	
	AND THREE PHASE CIRCUITS			-	-	tere ered F	12
A.C. circuits - Ave	rage and RMS value - Phasor D	lagram - H	OWE	er, Po	d loodo	tor and t	-nergy- Analysis (
hree phase 3-wire	and 4-wire circuits with star a voltages and currents-power mea	surement r	thr	ee nh	ase circ	, balance	u dun balanceu -
	ENT RESPONSE ANALYSIS	Surementi	i uni	cc pi		uito.	12
	Transient response of RL, RC and		ite i	ising	Lanlace	transform	
A.C. sinusoidal inpu			111.5 1	Jailig	Laplace	transion	into Do input and
		S					12
	l resonance-their frequency res		ality	fact	or and	Bandwidt	
nductance-Coeffic	ient of coupling–Tuned circuits–Si	ingle tuned	circ	uits.	or and	Banamat	
TEXT BOOK(S):							y in the
	ninister, Mahmood Nahri, "Electri	c circuits".	Sch	aum'	s series	McGrav	- Hill, New Delhi
2010.							
	t Jr, Jack E. Kemmerly and Stev	en M. Durb	oin, '	"Engi	neering	Circuits A	Analysis", McGraw
Hill publishers,	edition, New Delhi, 2013.						
3. Charles K. Ale	exander, Mathew N.O. Sadiku,	"Fundamer	ntals	s of	Electric	Circuits",	Second Edition
McGraw Hill, 20							
4 Allan H. Robbi	ns, Wilhelm C. Miller, "Circuit Ar	nalvsis The	orv	and	Practice	". Cenga	e Learning India
2013.			.,				,
REFERENCE(S):				1			10.11
source that the first states of the states of the	"Circuits Theory (Analysis and sy	nthesis) Dr	ann	nath F	ai & So	ns New	Jelhi 1999
1002	7, 0, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7,					113, 140 00 1	
	R., "Analysis of Electric Circuits," N		3751.0 Sec. 4	a li sevals		D II 1 00	
영화 이 유민이는 이번 물이가 가면 대부분가 가장했다.	nburg, "Network Analysis", Prentic					and the second second	
1 Mahadavan K	, Chitra, C., "Electric Circuits Ana	lysis," Pren	tice-	-Hall	of India	Pvt Ltd., 1	New Delhi, 2015.
4. Mahadevan, K.	1						
		duction to	Ele	ctric	Circuits"	, 7th Edi	tion, John Wiley
	rf and James A. Svoboda, "Intro	oduction to	Ele	ctric	Circuits"	, 7th Edi	tion, John Wiley

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and the second se	nent ELECTRICAL AND ELECTRO	and the second se		and the second se	R 2019	Semester III	MC
Cours	Course Name	and the second s	urs /M		Credit	Total Hours	Maximum
Code			T	P	C		Marks
19MC3		2	0	0	0	30	100
0 0	se Objective (s): The purpose of lear inderstand the premises informing the erspective. ddress the growth of Indian opinion ntitlement to civil and economic rights indian nationalism. ddress the role of socialism in India at se Outcomes: At the end of this cour iscuss the growth of the demand for o candhi in Indian politics. iscuss the intellectual origins of the fr locial reforms leading to revolution in I	e twin the regarding as well a fter the co se, learne se, learne sivil rights ramework ndia.	mes or mode as the ommer ers will in Ind	f liberty ern Ind emerge ncemer be abl ia for th gument	ian intelle ence of na <u>nt of the B</u> e to: ne bulk of that inform	ctuals' constitut ationhood in the <u>olshevik Revolu</u> Indians before t med the concep	ional role and early years of tion in 1917 he arrival of tualization of
that	iscuss the circumstances surroundin ne leadership of Jawaharlal Nehru and dult suffrage in the Indian Constitution iscuss the passage of the Hindu Code	the even	ntual fa				CONTRACTOR OF A
Unit I	History of making of Indian Consti		1.0		-		5
-listory o	of Indian Constitution - Drafting Comm	nittee, (Co	ompos	ition &	Working)		
	Philosophy of the Indian Constitut		1				5
Preambl	e - Salient Features						
Unit III	CONTOURS OF CONSTITUTION	AL RIGH	ITS &	DUTIE	S	A CARLES AND A CARLES	5
Religion	ental Rights - Right to Equality - Right - Cultural and Educational Rights - R Fundamental Duties.						
	ORGANS OF GOVERNANCE						5
Parliame - Goverr and Fun	ent - Composition - Qualifications and nor - Council of Ministers - Judiciary, ctions.	Disqualif Appointr	ication nent a	s - Pov nd Tra	vers and F nsfer of J	Functions Execu udges, Qualifica	itive - Presider ations - Power
Jnit V	LOCAL ADMINISTRATION		1. 1				5
Represe officials (Differen democra		n - Pancl at: Posit	hayati ion an	raj: Inti d role-	oduction, Block le	PRI: Zila Panc vel: Organizati	hayat - Electer onal Hierarch e of grass roo
	ELECTION COMMISSION						5
Election State Ele women	Commission: Role and Functioning ection Commission: Role and Function	, Chief E oning, Ins	Election stitute	n Comi and Bo	missioner odies for t	and Election (he welfare of S	Commissioners C/ST/OBC an
	DOK(S):						
	"The Constitution of India", 1950 (Bar						
- Arres	Dr. S. N. Busi, "Dr. B. R. Ambed Publishers					ution", 1st Edit	ion, 2016. Av
	M. P. Jain, "Indian Constitution Law",	7th Edn.,	Lexis	Nexis,	2014.	A	
	REFERENCE (s)						
	D.D. Basu, Introduction to the Consti						

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-	ment	ELECTRICAL AND ELECTR					R 2019	Semester II	EEC
Course	Code	Course Name	Hou			Credit	Total	Maximum I	Marks
				Т	Р	C	Hours		
19TPS	coverna.	QUANTITATIVE APTITUDE / LOGICAL REASONING - I	2	0	0	0	30	100	
		ctive (s): The purpose of learning							
		ptitude assessment by using speed							
		roblems using fast track method by	a second for the second second			n and nu	imbers.		
ΟL	_earn th	ne basic of ratio and proportion and	mixture cor	ncep	ts.				
		te different ways of solving problem		ge ar	nd age	es.			
	earn th	ne logical skills by analyzing the ob	jects.			a stress		Street Street	
		omes: At the end of this course, le		e ab	le to:				
		e question with speed and accurac	Sector and the sector of the s			1.1	1111	5. c 5. J3	
		ne quantitative aptitude questions b					and the second second second		
0 5	Solve n	ost of the aptitude topics by knowi	ng ratio and	prop	portion	n topics	with alleg	ation.	
		e problems on average and ages l	by using log	ical v	way of	approa	ich.		
		their logical thinking.		-	1	in deve			1.0
UNIT I		EED MATHS AND NUMBER SYST							6
		HS: Square and square roots - 3		num	bers	from 31	to 50. I	-inding squa	res of
number	rs betw	een 81 to 100. Cubes and cubes ro	oots.		dian .	of Niccondi	En En	a value and	nlago
		STEMS: Numbers and types of Nu					bers -rac	e value and	place
		ility rules – Concept on unit digit a			eorer	n.			6
11.00 Control 1000 1000	A CONTRACTOR OF A CONTRACT OF	PLIFICATIONS & PROBLEMS OI	the second s	OCAU.		0	1.6	of dealers of fe	
		IONS: BODMAS rule – Application						of decimal fr	action
& mixed	d fractio	on – Continued fraction and its sim	plification -	Reci	urring	decima	IS. a and form	o oquations	
	1000	ON NUMBERS: Set of numbers - A				number	s and ion	requations	6
		FIO & PROPORTION , ALLIGATIO	N2 & MIXI			acelland	oue prob	omo	0
RAIIO	AND F	PODODTION, Datia hatuman tun	or more por		-1	Scenarie	OUS DIOD	ellis.	
		ROPORTION: Ratio between two							turo -
ALLIG	ATION	S ANS MIXTURES: Definition - Al	legation rule	e – N	lean v	value (o	r cost prid	e) of the mix	ture –
ALLIG/ Six gold	ATION den ruk	S ANS MIXTURES: Definition – Al es to solve problems on mixture – F	legation rule Removal am	e – N	lean v	value (o	r cost prid	e) of the mix	
ALLIGA Six gold	ATION: den rule V AVI	S ANS MIXTURES: Definition – Al es to solve problems on mixture – F ERAGES & PROBLEM ON AGES	legation rule Removal am	e – N long	lean v the q	value (o uantities	r cost pric more that	e) of the mix	ture – 6
ALLIGA Six gold UNIT IN AVERA	ATION den ruk V AVI AGES:	S ANS MIXTURES: Definition – Al es to solve problems on mixture – F ERAGES & PROBLEM ON AGES Average from total –Total from the	legation rule Removal am e average –	e – N long Misc	the que	value (o uantities eous pro	r cost prices more that oblems.	e) of the mix an two.	
ALLIGA Six gold UNIT IN AVERA PROBL	ATION den ruk V AVI AGES: LEMS (S ANS MIXTURES: Definition – Al es to solve problems on mixture – F RAGES & PROBLEM ON AGES Average from total –Total from the ON AGES: Ages - Persons in Past	legation rule Removal am e average – - Present - I	e – N long Misc	the que	value (o uantities eous pro	r cost prices more that oblems.	e) of the mix an two.	6
ALLIGA Six gold UNIT IV AVERA PROBL	ATION den ruk V AVI AGES: LEMS (AN)	S ANS MIXTURES: Definition – Al es to solve problems on mixture – F ERAGES & PROBLEM ON AGES Average from total – Total from the ON AGES: Ages - Persons in Past ALOGY & MIRROR & WATER IM	legation rule Removal am e average – - Present - I AGES	e – N iong Misc Futu	the que the qu	value (o uantities eous pro scellane	r cost prid s more that oblems. eous prob	ee) of the mix an two. em.	6
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ALLIGA Six gold UNIT IV AVERA PROBL UNIT V ANALC Work a	ATION: den ruk V AVI AGES: EMS (/ AN. OGY: S and wo	S ANS MIXTURES: Definition – Al es to solve problems on mixture – F RAGES & PROBLEM ON AGES Average from total –Total from the ON AGES: Ages - Persons in Past ALOGY & MIRROR & WATER IM/ tudy and topic relationship – Work orking place – Worker and pro	legation rule Removal am - Present - I AGES ker and tool duct – Pro	e – M hong Miso Futur rela	the que cellan- re. Mis tionsh	value (o uantities eous pro scellane nip – To raw n	r cost prices more that oblems. eous prob	ee) of the mix an two. em. ction relation:	6 6 ship –
ALLIGA Six gold UNIT IV AVERA PROBL UNIT V ANALO Work a measur	ATION den rule V AVI AGES: LEMS (/ ANI DGY: S and wo rement	S ANS MIXTURES: Definition – All es to solve problems on mixture – F RAGES & PROBLEM ON AGES Average from total –Total from the ON AGES: Ages - Persons in Past ALOGY & MIRROR & WATER IM/ tudy and topic relationship – Work orking place – Worker and pro – Quantity and unit – Animals and	legation rule Removal am - Present - I AGES ker and tool duct – Pro	e – M hong Misc Futu rela oduct s – f	flean withe quitten the quittent the qui	value (o uantities eous pro scellane hip – To I raw n and fem	r cost prices more that oblems. eous prob	ee) of the mix an two. em. ction relation:	6 6 ship –
ALLIGA Six gold UNIT IV AVERA PROBL UNIT V ANALO Work a measur MIRRO	ATION: den rule V AVI AGES: LEMS (/ AN, DGY: S and wo rement PR IMA	S ANS MIXTURES: Definition – Al es to solve problems on mixture – F RAGES & PROBLEM ON AGES Average from total –Total from the DN AGES: Ages - Persons in Past ALOGY & MIRROR & WATER IM/ tudy and topic relationship – Work orking place – Worker and pro – Quantity and unit – Animals and GES AND WATER IMAGES: Letter	legation rule Removal am - Present - I AGES ker and tool duct – Pro	e – M hong Misc Futu rela oduct s – f	flean withe quitten the quittent the qui	value (o uantities eous pro scellane hip – To I raw n and fem	r cost prices more that oblems. eous prob	ee) of the mix an two. em. ction relation:	6 6 ship –
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ALLIG Six gold UNIT IV AVER PROBL UNIT V ANALO Work a measur MIRRO REFERE 1. Ab Pu 2. Aru	ATION: den rule V AVI AGES: EMS (/ AN, OGY: S and wo rement PR IMA ENCES ohijit Gu ublishin un Sha	S ANS MIXTURES: Definition – Al es to solve problems on mixture – F RAGES & PROBLEM ON AGES Average from total – Total from the ON AGES: Ages - Persons in Past ALOGY & MIRROR & WATER IM/ tudy and topic relationship – Work orking place – Worker and pro – Quantity and unit – Animals and GES AND WATER IMAGES: Lette : iha, Quantitative Aptitude for Com g Company Ltd, 2012 irma, How to prepare for Data Int	legation rule Removal am - Present - I AGES ker and tool duct - Pro dyoung one er inverted -	e – M nong Miso Futur rela oduct s – f Obje	lean y the qu cellan- re. Mis tionsh t and Male a ect iny ations	value (o uantities eous pro scellane nip – To raw n and fem verted.	r cost prices more that oblems. eous prob ool and ac naterials ale.	ee) of the mix an two. em. ction relation – Instrumen Tata McGra	6 6 ship – nt and w-Hill
ALLIG Six gold UNIT IV AVER PROBL UNIT V ANALO Work a measur MIRRO REFERE 1. Ab Pu 2. Aru Pu	ATION: den rule V AVI AGES: EMS (/ AN, OGY: S and wo rement PR IMA ENCES ohijit Gu ublishin un Sha ublishin	S ANS MIXTURES: Definition – Alles to solve problems on mixture – F RAGES & PROBLEM ON AGES Average from total – Total from the DN AGES: Ages - Persons in Past ALOGY & MIRROR & WATER IMA tudy and topic relationship – Work orking place – Worker and pro – Quantity and unit – Animals and GES AND WATER IMAGES: Letter inha, Quantitative Aptitude for Com g Company Ltd, 2012 urma, How to prepare for Data Int g Company Ltd, 2012.	legation rule Removal am - Present - I AGES ker and tool duct – Pro dyoung one er inverted – npetitive Exa	e – M hong Misc Futur rela oduct s – I Obje	tions tions tions tand vale a ations he CA	value (o uantities eous pro scellane nip – To raw n and fem verted. s, Fourth	r cost prices more that oblems. ool and ac naterials ale. n Edition, t Edition,	ee) of the mix an two. em. ction relation: – Instrume Tata McGra Tata McGra	6 6 ship – nt and w-Hill
ALLIGA Six gold UNIT IV AVERA PROBL UNIT V ANALO Work a measur MIRRO REFERE 1. Ab Pu 2. Aru Pu 3. R. ^V	ATION: den ruk V AVI AGES: EMS (/ AN, OGY: S and wo rement R IMA ENCES oblijit Gu ublishin un Sha ublishin V.Prav	S ANS MIXTURES: Definition – Alles to solve problems on mixture – F RAGES & PROBLEM ON AGES Average from total – Total from the DN AGES: Ages - Persons in Past ALOGY & MIRROR & WATER IM/ tudy and topic relationship – Work- brking place – Worker and pro – Quantity and unit – Animals and GES AND WATER IMAGES: Lette uha, Quantitative Aptitude for Com g Company Ltd, 2012 urma, How to prepare for Data Int g Company Ltd, 2012. een, "Quantitative Aptitude and Rea	legation rule Removal am - Present - I AGES ker and tool duct – Pro dyoung one er inverted – npetitive Exa terpretation asoning" Thi	 Miscong Miscong Miscong Future related <	tionsh tionsh tionsh tand Male a ations he CA	value (o uantities eous pro scellane nip – To raw n and fem verted. s, Fourth AT, First	r cost prices more that oblems. ool and ac naterials ale. n Edition, t Edition, arning ,2	ee) of the mix an two. em. tion relation: – Instrume Tata McGra Tata McGra	6 <u>6</u> ship – nt and w-Hill w-Hill
ALLIGA Six gold UNIT IV AVERA PROBL UNIT V ANALO Work a measur MIRRO REFERE 1. Ab Pu 2. Art Pu 3. R. ¹	ATION: den rulk V AVI AGES: LEMS (/ AN. OGY: S and wo rement R IMA ENCES obhijit Gu ublishin un Sha ublishin V.Pravi .R S	S ANS MIXTURES: Definition – Alles to solve problems on mixture – F RAGES & PROBLEM ON AGES Average from total – Total from the DN AGES: Ages - Persons in Past ALOGY & MIRROR & WATER IM/ tudy and topic relationship – Work- orking place – Worker and pro – Quantity and unit – Animals and GES AND WATER IMAGES: Lette uha, Quantitative Aptitude for Com g Company Ltd, 2012 urma, How to prepare for Data Integ g Company Ltd, 2012. een, "Quantitative Aptitude and Rea Aggarwal, Quantitative Aptitude, Aptitude,	legation rule Removal am - Present - I AGES ker and tool duct – Pro dyoung one er inverted – npetitive Exa terpretation asoning" Thi	 Miscong Miscong Miscong Future related <	tionsh tionsh tionsh tand Male a ations he CA	value (o uantities eous pro scellane nip – To raw n and fem verted. s, Fourth AT, First	r cost prices more that oblems. ool and ac naterials ale. n Edition, t Edition, arning ,2	ee) of the mix an two. em. tion relation: – Instrume Tata McGra Tata McGra	6 <u>6</u> ship – nt and w-Hill w-Hill
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	rtment e Code	ELECTRICAL AND ELECTRON Course Name	Hours	_			Total	Semester III PC
NO21	In the Market of the	DC MACHINES AND	L	T	Ρ	С	Hours	Maximum Marks
19	EE306	TRANSFORMERS LABORATORY	0	0	2	1	30	100
Cours	e Object	tive (s): The purpose of learning this of	course	is to				
		load characteristics of different DC m	achine	es.		0.2		
		load characteristics of transformer.						
		students to do experiment on transfor		drav	w the	e equival	lent circu	it.
		speed control methods of DC motors						
		t indirect method of testing in DC mac						
		mes: At the end of this course, learne						
		performance of DC machines under I	vo load	a and	a ioa	a conait	ion.	
		performance of Transformers. uivalent circuit for transformer.						
		he no load parameters of DC machine	usina	in d	irect	method		
		speed control methods.	uonig	in a	neor	method		
Exp. No.		Name of Exp	erime	nts	· ·		lis in	Las There is
1	Load te	st on DC Shunt motor.		50.1		and a second	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Sec. 1
2	Load te	st on DC Series motor.						
3	Load te	st on DC Compound motor.						a state and
4	Speed	Control of DC Motor: Field control, Arr	nature	con	trol.			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5	Swinbu	rne's test and separation of losses in I	DC Ma	chin	e.			1 1
6	Open c	ircuit and Load characteristics of DC g	eneral	tor (S	Self a	and Sep	arately E	xcited).
7	Load te	st on DC series generator.	-			-		
8		son's test.		1			*	
9		st on single phase transformer.	> 1					
10		ircuit & Short circuit test on single pha	se tran	sfor	mer.		1	
11	Sumpre	er's test.	-		-	10.0	-	É.
S. No.		List of Equipment		-				Quantity
1		nt Motor with Loading Arrangement				1	1.1	3 Nos.
2		nt Motor Coupled with Three phase A	Iternat	or			2 1	1 No.
3		Phase Transformer					1	4 Nos.
4		es Motor with Loading Arrangement	_				51 100	1 No.
5		pound Motor with Loading Arrangeme				1.6		1 No.
6	and the second sec	hase Induction Motor with Loading Ar		AND INCOME.	A DECK DECK DECK	n sen en se	177,000 1882	2 Nos.
7	Single F	Phase Induction Motor with Loading A	rrange	men	t			1 No.
8	DC Shu	nt Motor Coupled With DC Compound	d Gene	erato	r		and the second	2 Nos.
9	DC Shu	nt Motor Coupled With DC Shunt Motor	or					1 No.
10	Tachom	neter -Digital/Analog		104				8 Nos.
11	Single F	Phase Auto Transformer						2 Nos.
12		hase Auto Transformer						1 No.
13		Phase Resistive Loading Bank		-				2 Nos.
14		hase Resistive Loading Bank.		_				2 Nos.

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Depart						in the second se	Semester III PO
Course C		Hours			Credit		Maximum Marks
19EE	BLECTRIC CIRCUITS	L	Т	Ρ	С	Hours	
	LABORATORY	0	0	2	1	30	100
	bjective (s): The purpose of learning this						
	alyze the electrical quantities, mesh and n		ques	in D	.C circu	its	
	part the fundamental concepts of resonance						
	alyze the electrical network by applying ne						
0 Le	arn about the measurement of self & mutu	al inductan	ce, tra	ansie	ent and	coupled c	ircuits.
	utcomes: At the end of this course, learn						
	plain the basic concepts of ohm's law and					etwork.	
	alyze the concept of mesh and nodal analy		rical r	netw	ork		
	oly and understand the types of network the						
	er the concept of self and mutual inductand						
De De	ermine the frequency response of resonal	nce & Tune	d circ	uits.			
Exp. No.	Name of Exper						
1.	Verification of ohm's laws and Kirchhoff's	COVER INTERNAL				and the second	La contraction of the second
2.	Verification of Thevenin's and Norton's Th	eorem	Angle'	-	5 1 378	1	Carry Carlos
3.	Verification of superposition Theorem.	1				in di	
4.	Verification of maximum power transfer th	eorem.	1			-	
5.	Verification of reciprocity theorem.	1	1.1		1.00		
6.	Measurement of self-inductance of a coil.						
7.	Verification of mesh and nodal analysis.						
8.	Transient response of RL and RC circuits				-		
9.	Frequency response of series and paralle		circu	its.			and the second second
10.	Frequency response of single tuned coup						
	EQUIPMENT REQUIR	RED FOR C	NE E	BAT	CH		and the second second
S.No.	List of Equ			16.	1		Quantity
1.	Regulated Power Supply: 0 - 15 V D.C / I	Distributed F	Power	Sou	Irce.		10 Nos.
2.	Function Generator (1 MHz) -				1		10 Nos.
3.	Single Phase Energy Meter -						1 No
4.	Oscilloscope (20 MHz)		£				10 Nos.
5.	Digital Storage Oscilloscope (20 MHz)	100					1 No .
0	PC with Circuit Simulation Software) (e-	Sim / Scila	b/ Ps	pice	/ MATL	AB /other	10 10-
6.	Equivalent software Package) and a Print						10 Nos.
7.	Single Phase Wattmeter						3 Nos.
8.	Decade Resistance Box, Decade Inductar	nce Box, De	cade	Cap	acitance	e Box	6 Nos. each
9.	AC/DC - Voltmeters, Ammeters and Multi		1.4.12	15		S. C. Martin	10Nos .each
10.	Circuit Connection Boards		14			S. Same a	10 Nos.
11.	Necessary Quantities of Resistors, Induc (Quarter Watt to 10 Watt)	tors, Capa	citors	of v	arious c	apacities	As required

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Department	ELECTRICAL AND ELECTRO	NICS	ENG	INE	ERING	R 2019	Semester IV	BS
Course Code	Course Name	Hour			Credit	Total	Maxim	
19BS402	NUMERICAL METHODS	L 3	T 1	P 0	C 4	Hours 60	Marl 100	(S
	ctive (s): The purpose of learning this c			U	4	60	100	
differen Interpol Analyze Find so	the knowledge of finding approximate tiation and integration by numerical met ate and predict a data differentiation and integration numerica ution of initial and boundary value probl b enough confidence to identify and	thods ally lems ι	and in sing	nterp	olating t le and m	he values nulti-step a	of a function	15.
	iate solutions, using the skills learned ir							
 Classify solve th Demons Apply n Obtain 1 Classify 	omes: At the end of this course, learner the equations into Algebraic, Transce em numerically. strate and implement an appropriate nur umerical computational techniques to of he solutions of first order ordinary differ the partial differential equations and	endent merica otain t rential	al or I met he dit equa	sim thod ffere	for intern ntiation a s, numer	polation. and Integra	ation of funct	ions.
	al methods. LUTION OF SYSTEM OF EQUATION	IS				the second s		12
	son method- Method of False Position		raffes	s ro	ot squar	e metho	d – Crout's N	1200 C
	Gauss Seidel method.						4	140
Unit II INT Interpolation:	ERPOLATION Newton's forward and backward diffe	ronor	form	aula		nao's and	Newton's	12 divided
	erpolation formulae	erence		luiat	e, Lagra	nges and	Newlons	uivideu
	MERICAL DIFFERENTIATION AND	INTE	GR/	TIO	N		1	12
Trapezoidal, S quadrature for		aussia	an q	luadi	rature fo	rmula – T	umerical Inte hree point G	Saussian
	MERICAL SOLUTION OF ORDINARY							12
Runge - Kutta	oblem: Single step methods: Taylor's method for solving first order equation orrector methods for solving first order e	ns - M	lulti s	etho tep	d ,Euler methods	's metho : Milne's	d and Fourt - Adams – B	n order ashforth
Unit V NU	MERICAL TECHNIQUES FOR THE SO JATIONS			DF F	PARTIAL	DIFFER	ENTIAL	12
simple harmon	e solution of parabolic equation by Cr. c motions and its solutions numerically.	ank-N	ichols	son	method-s	Solution o	f elliptic equa	ations of
REFERENCE(
New Del								
Ninth Ed	R. L and Douglas Faires J, Numerical A ition, 2005.							earning,
3. Steven C	hapra, Numerical Methods for Enginee	ers, T	ata N	lcGr	aw Hill s	eventh Ed	ition, 2015.	
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Depar	rtment	ELECTRICAL AND ELECTRO	NICS	ENG	INE	ERING	R 2019	Semester IN	PC
	e Code	Course Name		1	-	Credit	Total	Maximum I	Marks
in constants			·L	T	P	C	Hours	Testina participativa de la	and a water as
	EE401	AC MACHINES ve (s): The purpose of learning this court	3	0	0	3	45		00
DC	lassify d	ifferent types of synchronous machines ne different types of voltage regulation n	and th	neir d					
		ifferent types of induction machines and					515.		31
210 100		but different speed control and starting n			aore				
DS	tudy abo	out different types of single phase motor	S.	an Mariana			2 de la		
		nes: At the end of the course, learners v				i de la combe	8 23		
		e construction, working principle of synd	chrono	ous g	jene	erators a	nd analyz	e the differen	t .
	/pes of v	oltage regulation methods. he construction, principle of operation a	nd ne	form	anc	e of syne	chronous	motor	
		e construction and its features of induct				e or eyra	Sinonouo	motor	
		erformance of three phase and single p				motors.			
D E	xplain d	fferent speed control and starting metho	ods of	indu	ctior	n motor.			
Unit I	SYNC	HRONOUS GENERATORS				The second second			9
		nstruction features of alternators -							
		ermination of voltage regulation using E		ИMF	and	ZPF me	ethods - p	parallel opera	tion of
if and	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	enerators - two reaction theory - slip tes	st.	1999					
Unit II		HRONOUS MOTOR					- A.		9
Constru	uctional	features and principle of operation of sy	/nchrc	ind	s mo	otor – St	arting me	thods - torqu	and and
conden		- v curves and inverted v curves -	Hum	ing a	anu	suppres	SIGH MEU	ious-oynonia	Jilous
Unit III	1	E PHASE INDUCTION MACHINES							9
		nd principle of operation of three phas							
		is - Slip - Torque characteristics - Ma							iency-
		oad & blocked rotor tests - Separation of					e diagram	1.	10
Unit IV	1. SALG288	TING AND SPEED CONTROL OF IND		State In		CC			9
		ts of three phase induction motor – Cog nce control – Pole changing – Frequence							
		uction generator – Synchronous inductio			01	p poner	10001019	Contentio D	Cable
Unit V		LE PHASE MOTORS				2.2			9
		nduction motors - Double revolving							
		uit - No load and Blocked rotor test - I							
		Special motors: shaded pole motor, rel	uctand	ce m	otor,	repulsio	on motor,	Hysteresis m	otor.
	BOOK(S): n.I.J. and Kothari.D.P., "Electric Machi	noo"	TM	Ц	Dublichi	n Co It	d New Dell	ni 5th
	edition 2		nes,	1.101	п.	Publishii	IS CO LU	u., New Den	n, Sur
		B.L., and Theraja, A.K., " A Textbook s", S.Chand, 23 rd Edition	of El	ectri	cal	Technolo	ogy, Volu	me 2, AC ar	nd DC
	Say,M.G New Del	., "Performance and Design of Alterna ni.	iting N	lach	ines	", CBS	Publicatio	on and Distri	outors,
		esh Kumar, "Electrical Machines,vol II", '	Vikas	Publ	icati	on Pvt. I	_td., 2010		
A DESCRIPTION OF THE PARTY OF T	RENCES								
r F	oublishin	gerald, Charles Kingsley, Stephen.D. g Company Ltd, 2014.		125					w Hill
2	I.B. Gup	ta, 'Theory and Performance of Electrica	al Mac	hine	s', S	.K.Katar	ia and Sc	ons, 2010.	

Department	ELECTRICAL AND ELECTRONICS	ENGI	NEEI	RING		R 2019	Semester IV	PC
Course Code	Course Name	Hour			Credit	Total	Maximum I	Marke
	oouroo numo	L	Т	Р	С	Hours		
19EE402	DIGITAL LOGIC CIRCUITS	3	0	0	3	45	1	00
Course Obje	ctive (s): The purpose of learning this co	ourse is	s to			•	15	
5/22 (A)	various number systems and to sim	plify th	ne n	nathe	matical	expression	ons using	
1	n functions. nplementation of combinational circuits.							
	the procedures for analysis and design of	ofound	hron	~~~~	oquantic	al oirouito		
	the procedures for analysis and design of the procedures for analysis an							
	the concept of memories and program					ai circuits.		
	omes: At the end of this course, learner		-		063.		the state of the s	2
	various number systems and the mathe				ione uein	a Boolea	n functions	
	of various combinational logic circuits and							re l
	and analyze the behavior of synchronous						a manpiezei	З.
	and analyze the various behaviors of Asy						uits	
	t different memory devices, programmab							
Unit I NUM	BER SYSTEM & BOOLEAN ALGEBRA	A	0 00	1000	und digi	tur rogio it		9
Review of nur	nber system, Basic logic gates, Types a	nd con	versi	on co	odes, Bo	olean alg	ebra: De-Mor	gan's
theorem, swite	ching functions and simplification using k	K-maps	s & C	uine	McClus	key metho	od.	
Unit II CON	BINATIONAL CIRCUITS				100		19. HE 2. SHE	9
	der, subtractor, comparators, code	conver	ters,	enc	oders, d	decoders,	multiplexers	s and
demultiplexers		1	1			- A.		
	CHRONOUS SEQUENTIAL CIRCUITS					and the second	and and	9
	R, D, JK, MSJK, T- Analysis of syncl			equer	ntial circu	uits; desig	gn of synchr	onous
	cuits – Counters, state diagram; state rec					()		a sures
	NCHRONOUS SEQUENCTIAL CIRCUI	SUNCTION.	1.15	1112	1			9
Analysis of as	ynchronous sequential machines, state a	assigni	ment	, asy	nchrono	us design	problem.	
Unit V PRO	GRAMMABLE LOGIC DEVICES, MEM	ORY A	ND	LOG	C FAMI	LIES	Eline conces	9
Memories: RC	M, PROM, EPROM, PLA, PLD, FPGA,	Digital	logic	fam	ilies: TTL	, ECL, CI	MOS.	
TEXT BOOK(S):							18
1. Morris.	M.Mano and Michael.D.Ciletti,"Digital De	esian".F	Prent	ice H	lall.5 th e	dition.201	3.	
2. Thoma	s L. Floyd ," Digital Fundamentals" Pears	son Ed	ucat	ion ,1	0 th edit	ion,2011.		25
	Wakerly,"Digital Design Principles and F							5.
	ncoln,"Digital Electronics" First Edition, I							28.1.19.08.1-
REFERENCE	S):	1.5	2			-		1.00
	P Leach, "Digital Principles and applicat							014.
2. Charles	H.Roth, "Fundamentals of Logic Design	n", Sev	enth	editi	on, Ceng	gage Lear	ning, 2014.	
	Digital Systems : Principles and applicat							
	nal, "Digital systems-Principles and Des							
	Yarbrough, "Digital Logic Applications	and D	esig	n", Fi	rst editio	on, Thoms	saon Publicat	tions,
2006.		1000			12.14			1.15

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Department	ELECTRICAL AND ELECTRON	NICS I	ENGI	NEEF	RING	R 2019	Semester IV PC
Course Code	Course Name	Hou	ırs / V		A	Total	Maximum Marks
		L	Т	P	C	Hours	
19EE403	LINEAR INTEGRATED CIRCUITS	3	0	0	3	45	100
 Provide I Introduce Expose t Learn the 	tive (s): The purpose of learning this convolvedge about IC fabrication. The basic building blocks of linear interest to linear and integrated cires concepts of converters using operation he basic knowledge of special function	egrate rcuits onal a	ed circ in line	ear ar	nd nonline	ear appli	cations.
 Outline the second secon	mes: At the end of this course, learned the concepts of IC Fabrication technique the basics and operational characteris y applications of op-amp like differentiat f ADC and DAC and V/I and I/V Conver- the working of PLL and use PLL as free	ues in itics of al amp ertors	, Resi f op-a olifier, using	istor, mp Instr op –	Capacito umentatio amps		
	ICATION OF INTEGRATED CIRCUIT		oy ma	nuprio	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Page Service	9
Diffusion of in Fabrication of o Unit II INTRO	n, fundamental of monolithic IC techn npurities - Realization of monolithic capacitance - Fabrication of resistance DUCTION TO OPERATIONAL AMP o-Amp-Functional block diagram - I	-Fab	and ricatic R	pack on of l	aging - FETs.	Fabrica	tion of diodes -
characteristics	CMRR - Open loop gain, Slew rate - Offset compensation techniques - F	- Tra	nsfer	char	acteristics	s - Input	bias and output
Unit III APPL	ICATIONS OF OPERATIONAL AMPI	LIFIEF	R			*	9
	Non-inverting amplifiers - Voltage Fo a amplifier - Integrator and Differen mitt Trigger.						
Unit IV CON	/ERTERS		N.S.				9
type - Success Voltage-to-Tim		pe typ					Converter using
	IAL FUNCTION INTEGRATED CIRC						9
Controlled Osc PLL, Characte	nctional block diagram and description cillator – 565 PLL: Functional Block of ristics, IC voltage regulators: Regulation egulators – LM 317, LM723 ICs.	diagra	m, Pr	incip	le of ope	ration, E	Building blocks of
	dhury Roy, Sheil B.Jani, "Linear Integr	ated C	Circuit	s" 4th	Edition	New Ag	e International.
2014.							
	honon MC Konshana Dhasakaran "I	incor					
	hanan, V S Kanchana Bhaaskaran, "L cation, 2014.	Inear	Integ	rated	Circuits",	2nd Ed	ition, McGraw-
Hill Edu	cation, 2014.				_		

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Departmei Course				Veek	the second se		Semester I Maximum M	
Code	Course Name	L	T	P	С	Hours		
19ES402	DATA STRUCTURES AND ALGORITHMS	3	0	0	3	45	100	
Course O	bjective (s): The purpose of learning this cour	se i	s to	1			the second s	
	Inderstand the impact of algorithms in problem							
O F	amiliar with utilization of data structure metho	dolo	ogies					
0 1	Know the concepts of tree data structures		-					
0 1	Inderstand the search to graph based algorith	ms						
	Know the various sorting and searching algorit		for s	olving	g real tin	ne proble	ems	
	Itcomes: At the end of this course, learners w							
	besign simple algorithms and determine its effi							
	lustrate basics of Linear data structures and it		-	ons				
	xplain the concepts of tree data structures	- -						
	olve shortest path problems using graph base	d al	aorith	nms				
	pply various sorting and searching algorithms	-	-		al time p	roblems	5. J. C. T. T. T.	
Unit I IN	TRODUCTION TO ALGORITHMS	101	001111	19100	ar time p	Contentio		9
Notion of	an Algorithm - Fundamentals of Algorith	nmic	So	lvina	- Impo	ortant P	roblem type	es -
rundamer	tals of the Analysis of Algorithm Efficiency: A	nalv	sis F					
	tals of the Analysis of Algorithm Efficiency: A es – Mathematical Analysis for Recursive and			rame	work - /	Asympto		
its properti	tals of the Analysis of Algorithm Efficiency: A es – Mathematical Analysis for Recursive and INEAR DATA STRUCTURES			rame	work - /	Asympto		
its properti Unit II L	es – Mathematical Analysis for Recursive and INEAR DATA STRUCTURES	Nor	n Rec	rame	work – / e algorit	Asympto hms	tic Notations	and 9
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Depa	rtment	ELECTRICAL AND ELECTRONI	CS E	NGI	NEE	RING	R 2019	Semester IV	HS
Cour	se Code	Course Name	Hou	rs/ V	Veek	Credit		Maximum Ma	rks
			L	Т	P	С	Hours		
19	HS402	UNIVERSAL HUMAN VALUES 2 : UNDERSTANDING HARMONY	2	1	0	3	45	100	
Cour		ive (s): The purpose of learning this co							
0	Help the	students appreciate the essential co	omple	eme	ntaril	y betwe	en 'VALU	ES' and 'SKILL	.S' to
	ensure su	ustained happiness and prosperity which	ch are	e the	e cor	e aspirat	ions of all	human beings.	
0	Facilitate	the development of a Holistic perspe	ctive	am	ong	students	towards I	ife and professi	on as
	well as	towards happiness and prosperity	based	d o	n a	correct	understar	iding of the H	uman
	reality an	d the rest of existence. Such a holis	stic p	ersp	ectiv	e forms	the basis	of Universal H	uman
1	Values a	nd movement towards value-based living	ng in	a na	atura	l way.			
	Hghlight	plausible implications of such a H	lolisti	ίς ι	Inde	standing	in term	s of ethical h	uman
	conduct,	trustful and mutually fulfilling huma	n be	havi	or a	nd mutu	ally enric	hing interaction	with
Calla	Nature	a of the Courses The collect feetures	thin			1	111-12	helm Thur II mure	
-		es of the Course: The salient features				ning the	right und	protonding of roc	lity
		ts a universal approach to value educa						erstanding of rea	anty
		rldview of the reality "as it is") through						nanala about w	riouo
		e course is presented in the form of a of the reality are presented and the stu							
		ng them on the basis of their natural a							
	living.		ccepi	anc	e wit	nin ones		idate experienti	any m
		e focus throughout the course is towa	ard af	fect	ina a	qualitat	ive transfo	ormation in the	life of
		nt rather than just a transfer of informa							
0		roducing the holistic worldview and i		plica	ation	s, a criti	ical appra	isal of the prev	ailing
		also made to enable the students disc							
Cour	se Method	dology: The methodology of this cours	se is	:	•				
0		ational and thus universally adaptabl			lves	a system	matic and	rational study of	of the
1.00	human be	eing vis-à-vis the rest of existence.							h. 11
0	The cours	se is in the form of 28 lectures (discuss	ions)	and	14	oractice s	sessions.		1.00
0	It is free	from any dogma or value prescriptions							
.0		ocess of self-investigation and self-e							
		truth or reality is stated as a proposi							
1.00		, based on their Natural Acceptance					eriential V	alidation - the	whole
1050		is the lab and every activity is a sourc						202	
0	51 5 1	ess of self-exploration takes the form of							
	· · · · · · · · · · · · · · · · · · ·	h, and then to continue within the s	stude	nt ii	n ev	ery activ	vity, leadin	g to continuous	s self
	evolution						alian araan		
		exploration also enables them to cr	iticall	y e	valua	ite their	pre-condi	tionings and pr	esent
Marilii	beliefs.							6+3	
Color Contractor (1984)		oduction to Value Education				the Dee			
		erstanding Value Education - Self-e							
		opiness and Prosperity – the Bas I Physical Facility - Happiness and F							
	Human As	1월 및 1월 및 1월 일일(1월 20일) 전 1월 1월 20일(1월 1월 20일)	TUSP	enty	- 0	unent o	cenano -		in the
		ice Session] - Sharing about Oneself	- F	xpla	orina	Human	Consciou	sness - Explor	ina
	Acceptar						20.000		
and the second se	and a second second second	mony in the Human Being	-					6+3	
					T.		BI	~	
		Chaiman - BoS					Ohal	- D-0	
		3823 - 345 W 1090				D	Chairma	IN - BOS	

	res - Understanding Human being as the Co-existence of the Self and the Body -	Distinguishing
	en the Needs of the Self and the Body – The Body as an Instrument of the Self -	Understanding
	ony in the Self - Harmony of the Self with the Body - Programme to ensure self	r-regulation and
Health	ials [Practice Session] - Exploring the difference of Needs of Self and Body - Explorin	a Sources of
1.5	nation in the Self - Exploring Harmony of Self with the Body	ig obuices of
	le 3 – Harmony in the Family and Society	6+3
	res - Harmony in the Family – the Basic Unit of Human Interaction - Values in Human	2.770 (C. 1977) (C. 1977)
	onship – 'Trust' – the Foundational Value in Relationship - 'Respect' – as the Rig	
	standing Harmony in the Society - Vision for the Universal Human Order	
	ials [Practice Session] - Exploring the Feeling of Trust - Exploring the Feeling	of Respect -
	ring Systems to fulfil Human Goal	
	le 4 – Harmony in the Nature/Existence	6+3
	res - Understanding Harmony in the Nature - Interconnectedness, self-regulation	ion and Mutual
Fulfilm	nent among the Four Orders of Nature - Realizing Existence as Co-existence at A	
Holisti	c Perception of Harmony in Existence	
Tutor	ials [Practice Session] - Exploring the Four Orders of Nature - Exploring Co-	-existence in
Existe		
	le 5 – Implications of the Holistic Understanding	6+3
Lectu	19 mar	
		Competence in
	sional Ethics - Holistic Technologies, Production Systems and Management Model	s-Typical Case
	s - Strategies for Transition towards Value-based Life and Profession	
	ials [Practice Session] - Exploring Ethical Human Conduct - Exploring Humanis	stic Models in
	tion - Exploring Steps of Transition towards Universal Human Order	
	se Outcomes: At the end of this course, learners will be able to:	
		maline a line and
	Students are expected to become more aware of themselves, and their surrou	ndings (family,
	society, nature)	
0	society, nature) Students would become more responsible in life, and in handling problems wi	
0	society, nature) Students would become more responsible in life, and in handling problems wi solutions.	ith sustainable
	society, nature) Students would become more responsible in life, and in handling problems wi solutions. Students become sensitive to their commitment towards what they have under	ith sustainable
۵	society, nature) Students would become more responsible in life, and in handling problems wire solutions. Students become sensitive to their commitment towards what they have under values, human relationship and human society).	ith sustainable rstood (human
0 , 0	society, nature) Students would become more responsible in life, and in handling problems with solutions. Students become sensitive to their commitment towards what they have under values, human relationship and human society). Students would be able to apply what they have learnt to their own self in differ	ith sustainable rstood (human
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7.	Economy of Permanence - J C Kumarappa
8.	Bharat Mein Angreji Raj – PanditSunderlal
9.	Rediscovering India - by Dharampal
10.	Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
SUGG	ESTED ASSESSMENT:
stude in ev	is a compulsory credit course. The assessment is to provide a fair state of development of the ent, so participation in classroom discussions, self-assessment, peer assessment etc. will be used valuation. nple:

Assessment by faculty mentor: 10 marks Self-assessment: 10 marks & Assessment by peers: 10 marks Socially relevant project/Group Activities/Assignments: 20 marks Semester End Examination: 50 marks

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Department	ELECTRICAL AND ELECTRONIC	CS ENG	GINE	ERI	NG	R 2019	Semester IV	EE
Course Code	Course Name	Hour	s/We	ek	Credit	Total	Maximum	9
oourse ooue		L	Т	Ρ	C	Hours	Marks	
19TPS04	QUANTITATIVE APTITUDE AND LOGICAL REASONING - II	2	0	0	0	30	100	
	ive (s): The purpose of learning this cou			1.1				
I Learn	the basic of partnership and chain rule	in simp	lified	way				
	problems using fast track method by lean the angle of elevation and depression.		profit	and	loss with	n percenta	ige.	
I Know	the relationship, direction concepts in e	asy wa	ıy.					
	about coding and decoding through log			an ()	1.1		and the	
	mes: At the end of this course, learners							
	problems by using shortcut in partnersh							
	the tips and tricks of profit and loss with	percei	ntage	e thro	ough fast	track met	hods.	
	stand the concepts of angles.							
	ate critically the real life situations by re-	sorting	and a	analy	zing ana	alytical rea	asoning of key	
	s and factors.							
Enhar	the logical way of thinking by solving	loroble	ems c	codes	s and rar	nkinas con	icepts.	~
	NERSHIP & CHAIN RULE	Jantaan	alaina	0		Dentrere		6
sleeping partn	P: Ratio of division of gains: Simple F	annen	snip	- 00	ompound	Partners	nip - working a	anc
	Definition – Direct proportion and Indire	ect nro	oortic	n				
	T & LOSS, PERCENTAGE	set pro	oontic	<i>л</i> п.		-		6
	LOSS: Basic definition and types of pro	ofit and	loce	0	oncont o	fdiscount	the second s	-
	rue v/s false value – Application in data						anu markeu pi	lice
	E: Percentage – Percentage using short		statio	in pit	Julema.			
	HT AND DISTANCE	touto.	-		2			6
	DISTANCES: Line of sight - Angle of e	levatio	n – A	nale	of depre	ession		-
	DD RELATIONSHIP & DIRECTION SEN			angre				6
and the second se	TIONSHIP: Analysis the gender relation		17.00 A 17.00	tions	hip diag	ram - Fam		70
DIRECTION S	SENSE TEST: Distance between the	startin	ig ar	nd e	nding po	oints - Se	ense the direct	tion
correctly.								
	CAL SEQUENCE OF WORD, CODIN SEQUENCE TEST	g ani	D DE	CO	DING, N	UMBER	RANKING &	6
LOGICAL SEC	QUENCE OF WORDS: Sequence of occ	currenc	e of	even	ts - Seq	uence of o	objects in a clas	s
	uence of increasing/decreasing size, va						Color States	
	DECODING: Introduction – Descriptio				hod, Co	ding patte	rns - Concepts	s of
coding & deco NUMBER RAN	ding – Problems involving coding & deco IKINGS & TIME SEQUENCE TEST: No	oding n umber	netho test -	od. - Rar	nking tes	t – Time s	equence test.	
EFERENCES:				-		1.257		
	ha, Quantitative Aptitude for Competiti Company Ltd, 2012	ve Exa	amina	ations	s, Fourth	e Edition,	Tata McGraw-	Hill
	ma, How to prepare for Data Interpre Company Ltd, 2012.	tation	for th	ne C	AT, First	t Edition,	Tata McGraw-	Hill
. R.V.Pravee	en,"Quantitative Aptitude and Reasoning							
	garwal, Quantitative Aptitude, Revised a							any
	ma "How to Prepare for Quantitative Apt	titude"E	light	Editi	on, McG	raw Hill Ed	ducation,2018.	
	g and Aptitude" for GATE and ESE Preli							

Departn		ELECTRICAL AND ELECTRO					R 2019		
Course	e Code	Course Name			112-122-122-122-122-122-122-122-122-122	Credit	Total	Maximum Marks	
19EE4	05	AC MACHINES LABORATORY		T	P 2	C 1	Hours 30	100	
Course	Objective	e (s): The purpose of learning this of		-			30	100	
		he regulation of an alternator by inc							
		e characteristics of synchronous m		iou io	au.				
		e students to do experiment on indu		notor	to dr	aw the e	auivaler	nt circuit.	
		e speed control methods of induction							
344/2		es: At the end of this course, learne	62.102 1.102 / 0.101 1.202	(based)	ole to			191	
		e indirect methods of determination							
		e performance of synchronous mot							
0 B	uild an eo	uivalent circuit for induction motors	5.						
		the no load and blocked rotor para			ductio	on motor	r.		
0 St	udy abou	at speed control methods of induction						and the second second	
xp. No.	Devilet	Name of			ts	Sec. 1.	-	and the state of the	
2		ion of three phase alternator by EM					-		
3		ion of three phase alternator by MM ion of three phase alternator by ZP			-	4			
4		ination of direct axis and quadrature			anco	of solion	t nole al	ternator by slin test	
5		iverted V-curves of three phase sy					it pole al	ternator by silp test	
6		st on three-phase induction motor.	CHION	Jusi	notor	5.			
7		control of three-phase induction mo	tor		_				
8		ne the equivalent circuit parameter		ee-p	hase	inductio	n motor.		
9		ion of no-load losses of three-phas							
10		st on single-phase induction motor.				-			
11		and blocked rotor test on single-ph	nase in	ducti	on m	otor.	14		
S. No.		List of Equip			1	- C.		Quantity	
1	Synchro	onous Induction motor 3HP						1 No.	
2	DC Shu	nt Motor Coupled with Three phase	Altern	ator		1.1		4 Nos.	
3		nt Motor Coupled with Three phase	and the second second		ducti	on moto	r	1 No.	
4		hase Induction Motor with Loading					1	2 Nos.	
5	the second se	Phase Induction Motor with Loading						2 Nos.	
6	-	eter -Digital/Analog				1 55 5		8 Nos.	
7		Phase Auto Transformer	10	2		6-100 m	1212-2	2 Nos.	
8		hase Auto Transformer				*	Serie Series	3 Nos.	
9		Phase Resistive Loading Bank		- C., M.				2 Nos.	
10		hase Resistive Loading Bank		-	1.1			2 Nos.	
	THEEF								

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Departme							Semester IV PC
Course Co	de Course Name	-			Credit	Total	Maximum Mark
19EE40	6 LINEAR AND DIGITAL INTEGRATE CIRCUITS LABORATORY		T 0	P 2	C 1	Hours 30	100
Course O	bjective (s): The purpose of learning this c	ourse	is to	-			
	ionstrate the working of basic digital IC's						
	gn and implement Boolean functions						
I Anal	yze combinational logic circuits						
I Anal	yze sequential logic circuits						
	yze Linear electronic circuits.	-					
Course O	utcomes: At the end of the course, learne	rs will I	be at	ole to			
	y the Truth table of the various Logic gates						c gates.
	ain the operation of the BCD to Binary and				sing IC7	411.	
	ain the various applications of the operatio	nal am	nplifie	er.			
	rate the operation of the counters.						
	ain the operation of Astable and Monostab		er.	-	4.100	-	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
xp. No.	Name of Experim		-	te al	CR 1. 20	10.000	The second a second to
	Verification of Logic gates truth table using						
	Implementation of Boolean Functions Add using NAND gates.	er/Sub	tract	or circ	uits & C	onstructi	on of Logic Gates
3	Code converters by using suitable IC's						
(a) Gray to Binary						
	b) Binary to Gray			_			
	Design and test Encoders and Decoders.		10.1		- >		
	Design and test Multiplexer and E 2^n:1&1:2^n b) Implement 4:1 using 2	1 Mux	<	1	a)		
	Design and test Shift registers: Design SIPO, PISO, PIPO modes using suitable IC	°s.		nentati	on of 4	-bit shift	registers in SISC
	Design and test Parity Generator & Parity	Check	er				
8	Counters:						
	a) Ring countersb) Up and Down Counters						
9	Design and test the inverting and non inve	rting a	molif	ior usi		11	
	Design and test the integrator and differen					+1	
	Design and implement the adder circuit us			10 /4		-	
	Design and implement the subtraction circ			741			and the second
and the second se	Timer IC application		9.0		Contraction of the	ALC PROVIDENT	THAN DIE THE REAL
	a) Astable mode						
	b) Mono stable mode						
S.No.	Name of the equipments / Co	mpon	ents			Q	uantity
1	Dual ,(0-30V) variability Power Supply	-		1			10
	CRO						9
3	Digital Multimeter			1			10
	Function Generator		-	-			8
							2
	IC Tester (Analog) Bread board	-		_			
						day i	10
7 0 4	Computer (PSPICE installed) Consumable	es (sut	fficie	nt au:	antity)		1
1	IC 741/ IC NE555/566/565	- (- 4			,	۵	s required
	Digital IC types		-				s required
(112)							
0						A	s required

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4	LM317	As required
5	LM723	As required
6	ICSG3524 / SG3525	As required
7	Transistor – 2N3391	As required
8	Diodes, IN4001,BY126	As required
9	Zener diodes	As required
10	Potentiometer	As required
11	Step-down transformer 230V/12-0-12V	As required
12	Capacitor	As required
13	Resistors 1/4 Watt Assorted	As required
14	Single Strand Wire	As required

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	Department	ELECTRICAL A	ND ELECTRO				R 2019	Semester IV EEC
(Course Code	Course Na	me H	ours/V	P	Credit C	Total Hours	Maximum Marks
	19HS401	LANGUAGE S			2	0	30	100
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1.10		skins.		re will b	o oblo	to		
Uni List	Communia Comprehe Write the Integrate I t I LISTENII cening and its	NG mportance –Listen	up properly. technical text. lication in clear i ing strategies -	Listen t	o a pro			6 give information, a
lect Uni Giv	ure notes t II SPEAKII e personal ir	IG formation - ask fe	or personal inf					al feedback - taking 6 sk for clarification
piu	nunciation bas		on prophing on	nuoraati	an ata			cooling oullables on
								essing syllables and
spe Uni	aking clearly -	summarizing acade	emic readings a	nd lectu	res	rters: Pep	talk - str	6
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spe Uni Stra pho Uno	aking clearly - t III READING ategies for effe tos and title	summarizing acade active reading - Re - Read for details proun reference an	emic readings a ad and recogni: - Use of grap	nd lectu ze differ hic orga	res ent typ anizers	nters: Pep	talk - str ts - Pree w and ai	6 dicting content using di comprehension
spe Uni Stra phc Unc Unc Uni Pla Wri para Uni	aking clearly - t III READING ategies for effe derstanding pro- t IV WRITING n before writin te a descripti agraph – E-ma t V INTEGR/	summarizing acade active reading - Re- - Read for details bonoun reference and g - Develop a para /e paragraph – W il writing - Types of TION OF LSRW	emic readings a ad and recogni - Use of grap d use of connect graph: topic se /rite a paragra essays- descrip	nd lectu ze differ hic orga stors in a ntence, ph with ptive-nai	res rent typ anizers a passa suppor reaso rrative-	ters: Pep bes of tex to revie age- spee tring senter ns and e issue-bas	talk - str ts - Pree w and ai d reading ences, co examples sed-argur	6 dicting content using id comprehension - techniques 6 including sentence - - Write an opinion mentative-analytical 6
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Department	ELECTRICAL AND ELECTRON						Semester \	
Course Code	Course Name	Hou	Irs/W	P	Credit C	Total Hours	Maximum I	Mark
19EE501	POWER ELECTRONICS	3	T 0	0	3	45	100	
A State of the West of the State of the Stat	ve (s): The purpose of learning this		-					-
characteris Illustrate th Understand regulators. Understand understand Illustrate th Course Outcom Express ch Design a su Design and Design and Analyze dif Unit I POV	d the different types of powe tics. e operation, characteristics and per d the operation, switching technic d the different modulation technic l the harmonic, reduction methods. e operation of AC-AC converters. es: At the end of this course, learne aracteristics of SCR, BJT, MOSFET uitable power converter for given dc l analyze of various DC – DC conve l analyze the single and three phase ferent ac to ac converters. VER SEMI-CONDUCTOR DEVICES Power Electronics- Construction of Power diode, power BJT, SCR	formand ques of rs will to and IC load sp rters. inverte 5 , Princ	ce pa and l f pul be ab BBT. becific ers.	le to	eters of c topolog vidth mo n from A	controllec gies of odulated C input.	l rectifiers. DC-DC swit inverters a	nd to
			10, 1	Owc			1001,1001	1 440
Transistor Anal	ogy of Thyristor- Thyristor Protection	1.						
	ogy of Thyristor- Thyristor Protectior			-				9
Unit II PHA	SE CONTROLLED CONVERTERS	5	verte	ers w	th R RI	RLELO	ad – Estimati	
Unit II PHA Single phase ar	SE CONTROLLED CONVERTERS and three phase half and fully control	i led cor						on o
Unit II PHA Single phase ar average load v	ASE CONTROLLED CONVERTERS nd three phase half and fully control oltage and average load current for	i led con or cont	inuou					on of
Unit II PHA Single phase ar average load v inductance – sir	ASE CONTROLLED CONVERTERS and three phase half and fully control oltage and average load current for agle phase and three phase dual co	i led con or cont	inuou					on of
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ocuree oc				1		Hours		naine
19EE502	POWER SYSTEM ANALYSIS	3		-		60	100	
Course Ol	jective (s): The purpose of learning th	nis cou	irse is	to				-
Under	stand the power system components							
 Solve 	he power flow problems							
	symmetrical faults in power system ne							
	unsymmetrical faults in power system	netwo	orks u	sing 7	Thevenin	's and Z E	Bus method	
	he various stability problems.							
	tcomes: At the end of this course, lea							
	ate the incidence, network matrices a							
Perfor metho	n steady state power flow analysis of p	power	syste	em ne	tworks us	sing amer	ent power flow	V
	e symmetrical faults in power system i	notwo	rke ue	ing T	hovonin'	and 7 B	is method	
	e unsymmetrical faults in power system						us methou.	
Contraction of the second s	y different stability studies in power system		WUIKS	using	2 Dus II	lethou.		
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	stem planning and operational studie	es - 8	Sinale	line (diagram.	Impedan	ce and Reac	
	Per phase and Per Unit representation							
	lation by direct inspection and singula							
and the second se	n of Z-Bus matrix.	-		- 1		1.4.1711.2		
	OWER FLOW ANALYSIS		de las		t u destri			12
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	hnique – Gauss-Seidel method – N	Newto	n-Rap	ohson	method	- Fast-o	decoupled mo	ethod
(Qualitative			ala ala I			nomionion	less and line	flow
	on of solution techniques – Computation YMMETRICAL FAULT ANALYSIS		SIACK	ous p	ower, tra	ISINISSION	ioss and ime	10w.
	of short circuit analysis – Basic assum	ntions	in fa	ult an	alveis of	nower sve	tems Short	
	metrical fault – Problem formulation							
	with algorithm and flow chart. Compute							
line flows.	•							
Unit IV	NSYMMETRICAL FAULT ANALYSIS	5	6.0			the mark		12
	to symmetrical components - Oper							
	equence impedances and networks -		sis of	single	e line to g	ground fai	ult, line to line	fault
	ine to ground fault – Problem formulat	tion.					Reserve Luc	
and the second se	OWER SYSTEM STABILITY							12
	sification -Swing equation- Equal are							
	ing angle and time -Solution for swin	g equ	ation	using	Euler a	na moaiti	ed Euler met	nod -
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2. John	Grainger and Stevenson Jr. "Power S	Syster	n Ana	lysis"	, Tata Mo	Graw Hill	, 21 st reprint	2010
3. P. Ve	katesh, B. V. Manikandan, A. Sriniv	vasan	, S. C	Charle	es Raja,			
	is, Security and Deregulation" Prentice	e Hall	India	(PHI)	, 2012.	1.1.1		-1-
REFERENC							14.0	-
	aadat, "Power System Analysis", Seco							
	G.W. and El-Abaid, A. H. "Compute	er Met	hods	in Po	ower Sys	tem Anal	ysis", McGrav	v-Hill
Intern	itional Book Company 1993.	_						

Departme		ELECTRICAL A	ND ELECTRO					R 2019	Semester	V PC
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		(s): The purpose		-		U	-	00	100	
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		이상 영상에는 것이 같아요. 이 집 것을 위해 집에 가지 않는지 않는지 않는다.								
		system dynamics						312		
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		bility analysis of li								
		frequency response					IS.	1		
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Modeling of	of Electri	cal systems, Mecl	nanical systems	(Transl	ationa	al & F	Rotationa	l systems)	- DC Servon	notors-
		of Mechanical	Systems - Bloc	k diagr	am re	educt	tion tech	iniques -8	Signal flow g	raphs
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		ESPONSE ANAL	(15) (ABE) (5) (55) (1)	er syster	m for	diffe	rent inp	ut Signals	- Time resp	0.000
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Department	ELECTRICAL AND ELECTRONICS			the second second		R 2019	Semester V	V ES
Course Code	Course Name			and the second second	Credit	Total	Maximum	Mark
4050504		L	T	P	C	Hours	CONTRACTOR NOT PROVIDENT	
19ES501	MICROCONTROLLER AND EMBEDDED SYSTEM	3	0	0	3	45	100	
Course Obies		10.10				A		-
	tive (s): The purpose of learning this course				a with m	iorocontr	allera	
	and the basics of microprocessor and its com					licrocontr	ollers.	
	and the concepts of 8051 microcontroller and	Its va	ariou	s tea	tures.			
이 소리는 것을 많은 것을 수집하는 것이다. 것이다. 것	e advanced version of Microcontrollers.		1.0					
	nd the architecture of embedded systems and the second states of DTO's and its second states						.f. a wala a dala d	
and the second s	e brief introduction of RTO's and its schedulin	ng me	ecna	nisms	s and ap	plication of	or empedded	
Systems	mes: At the end of this course, learners will	ha ah	la ta	-				
	he evolution and architecture of microproces				ontrollor			
	he 8051 architecture and the function of on-o							
	he architecture and hardware features of PIC						otuorko	
	the basic concept of embedded system arch							
	he methods of scheduling, multitasking and t	ne ap	plica	alion	or empe	udeu sysi	ems.	
26 C 9 C 9 C 9 C 1 C 9 C 1 C 9 C 9 C 9 C 9	RODUCTION							9
	o Microcontroller and Microprocessor - Ex							
	Harvard architecture – CISC and RISC – C							essor
	8/16 bit Microprocessor – Application of Mic	rocor	ntroll	er an	d Microp	rocessor.		
	51 MICROCONTROLLER	1						9
	cture – Pin details – Addressing modes –		uctic	on se	ts - Tin	ning diag	rams – Men	nory -
	– Counters/Timers – Interrupts – Serial Ports					- 19 J.		
	RODUCTION TO ADVANCED MICROCON							9
PIC 16F877 N	licrocontroller – Architecture – On chip ADC) – Ca	aptu	re/Co	mpare/F	WM Mod	lule – I ² C – S	SPI –
	ner – ARM 7 (LPC2148) Microcontroller – An		ture	and	applicati	on.		inter a
Unit IV EN	BEDDED SYSTEMS AND ITS NETWORKS		-					9
		,						-
The build pro	cess for embedded systems - Structural un		an	embe	dded m	icrocontro	oller - Select	-
processor and	memory devices - Networks - CAN - USA	its for RT –	USB	- CF	PU bus, .			-
Unit V INT	I memory devices – Networks – CAN – USA RODUCTION TO RTO'S AND EMBEDDED	its for RT – APP	USB	ATIO	PU bus, . NS	ARM/SHA	ARC buses.	tion of 9
processor and Unit V INT Task, Process	I memory devices – Networks – CAN – USA RODUCTION TO RTO'S AND EMBEDDED s & Threads – Interrupt routines in RTO's –	its for RT – APP	USB	ATIO	PU bus, . NS	ARM/SHA	ARC buses.	tion of 9
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Course Code	Course Name		irs/W		Credit	Total	Maximun	n
course coue	oourse nume	L	T	Р	C	Hours	Marks	
19TPS05	QUANTITATIVE APTITUDE AND LOGICAL REASONING - III		0	0	0	30	100	
	ve (s): The purpose of learning this cours)					
•	help people make sense of numerical dat							
	the calendars and series in simplified way		~					
	d the concept of the interest amount in S						Contraction of the second	
	procedure to deal with a situation and suf		to de	eterm	ine the a	nswer.		
Teach sea	ting arrangements in rows or in small gro	oups.			1			112
Course Outcom	nes: At the end of this course, learners wi	III be a	ble to): _1	hlama a	nd tharab	u roducing the	
	e various principles involved in solving r	mather	matic	al pro	oblems a	na thereb	ly reducing the	3
time taken t	o solve Aptitude Questions.					haut math	odo	
	uestion based on calendar, odd man out						ous.	
	ne interest by using shortcut methods inst					IS.	a month of the	
	r critical thinking by solving the syllogism	and co	ourse	ofac	ction.			
in a second second second second second	e conditions and do interpretation.							
JNIT I DATA	A INTERPRETATION & CLOCKS RETATION: Tabulation – Bar graphs – Pi nition – important points – Angular diffe		Sec. 1					
Incorrect clock.								
CALENDARS: ODDMAN OUT JNIT III SIMP SIMPLE INTER methods	NDARS, ODDMAN OUT & SERIES Odd days – Leap year – Ordinary year – & SERIES: Odd man out – Power series LE & COMPOUND INTEREST REST: Principal – Rate of interest – N	s – Nui Numbe	mber er of	year	s – Usir	nce of rea	week. Il numbers. ae and shorte	
CALENDARS: 0 ODDMAN OUT JNIT III SIMP SIMPLE INTEF methods. COMPOUND IN Compounded au	Odd days – Leap year – Ordinary year – & SERIES: Odd man out – Power series LE & COMPOUND INTEREST REST: Principal – Rate of interest – N NTEREST: Compounded Annually – Co nnually – Rates are different for different	s – Nui Numbe mpoui years.	mber er of nded	year	s – Usir	nce of rea	week. Il numbers. ae and shorte	Cut
CALENDARS: 0 ODDMAN OUT JNIT III SIMP SIMPLE INTEF methods. COMPOUND IN Compounded an JNIT IV STAT	Odd days – Leap year – Ordinary year – & SERIES: Odd man out – Power series LE & COMPOUND INTEREST REST: Principal – Rate of interest – N NTEREST: Compounded Annually – Co nnually – Rates are different for different TEMENT & COURSE OF ACTION, SYLL	umbe Mumbe mpour years.	mber er of nded M	year Half-	s – Usir Yearly –	nce of rea	week. al numbers. ae and short inded Quarter	l (cut ly
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CALENDARS: ODDMAN OUT UNIT III SIMP SIMPLE INTEF methods. COMPOUND IN Compounded an UNIT IV STAT STATEMENT A further action in SYLLOGISM/ L propositions – In	Odd days – Leap year – Ordinary year – & SERIES: Odd man out – Power series LE & COMPOUND INTEREST REST: Principal – Rate of interest – N NTEREST: Compounded Annually – Co nnually – Rates are different for different EMENT & COURSE OF ACTION, SYLL ND COURSE OF ACTION: Courses of a regard to the given statement. OGICAL VENN DIAGRAMS: Relations!	 Number Number mpour years. OGIS action hip ber hip ber 	mber er of nded M - De tweer ductiv	year Half- cisior	s-Seque s – Usir Yearly – n taken - two thing	nce of rea ng formula · Compou Improven	week. al numbers. ae and short inded Quarter nent, Follow-u	ly ly ly n c
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Depart		ELECTRICAL AND ELECTRO					R 2019 Total	Semes	Semester V	
Course	Code	Course Name	Hour			Credit	direction with the	Maxim	um Ma	rks
19EE	504	POWER ELECTRONICS	L	T	P	C	Hours	100		
		LABORATORY	0	0	2	1	30	1	00	
		(s): The purpose of learning this c racteristics of power semiconductor								
		nalyze the Chopper and Inverter of		5.						
		asic topological power converter c		ing S	imula	tion tool.				
course O	utcomes	: At the end of this course, learne	rs will be	able	to:					
		steady state characteristics of vari		s of s	semico	onductor	devices.			
		hoppers and analyze the performa								
		single phase and three phase inve			l.,					
		voltage controllers' performance u ontrolled rectifiers and choppers u			n too	and anal	vzo tho no	formano	~	
		the second se	and the second			anu anai	yze the pe	normanc	е.	
Exp. No.	Oteratu	Name of	Experim	ents			a		1.011	
1		State Characteristics of SCR	and and the	Same	2 - 2 MA	and a second and and	- Strangers -	1. 1 - 1. 1 (b)		
3	and the second	State Characteristics of TRIAC State Characteristics of MOSFET	1.2	5050		A STELLY				_
4		State Characteristics of IGBT		-		- de la		and with	and and	_
5		State Characteristics of IGBT						11.04		_
6		wn and step up MOSFET based of	honnor						-	-
7		nance Analysis of Voltage commut		nnor	-	2				_
8		nance Analysis of Series Inverter	aleu cho	pper		and the second	a a la sama			_
9	And the second	ased single phase PWM Inverter	-			<u>6</u>		- the second	See.	
10	1	ased three phase PWM Inverter			-				-	-
11		entation of AC voltage controllers	using TR	IAC						_
12		entation of Three phase half and f	-		Rect	fiers usin		2 mar	-	-
13		entation of Single phase half and f				The second se				
S.No.		Name of t		7			9		Quar	ntity
1.	Device	Characteristics(for SCR, MOSFE	North State of the Law		COLUMN TRANSPORT	CT and IG	BT kit with	built in	2	0.1129U.04
		e power supply and meters)								
2.	MOSFE	T based step up and step down c	hoppers(Built	in / D	iscrete)	18.5		1	
3.		phase SCR based half controlled					d converte	er along	2	
	with bui	It in / separate / firing circuit/ modu	ule and m	ete				A CARLEN IN STREET		
4.	IGBT ba	ased single phase PWM inverter n	nodule/di	scret	e com	ponent		1.5.1.1	2	
5.	AT A STATE OF A STATE	ased three phase PWM inverter m			and a second second second		E R		2	
6.		TRIAC based single phase AC Co	ontroller a	long	with I	amp and	rheostat lo	ad	2	
7.	and the second	e Ray Oscilloscope			1				10	
8.		d Mode power converter module/	discrete o	omp	onent				2	_
9. (AND INCOME AND	AC meters of required range							20	
10.	Persona	al Computer			15.2			1.2	10	

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Departn		ELECTRICAL AND ELECTRONIC	102 - 502 5 2 8 10 2 3 2 - 5 1 - 5	a contraction of the	Contraction of the			Semester V P
Course (Code	Course Name	Ho	-		Credit	Total	Maximum Mark
19EE5	05 C	ONTROL SYSTEMS LABORATORY	L	T	P	C	Hours	100
CONVERSION AND			0	0	2	1	30	100
		s): The purpose of learning this course i					1.4	
		nowledge on applications of machines a		onic	cs dev	vices in	control sy	ystems.
		udents will have strong knowledge on M equency response various compensator						
		asic knowledge in practical control syste						
0 Illust	rate abou	it simulation of control system required f	or its plan	nnin	ig, op	eration a	and contr	ol.
		At the end of this course, learners will t			0. 1			
		ulate transfer function for given control s			ems			
		knowledge of MATLAB software.						
0 Dete	rmine tim	e response of given control system mod	lel					
		lency response Lag, Lead networks for g		itrol	syste	em mode	9I	
Exp. No.	nine P, P	Name of I		onte		1.1.2	Section 11	To use inchas an east
1	Determi	nation of transfer functions of self-excite						
2	A STOCK STOCK STOCK	nation of transfer functions of separately	•	1222 - 123	023.96 (A.S.	rator		
3	and the second second second second	nation of transfer function of armature co						
4	Determi	nation of transfer function of field contro	lled DC s	hur	nt mot	or		
5	Determi	nation of transfer function of DC servo n	notor	-				
6	Determi	nation of transfer functions of AC servo	motor		$_{\rm e}$			
7	DC posi	tion control system	1		1.0		-	
8	a chain the second second	motor control system						
9		imulation of Type-0 and Type-1 systems			19		1.	
10	•	imulation of first order and second order	r systems	1			1.12	4
11		Analysis of linear systems					-	
. 12	Simulate	e frequency response of lag and lead ne	12 hover three branching			1000		
S. No.		Name of the Eq						Quantit
1.		or Generator test set up for evaluation o	f motor p	ara	meter	S		1
2.		Control System Kit					1.0.2	1
3.	and the second se	chro transmitter& receiver					100	1
4.		vo Motor	4	L		1000	1919 B	1
5.		vo Motor						1
6.	Stepper				1.19			1
7.	System	with MATLAB						3

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Departm						-	Semester	_
Course C					Credit	Total	Maximum	Marks
19ES50	MICROCONTROLLER AND EMBEDI PROGRAMMING LABORATORY		T 0	P 2	C 1	Hours 30	100	
	pjective (s): The purpose of learning this course	is to						-
	ze the basic processor and controller functions							
	n the control program for various applications.							
	se the students to do programming in PIC Microo			1				
	ze the interfacing concepts in 8051Microcontroll utcomes: At the end of this course, learners will		_					
	ate the arithmetic operations that can be implem		n Mic	ronro	cessors	and Mi	crocontrolle	ər
	re the interfacing methods that can be used in N			opie	0000010	and m	or o o o o r n o n	51.
	a program to interface application oriented conti							
	mine the display and voltage control module usi							
Study	and understand the functional block of 8051 Mi	crocontrolle	er and	d PIC	Microco	ontroller	Same Same	
Exp. No.	Name of Expe	riments			e o line e		1.1.1.1	
1	8 bit arithmetic operations using basic 8085 M		or			and a second	1.515.17	. En
-	a)Addition b)Subtraction c)Multiplication d)Div		* 14C.34	e	en som sy minary	FRESPENSE	e marine men da	S. C. P. C.
2	8/16 bit arithmetic operations using 8051 Micro							
3	a)Addition b)Subtraction c)Multiplication d)Divis To design the implementation & interfacing of I		051	5		1311-2	-	
4	To develop an interface of keypad with 8051 M				-		and the state	
5	To generate 10 kHz square wave using 8051 M			-	-			-
6	To develop a Program for Transmission and R			throu	igh seria	al port u	sing 8051.	
7	To implement the design of DC Motor control u						S 1 2 1	
8	To interface PWM based voltage regulator usir				r.	S. 1.	Sec. States	
9	Analysis of interfacing of graphical LCD using I		ntro	ler.	1			
10	Real time clock interfacing with Arduino using I			184	145 -			1.14
S. No.	Name of the Ec		- 120		-they		Qua	antity
1.	8085 Microprocessor Trainer with Power suppl	-					ŧ	5
2.	8051 Micro controller Trainer Kit with power su	pply	2	1			ŧ	5
3.	8255 Interface board					1	ŧ	5
4.	8251 Interface board	1.					Ę	5
× 5.	8259 Interface board		Ince	lly.	and the second		ŧ	5
6.	8279 Keyboard/Display Interface Board	1.	144			-	5	5
7.	8254 timer counter	igs	20.00	24	1000	çanılır.ə		5
8.	ADC and DAC card						5	5
9.	Stepper motor with Controller		10				ŧ	5
10.	Traffic Light Control System	0 -		1	100		ŧ	5
11.	PIC Microcontroller Trainer Kit					1. C. C.		
12.	Arduino Interface Board	3		1	24			
13.	LCD Interface Board							

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Dep	artment	ELECTRICAL AND ELECTRONIC	SE	NGIN	EERIN	IG	R 2019	Semester V E		
			Hou	urs /	Week			Massimum Massi		
Cour	se Code	Course Name	L	Т	Р	Credit	Total Hours	Maximum Marks		
	19EE506	INTERNSHIP / INDUSTRIAL TRAINING	0	0	2	1	0	100		
	Un Ge Ge Ga Ga	tive (s): The purpose of learning this counderstand one or more practical application et an inside view of an industry and organition valuable skills and knowledge alke professional connections and enhance at experience in a field to allow the student of the end of this course, arrners will be able to provide short-term w	n of f zatio e net t to r	the con/co work make	mpany ing a care	er transi	tion	nv/ Organiza	tion	
Guid	elines							, ,		
		latory for every student to undergo this co								
		udent is expected to spend a minimum e vacation.	of	15-di	ays in	an Indu	stry/ Compa	ny/ Organiza	tion,	
3. 4.	The stude Organiza eligible fo	ent must submit the "Training Completion tion as well as a technical report not e or making a presentation before the comm mittee assesses the student performance,	excee	eding cons	15 pa stituted	ages, with by the c	thin the stipulepartment.	lated time to		

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Department	ELECTRICAL AND ELECTRONICS				0		Semester V	PC
Course Code	Course Name	HO	-		Credit	Total	Maximum N	lark
	DOWED OVOTEN BROTEOTION	L	Т	Ρ	С	Hours		
19EE601	POWER SYSTEM PROTECTION AND SWITCHGEAR	3	0	0	3	45	100	
	tive (s): The purpose of learning this course is							
	nd the need of protection of electrical equipme							
Compare	the operations and characteristics of various e	electro	mag	nețic	and stat	ic relays.		
Study the	arc interruption phenomena.							
	e the operations of various types of circuit bre							
Elaborate	the unit protection and over voltage protection	n of di	ffere	nt app	aratus i	n power	system.	
Course Outco	mes: At the end of this course, learners will be	e able	to				1	
	e various methods of over voltage protection			vstem	s and th	e importa	ance of ground	dina
in power s								
	he working principles of various types of relay	s and	fuse	S.				
Interpret t	he concept of circuit theory interruption and its	s impa	act or	n powe	er syste	m safety.		
D Summariz	e the various types of circuit breakers operation	on.						
Elucidate	various protection schemes of various power	syster	m co	mpon	ents like	alternat	ors, transform	ers,
feeders, tr	ansmission lines, bus bars etc.,							
Unit I INT	RODUCTION				n nish (11.11.2		9
Principles and	d need for protective schemes - nature ar	nd cau	uses	of fa	ults – t	vpes of	faults - Zone	es of
	d essential qualities of protection - Protection							
	switching – arcing grounds – Peterson Coil –							
	ling waves; surge absorber and diverters - I							
	ation coordination - Blackout case study.		.,		5		5	
	LAYS AND FUSES			-				9
The second further second to the second s	ments of protective relaying - Types of prote	ction	- Cla	ssific	ation of	relays: c	ver current re	
	stance and differential relays, under frequ							
	or based relays, Intelligent Electronic Devices							
	es – High Voltage H.R.C. fuses, Semico							
Disadvantage		, au		4000	1.66	location	, la vantagoo	Carro
	EORY OF CIRCUIT INTERRUPTION							9
	c phenomena and arc interruption. Restrik	ina va	oltag	e & F	Recover	v voltage	e, rate of rise	A CONTRACTOR
	ge, current chopping, interruption of capacitiv							
	C circuit breaking.						5	
	CUIT BREAKERS	4.1				1.11		9
	- fault clearing process - interruption of cur	rent -	- Fac	tor in	fluencin	a for the	Selection of	1 miles
	uit Breakers – Air blast, oil, SF6 and Vacuun							
	rs – Testing of circuit breakers – Circuit break							
Design and its								
	OTECTION OF ELECTRICAL APPARATUS		_		nut for			9
	otection - Alternators and transformer p	orotec	tion(Differe	ential 8	Restric	ted Earth E	
) – Protection of bus bars, Feeders, transmiss							
	protective schemes.			g.				
TEXT BOOK		1.0	_					
A Chakrah	ati,M.L.Soni,P.V.Gupta,U.S.Bhatnagar, 'A Te	vt Bor	ok or		er Syst	em Engli	neering' Dhan	nat
	Pvt) Ltd, New Delhi, Second revised Edition 2			1100	ci oyou	enn Engi	icening , brian	put
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2008	ao, 'Switchgear Protection and Power syste			1940 	1.4			
	 D N Vishwakarma, 'Power System Protect Second Edition, 2011 	ion ar	nd S	witchg	jear', Ta	ata McGr	raw-Hill Educa	ation
REFERENCE	(S):							
1. C.L. Wadh	wa, 'Electrical Power Systems', New Age Inte	rnatio	nal (P) Ltd	, 2000.			
						1		
				P	31	-		

	P.M.Anderson, 'Power system protection', IEEE Press – Wiley & Sons Publications, 1999
З.	B.Ravindranath, M Chander, 'Power system protection and switchgear', New Age International Pvt. Limited, 1977

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Department	ELECTRICAL AND ELECTRONICS	ENG		G	R 2019	Semester V	PC	
Course Code	Course Name	Hou		CTARGE STREET	- 284 STUDIES - 201	Total	Maximum	Marks
19EE602	SOLID STATE DRIVES	L 3	T	P 0	C 3	Hours 45	100	
	tive (s): The purpose of learning this course		0	U	3	40	100	
	the various drive characteristics	. 10 10						
Steady sta	ate operation and transient dynamics of a m	otor lo	bad s	yster	n.			
	ne operation of the converter/chopper fed do					and quar	ntitatively.	
	and performance of AC motor drives.							
Analyze a	nd design the current and speed controllers	for a	close	ed loo	op solid s	state DC r	notor drive.	
	mes: At the end of this course, learners will	be ab	le to					
	tability drive for the given application.	2		1				
	but the steady state operation and transient			of a r	notor loa	id system.		
	ne operation of the converter/chopper fed do ne operation and performance of AC motor of							
	nd design the current and speed controllers			ad lo	on solid s	state DC r	motor drive	
		ioi a	0030	54 10	op solid .	state DOT	notor anve.	9
Electric drive	- Equations governing motor load dynamic	s – st	eady	stat	e stabilit	y – multi d	quadrant Dyn	amics:
	deceleration, starting & stopping - typical loa			chara	acteristic	s – Select	ion of motor.	
	NVERTER / CHOPPER FED DC MOTOR I		150					9
	analysis of the single and three phase							
	nduction – Time ratio and current limit cont	trol –	4 qu	adrar	nt operat	ion of con	verter / chop	per fed
drive-Applicat	DUCTION MOTOR DRIVES							9
169/34038/3/33378	e control-V/f control- Rotor Resistance of	contro	daus	litati	vo troat	mont of a	lin nower re	
	loop control— vector control- Applications.	Contro	n-qua	antati	ve lieau	nent of a	silp power re	covery
	NCHRONOUS MOTOR DRIVES							9
	d self-control of synchronous motor: Margin	angle	e cor	trol a	and powe	er factor o	ontrol-Three	phase
voltage/currer	t source fed synchronous motor- Application			1				
1	SIGN OF CONTROLLERS FOR DRIVES							9
	tion for DC motor / load and converter - clo							
	age control and field weakening mode –	Desig	in of	con	rollers; o	current co	ontroller and	speed
				-	-			
TEXT BOOK					11	1000		
	ubey, Fundamentals of Electrical Drives, Na			-				
	ose. Modern Power Electronics and AC Drive n, Electric Motor & Drives: Modeling, Analysi							
REFERENCE		is and	COL	uoi,	Pearson	, 2001.		12120
		Annli	antin		0- M-C		2010	
	bramanyam, " Electric Drives Concepts and	the second s		and the second	Contraction of the second		233.22245325	-
	elizadeh, "Electric Machines and Drives", CF					Contract of the second s		
	marsh and Alasdain Renfrew, "Electrical Mar Wildi, "Electrical Machines, Drives and							ation
,2015		powe	a sy	stern	is, otri	eution, P		alion
5. N.K. De., F	P.K. SEN" Electric drives" PHI, 2012					1 - Contract	and the second second	Sec. 1

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De	partment	ELECTRICAL AND ELECTRONICS	ENG	INE	ERIN	G	R 2019	Semester VI	PC
	Irse Code	Course Name	Ηοι		-	Credit	Total	Maximum M	/arks
			L	T	P	C	Hours		
 	9EE603	RENEWABLE ENERGY SOURCES	3	0	0	3	45	100	
1.1		ctive (s): The purpose of learning this course							
0		and the basic concepts and the importance of			ble e	nergy res	sources		
		out the basic concepts of solar energy and it			-				
		the concepts of wind and its uses for power on out the fundamentals and importance of bio							
0	Undereta	and the concept of other alternate sources fo	n nov		ener	ation			
						adon			
		omes: At the end of this course, learners wil							
		he knowledge about various renewable ener ne concept of solar energy uses and its base				ration			
		he basic concepts and working of wind energy					ation		
		ze the bio conversion from Anaerobic/aerob						n nrocess	
		the other types of energy sources for power						n process.	
Un	it I NO	N CONVENTIONAL ENERGY SOURCES	gone	nutio	iii aii		when the units	No. of the local sector	9
Intr	oduction a	bout the renewable energy sources - W	orld	Ener	gy s	tatus -v	vorld ener	gy future - E	nergy
SOL	irces and t	heir availability in India - Importance of rene	ewab	le en	ergy	sources	- Types of	of Non conver	ntional
		es and its uses - Green coal technologies - E	Inerg	y co	nser	vation - C	Cost of ene	ergy	
Un		LAR ENERGY		1	0.1			the la common	9
Intr	oduction a	bout the solar energy - Basics of Solar ra	diatio	on -	Sola	r PV sys	Selar na	their compor	tome-
50	ar cells - F	Performance of solar cell - Estimation of po of solar energy – Solar water heating -	Sol	ar s	nace	heating	- Solar pa	na systems -	Solar
	salination s		001	u 3	puce	nearing		ig official	e e i ai
-		ND ENERGY			-				9
		d – Wind Power calculations - Power in wi	ind to	urbin	e - :	Site sele	ction -Mer	its and limitat	ions -
Wi	nd enerav	conversion system - Basic principles of V	Nind	Ene	erqy	Conversi	ion -Wind	turbine type	s and
		- power equation -grid connection - environn					59954		
Un		DMASS ENERGY							9
Pri	nciple of Bi	o conversion - Anaerobic/aerobic digestion	- E	Bio ga	as ge	eneration	-Types o	f bio-gas dige	sters-
		of bio gas plants – advantages and disadva	ntage	es –s	selec	tion of si	te for blog	as plant.	9
		TERNATE SOURCES g principle, types, features and potential	lo fo	r 1/0	riour	nowor	aonoratio	n technologi	-
Ge	othermal 7	Fidal and MHD. Thermo nuclear energy-Basi	ics o	f Nuc	lear	fusion re	eactor. Oce	ean. Fuel cells	i.
	XT BOOK							201 1 1 1 2 1	
		"Non Conventional Energy Sources", 1 st E	ditior	h, Kh	anna	Publish	ers, 2010.	- Andreas and a	- 1
2.	B. H. Khar	n, "Non-conventional Energy Resources", 2 r	nd E	ditior	n, Tat	a McGra	aw Hill, 200	09, New Delhi	
3.	Desai,AV,	"Energy Demand: Analysis, Management a	nd C	onse	rvati	on", Wile	y Eastern	Limited, 1990	
RF	FERENCE								
1	A.K.Muker	rjee and Nivedita Thakur," Photovoltaic Sy	stem	is: A	naly	sis and I	Design", F	PHI Learning	Private
	Limited, N	ew Delhi, 2011							
2.	Richard A.	Dunlap," Sustainable Energy" Cengage Lea	arnin	g Inc	lia P	rivate Lin	nited, Delh	ni, 2015.	
3.	Chetan S	ingh Solanki, "Solar Photovoltaics : Fu	ndar	nenta	als, `	Technolo	ogies and	Applications",	PHI
-	Learning F	Private Limited, New Delhi, 2011							
4.	Bradley	A. Striebig,Adebayo A.Ogundipe and	Mari	a F	apa	dakis,"	Engineeri	ng Application	ns in
-	sustainabl	e Design and Development", Cengage Lear	ning	India		ate Limit	Droce in	2010.	ith the
5.		Boyle, "Renewable energy", Open Univers	ity, (OXIO		niversity	Press in	association w	iui uie
6	Shokh Ma	versity, 2004. th Singh, 'Non-conventional Energy resourc	'ae' [Dear	son F	ducation	2015		
6.	SHOULING	an oligh, Non-conventional Energy resource		Cars	5011	-uuuuuu	1,2010.		
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						l	20		

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Department	ELECTRICAL AND ELECTRONIC					R 2019	Semester VI PC
Course Code	Course Name	Ho	urs/M		Credit	Total	Maximum Marks
19EE604	POWER SYSTEM ANALYSIS	3	T 1	P 0	C 4	Hours 60	100
	ctive (s): The purpose of learning this of	-		U	4	00	100
	stand the power system components	Jourse	15 10				
	the power flow problems						
	symmetrical faults in power system netv	vorke	usina	They	anin's a	nd 7 Bus r	nethod
	unsymmetrical faults in power system net						
	the various stability problems.	ciwon	No uoi	ng m	evenina		3 method
	omes: At the end of this course, learne	re will	he at	le to			
	ate the incidence, network matrices and				r syster	n compon	ents
	m steady state power flow analysis of p				—		
	ethods.	00.	0,000	ii noti	ionio de	ang amore	in pono.
	e symmetrical faults in power system ne	etwork	ks usi	na Th	evenin's	and Z Bu	s method.
	e unsymmetrical faults in power system						
0 Classif	y different stability studies in power sys	tem	onto t	ioning i	- Duo m	curiou.	and the second second
Unit I INT	RODUCTION			191			12
Need for sys	tem planning and operational studies	- S	ingle	line c	liagram,	Impedan	ce and Reactance
diagrams - Po	er phase and Per Unit representation -	Char	nge of	base	Primiti	ve network	and matrices - Y.
	on by direct inspection and singular tra	ansfor	matio	n met	hods. B	us building	g algorithm for the
formation of Z							
	WER FLOW ANALYSIS	_					12
	f power flow analysis in planning and					ystems. B	us classification -
Solution took							
	nique – Gauss-Seidel method – N						decoupled method
(Qualitative s	tudy only) - Comparison of solution						decoupled method
(Qualitative s transmission le	tudy only) – Comparison of solution oss and line flow.						decoupled method slack bus power,
(Qualitative s transmission lo Unit III SY	tudy only) – Comparison of solution oss and line flow. MMETRICAL FAULT ANALYSIS	n tec	hniqu	es –	Compu	itation of	decoupled method slack bus power, 12
(Qualitative s transmission k Unit III SY Importance of	tudy only) – Comparison of solution oss and line flow. MMETRICAL FAULT ANALYSIS short circuit analysis – Basic assumpt	n tec tions i	hniqu	es – It anal	Compu ysis of	tation of	decoupled method slack bus power 12 tems. Short circuit
(Qualitative s transmission k Unit III SY Importance of MVA – Symm	tudy only) – Comparison of solution oss and line flow. MMETRICAL FAULT ANALYSIS short circuit analysis – Basic assumption petrical fault – Problem formulation - TI	n tec tions i heven	hniqu in faul	es – It anal	Compu- ysis of entation	power sys - Fault ar	decoupled method slack bus power 12 tems. Short circuit nalysis using Z-bus
(Qualitative s transmission le Unit III SY Importance of MVA – Symm matrix with al	tudy only) – Comparison of solution oss and line flow. MMETRICAL FAULT ANALYSIS short circuit analysis – Basic assumpt	n tec tions i heven	hniqu in faul	es – It anal	Compu- ysis of entation	power sys - Fault ar	decoupled method slack bus power 12 tems. Short circuit nalysis using Z-bus
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(Qualitative s transmission I Unit III SYI Importance of MVA – Symm matrix with all flows. Unit IV UN Introduction tr currents – Seand double lin Unit V PO Stability class critical clearin Methods for st TEXT BOOK(3) 1. Nagrath. Edition, 2 John J. C 3. P. Venk Analysis REFERENCE(1)	tudy only) – Comparison of solution oss and line flow. MMETRICAL FAULT ANALYSIS short circuit analysis – Basic assumpting tetrical fault – Problem formulation - Trigorithm and flow chart. Computations SYMMETRICAL FAULT ANALYSIS o symmetrical components – Operating quence impedances and networks –Arrent to ground fault – Problem formulation WER SYSTEM STABILITY ification -Swing equation- Equal area g angle and time -Solution for swing tability improvement. S): I.J, Kothari. D.P, "Modern Power system atesh, B. V. Manikandan, A. Sriniva , Security and Deregulation" Prentice Harris (S): adat, "Power System Analysis", Second	tions i heven of sh tor 'a halysis crite equa stem A isan, all Ind	hnique in faul in's re ort cir '-sym s of s s of s rion - ation u Analy S. Cl lia (PH	es – It anal eprese rcuit c ingle - Pow using sis", Ta harles II), 20	Compu- ysis of entation apacity, al com ine to g ver angl Euler a Fata McG Raja, 12.	power sys - Fault ar post faul ponents i ponents i round fau e equatio nd modifie Graw Hill raw Hill, 2 "Electrical	decoupled method slack bus power, 12 tems. Short circuit halysis using Z-bus t voltages and line 12 n terms of phase It, line to line fault 12 n-Determination of ed Euler method - Pub.Co. Ltd., 4 th 1 st reprint 2010 Power Systems: 010.
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	P.Kundur, "Power System Stability and Control", McGraw Hill publications, 10 th reprint 2010.
5.	Olle. I. Elgerd, 'Electric Energy Systems Theory – An Introduction', Tata McGraw Hill Publishing Company Limited, New Delhi, Second Edition, 2012.

BL Chairman - BoS Dept. of EEE - ESEC

Department	ELECTRICAL AND ELECTRONIC	S ENG	SINE	ERIN	IG	R 2019	Semester VI EE
Course Code	Course Name	Hou	rs/W	eek	Credit	Total	Manimum Mander
Course Code	Course Name	L	T	P	С	Hours	Maximum Marks
19TPS06	QUANTITATIVE APTITUDE AND LOGICAL REASONING - IV	2	0	0	0	30	100
	tive (s): The purpose of learning this court				Dec. Dec. of a		
Contraction of the second s	n the occurrence of an event on the basis						
10-4 B-12	a models to represent the distributive prop			hem	atical rea	asoning.	
	e the work capacity by chocolate based n th time, speed and distance by relative sp			ots.	_		
Determir	ne how various phenomena are related.						
	mes: At the end of this course, learners v						
Contract of the second s	e outcome of an event developed the con				ty.		
	e the area and surface volume in real time						11- O
	and the concepts of Times and Work and	Pipes	and	Ciste	rn and C	orrelating	the Concepts of
both.	a concents of Time, Speed and Distance	and or		to of	Deate a	nd Stroom	
	e concepts of Time, Speed and Distance the cause and effect of problems by usin					nu strear	lis.
	BABILITY , PERMUTATIONS & COMBIN	•		TIKING	J		6
	Y: Rolling an unbiased dice – Tossing a f			rawi		from a r	
	g up balls of certain color from a bag con						der of weir shuffled
	ONS: Numbers with digits - Words w						person in a row -
Arrangements	of books on a shelf.						
	NS: Formation of committee - Selection	of que	stion	s fro	m questi	on papers	3.
UNIT II AREA				-			6
	Perimeter – Important points about trian						
	boids - Cube - Cylinder - Cone - Frus	tum of	a co	one -	- Sphere	- Hemis	phere - Pyramid -
their formulas.	& WORK, PIPE & CISTERNS			_	9	1. Y.	6
	ORK: Introduction – Basic concepts – L s starting and ending.	Leaving	g and	a joir	ling – Al	ternative	days - In between
	ISTERNS: Introduction - Basic concepts	- Can	acity	of th	e total lite	ers _Wat	er flow in the tank
	& DISTANCE, TRAINS, BOATS AND S			or an		oro man	6
	STANCE: Definition - Average speed			COVE	ered is s	same – D	Distance covered is
	ppage time per hour for a train - Time						
	etween two moving bodies.	Anis		Eng		1.00-04-040	No.4
	ON TRAINS: Basic concepts - Basic	formul	ae -	- Diff	erent ty	pes of o	bjects –Two trains
	other in both directions – Shortcuts. STREAMS: Introduction – Speed of ma	n (hor	t on	d otr		Moving	some and ennesite
	portant formulae.	sou) ne	at and	u sue	eams) -	woving	same and opposite
	EMENT - CONCLUSION , ARGUMENTS					COEDTIC	N & PEASON 6
	AND CONCLUSION: Statement to be tru	and the second s		22.25.34			
	AND ARGUMENTS: Arguments strong v						gically follows.
	EFFECT: Cause and effect relationship b						
	AND REASON: Assertion(A) and Reason						dually true and (R)
	t (R) is false – (A) is false but (R) is true.						
REFERENCE	S:						
Hill Public	ha, Quantitative Aptitude for Competi				10		
2. Arun Sha	rma, How to prepare for Data Interpret Company Ltd, 2012.	tation	for th	ne C	AT, Firs	t Edition,	Tata McGraw-Hill
-		"Thind		-		ing 0040	
	en, "Quantitative Aptitude and Reasoning"						
^{4.} Ltd, 2017.							
	ma "How to prepare for Quantitative Aptiti		•		and the second s		ducation, 2018
6. "Reasonin	g and Aptitude" for GATE and ESE Prelin	ns, Ma	de Ea	asy F	ublicatio	n, 2020.	

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Departme						R 2019	Semester VI	
Course Co	de Course Name	Ho	urs/\	Veek	Credit	Total	Maximum	
19EE605	RENEWABLE ENERGY LABORATO	RY L	LT		С	Hours	Marks	
IJEE000			0	2	1	30	100	
and the second	ective (s): The purpose of learning this cours							
	ne students in Renewable Energy Sources an				- France			
	a adequate inputs on a variety of issues in har nize current and possible future role of Renew					<i>.</i>		
			_03	ouroc				
	comes: At the end of this course, learners wi		10:					
	tand and analyze Renewable energy systems ne students in Renewable Energy Sources an							
	e adequate inputs on a variety of issues in har				e Enera	,		
	te the various Renewable energy sources.	licssing	itterie	wabi	c Energy	·		
	nize current and possible future role of Renew	able ene	rgy s	ource	es.			
I Unders	tand basics of Intelligent Controllers.							
Exp. No.	Name of Exper	ments				y-siles	ay and a second s	
1	Simulation study on Solar PV Energy Syste	m.						
2	Experiment on "VI-Characteristics and Effic				100			
3	Experiment on "Shadowing effect & diode b	ased sol	ution	in 1k	Wp Sola	ar PV Syst	tem".	
4	Experiment on Performance assessment o	Grid co	nnec	ted a	nd Stand	alone 1k	Np Solar	
1. A.	Power System.							
5	Simulation study on Wind Energy Generato	r.	1.5					
6	Experiment on Performance assessment of	micro W	ind E	nerg	y Genera	ator.	- L. / S	
7	Simulation study on Hybrid (Solar-Wind) Po	wer Syst	em.					
8	Experiment on Performance Assessment o	Hybrid (Sola	r-Win	d) Powe	r System.		
9	Experiment on Performance Assessment of	100W F	uel C	ell.				
10	Simulation study on Intelligent Controllers for		-	C				

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Department	ELECTRICAL AND ELECTRON	ICS ENGI	NEE	RINC	3	R 2019	Semester VI EEC
Course Code	Course Name	Course Name Hours/Week Cred		Credit	Total		
4055000		L	Т	P	С	Hours	Maximum Marks
19EE606	MINI PROJECT	0	0	2	1	30	100
Course Outcome	innovative prototype of ideas. dents in preparing mini project reports s: At the end of this course, learners r final year project work and find solut	will be ab	le to:	71011	proper m	ethodol	ogy.
prepares a con progress of the be constituted semester. The	in a group of 5 to 6 works on a to mprehensive mini project report at project is evaluated based on a mi by the Head of the Department. A mini project work is evaluated base hal and internal examiners constituted	fter comp nimum of mini pro ed on oral	leting two ject pres	g the revie repor senta	e work ews. The t is req ation and	to the review uired at the m	satisfaction. The committee may t the end of the

BL Chairman - BoS Dept. of EEE - ESEC

Chairman - 805 Dont of CCE - ESEC

Department	ELECTRICAL AND ELECT					R 2019	Semester VI	
Course Code	Course Name	Hour	s/ We T	P	Credit C	Total Hours	Maximu Marks	
1046601	CAREED SKILLS						and the second se	1
Develop Improve Enable tl Prepare Strength Course Outco Develop Make eff Understa Enhance Strength Jnit I LISTE Conversational	CAREER SKILLS tive (s): The purpose of learning students' communicative com- their ability to communicate ef- the learners to fine-tune their co- the error-free documents. en their thinking level and upda- mes: At the end of this course listening skills to comprehend ective presentations in group/p and various concepts by readir the writing skills to express the en their soft skills. NING skills (formal and informal) ing interviews conversations,	petence ir fectively ir omprehen ate their kr , learners general / oair and a g differen e ideas of - Watchi	n Engl n inter ding le nowlec will be techni attend t texts f the le	ish w view evel dge fa e abl ical ti job i s. earne	s. of difference or career e to alks. nterviews ers. discussi	nt texts. growth.	ective presenta	6 ations m TV
Different types anguage paralinguistic Jnit III READ	Group Discussion - Participati of Interview format - answerir features) - Articulation of soun	ig questio ds - Inton	ns - o ation -	fferir - Mał	ig inform	ation - Mo	ock interviews - entations	- Bod
content - Gap	filling exercises - Sequencin	g the sent	tences	S	oleo ana	enert eter		9
Unit IV WRIT							1	
Writing Job ap	P. P. D. D. B.	and a second sec						6
Reports - Inter	plications - Resume preparati preting the visual texts – Com ER SKILLS	on - E-ma mon Error	ail writ rs in E	ing - Inglis	Letters(h - Prepa	formal & i aration of	nformal) - Men Essays	
Reports - Inter Unit V CARE Introduction to career changes Stress manages and Critical thir TEXT BOOK(S) 1 E. Suresh	Preting the visual texts – Com ER SKILLS Employability and Career S s -Time Management - Genera ement - Leadership traits - T hking	mon Error skills - de al awarene ſeam wo	rs in E velopi ess of ork -	ng a Curr Inter	<u>h - Prepa</u> long ter ent Affair cultural c	m career rs - Manag ommunica	Essays plan - making ging changes - ation - Creative	nos - 6
Reports - Inter Unit V CARE Introduction to career changes Stress manage and Critical thir TEXT BOOK(S 1 E. Suresh 2015	Preting the visual texts – Com ER SKILLS Employability and Career S s -Time Management - Genera ement - Leadership traits - T hking): Kumar et al. Communication	mon Error skills - de al awarene ſeam wo	rs in E velopi ess of ork -	ng a Curr Inter	<u>h - Prepa</u> long ter ent Affair cultural c	m career rs - Manag ommunica	Essays plan - making ging changes - ation - Creative	nos - 6 1 -
Reports - Inter Unit V CARE Introduction to career changes Stress manage and Critical thin TEXT BOOK(S) 1 E. Suresh 2015 REFERENCE(S)	preting the visual texts – Com ER SKILLS Employability and Career S s -Time Management - Generatement - Leadership traits - Toking): Kumar et al. Communication S):	mon Error kills - de al awarene Feam wo for Profe	rs in E velopi ess of ork - ssiona	ng a Curr Intere	h - Prepa long ter ent Affair cultural c	m career rs - Manag ommunica Drient Bla	Essays plan - making ging changes - ation - Creative	nos - 6 1 -
Reports - Interverted Introduction to career changes Introduction to career changes Stress manages and Critical thir TEXT BOOK(S) 1 E. Suresh 2015 REFERENCE(S) 1 Butterfield,	Preting the visual texts – Com ER SKILLS Employability and Career S s -Time Management - Generatement - Leadership traits - Thing hiking): Kumar et al. Communication S): Jeff Soft Skills for Everyone. C	mon Error kills - de al awarene Feam wo for Profe Cengage L	rs in E velopi ess of rk - ssiona	ng a Curr Inter al Su	h - Prepa long ter ent Affair cultural c iccess. C	m career rs - Manag ommunica Drient Bla , 2015.	Essays plan - making ging changes - ation - Creative ckswan: Hyder	nos - 6 7 - - -
Reports - InterUnit VCAREIntroduction to career changesStress manageand Critical thinTEXT BOOK(S)1E. Suresh 20152015REFERENCE(S)1Butterfield, Raman, Me Oxford, 201	Preting the visual texts – Com ER SKILLS Employability and Career S s -Time Management - General ement - Leadership traits - T hking): Kumar et al. Communication S): Jeff Soft Skills for Everyone. C glish Lab Manual for Undergra eenakshi and Sangeeta Sharr	mon Error kills - de al awarene Feam wo for Profe Cengage L duate Stu na. Profes	rs in E velopi ess of ork - ssiona dents ssiona	ng a Curr Inter al Su ng: N , Orie	h - Prepa long ter ent Affair cultural c iccess. C lew Delhi ent Balck	m career rs - Manag ommunica Drient Bla , 2015. Swan: Hy	Essays plan - making ging changes - ation - Creative ckswan: Hyder yderabad, 2016	nos 6 7 abao

Chairman - BoS Dept. of EEE - ESEC

Department	ment ELECTRICAL AND ELECTRONICS ENGINEERI	RING	R 2019	Semester VII	ES			
Course Code	Course Name	Hour	s/W	leek	Credit	Total	Maximum M	/larks
4050704		L	T	Ρ	С	Hours	e të daga	
19ES701	RESEARCH METHODOLOGY	3	0	0	3	45	100	1.5
Know the Collect t Learn Se Know the	f learning this course is to basics of Research formulation a he data and Analyze oft Computing Algorithms concept of Ethics and scholarly p w to prepare reports				IPR			
Course Outco	mes:		-				the second s	-
 Understa Collect a Impleme 	nis course, learners will be able to and basics of research formulation nd analyze data with statically pao nt soft computing algorithm and ethics and IPR reports	and o	desi s.	gn				• •
Unit I RESE	ARCH FORMULATION AND DE	SIGN		-				9
Unit II DATA	asic research process, criteria of ting the problem, necessity of de blem, literature review- primary bases, web as a source, searchin erature and research database, COLLECTION AND ANALYSIS hod validation, observation and c	fining and s ng the develo	the eco wel	prol ndar b, c lent	blem, imp y sources ritical lite of workin	portance of a, reviews, n rature revie g hypothesis	literature revie nonograph, pat w, identifying s.	ew in tents, gap 9
(Sigma STAT,	SPSS for student t-test, ANOVA, e	dies a	ind	tools	s, data a	nalysis with	statically pac	kage
	COMPUTING				a la		Services for services	9
Introduction to	its role in research, Use of evolutionary algorithms - Funda k based optimization, Optimization	ament	als	of G	Genetic a	PSS, GRE lgorithms, S	L etc in reso Simulated Anne	earch. ealing,
	ARCH ETHICS, IPR AND SCHO							9
ights (TRIPS);	ssues, ethical committees (hum mmercialization, copy right, roy scholarly publishing- IMRAD c ent, plagiarism, reproducibility and	alty, t	rade	e rel	lated asp design of	pects of inte	ellectual prope	rtv r
	RPRETATION AND REPORT WR			11				9
Oral presentat Mechanics of w	terpretation, Technique of Inter ng, Different Steps in Writing Rep ion, Mechanics of writing a Re riting a Research Report, Precau	oort, L eseard	ayo ch l	ut of Repo	the Rese ort.Types	arch Report	t, Types of Rep Oral Presenta	orts
1. Garg, B		A		117	0000		÷	
2. An intro	.L., Karadia, R., Agarwal, F. and A duction to Research Methodology	-garw		J.K.,	2002.			
/ / IIIIII / IIII	duction to research wethodology	, RBS	AP	uplis	ners.			

Bly Chairman - BoS Dept. of EEE - ESEC

3.	Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.
4.	Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Publications. 2 volumes.
5.	Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.
REFI	ERENCES:
1.	Anthony, M., Graziano, A.M. and Raulin, M.L., 2009. Research Methods: A Process of Inquiry, Allyn and Bacon.
2.	Fink, A., 2009. Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications

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Department	ELECTRICAL AND ELECTRONI	CS EN	GINEEF	RING	R 2019	Semester VII PC
Course Code	Course Name		s /Week		Total	Maximum Marks
	POWER SYSTEM OPERATION	L	TP	С	Hours	
19EE701	AND CONTROL	3	0 0	3	45	100
 Study th Schedule Model per Model Model maintain 	tive (s): The purpose of learning this cou e system load characteristics and over v e generating units an economically. ower - frequency dynamics and to design reactive power - voltage interaction ing voltage profile against varying syst ADA and EMS for monitor and controlling	view of n powe and th em loa	power s r-freque e contr d.	ency cont ol action	rollers.	
 Determin Explain dispatch Prepare model a for Auto Develop static an Develop 	mes: At the end of the course, learners the the reserve capacity of power system of generating units with and without los the unit commitment scheduling of matic Load Frequency Control. The mathematical model of two area lo d dynamic analysis. The mathematical modeling of excita f power system using state estimation and	based ation a genera govern bad free tion sy	on load and con ting uni ing syst quency stems a	trol and ts and o tem, sta control a and expl	determir develop t tic and c and tie lin	he mathematical dynamic analysis e bias control for
Unit I INTRO	ODUCTION					9
duration curve reserves, cold commitment, I system voltage	 variation: system load characteristics load factor - diversity factor - Res reserves, hot reserves- Overview oad dispatching - Overview of system control, security control - Power Grids: 	serve r of sy em cor	requirem stem c ntrol: G	peration	stalled re	eserves, spinning forecasting, unit LFC, EDC, AVR,
	EM OPERATION					9
without loss and coefficients.) - constraints in U constraints - (Numerical pro	orecasting — Economic dispatch — I nd with loss, solution by direct metho Base point and participation factors - IC: spinning reserve, thermal unit constr Solution methods: Priority-list method blems only in priority-list method usin re economic dispatch and unit commitme	d and Stater aints, h ods, fo g full-le	λ-iteration ment of hydro co prward oad ave	ion meth Unit Co nstraints dynamic	nod (No mmitmen , fuel con prograr	derivation of loss t (UC) problem - straints and other nming approach.
Unit III SYST	EM CONTROL: REAL POWER - FRE	QUENC	Y CON	TROL		9
model: speed g control – secon representation	nd frequency control – Fundamentals governing system, Turbo generator - sindary ALFC loop - AGC in power syst of two area system – static and dynamic Economic dispatch controller added to	tatic ar tems – c respo	nd dynai modeli onse – ti	mic resp ng of tie e line bia	onse of / line – T as control	ALFC – feedback wo area system: - Frequency bias
	EM CONTROL: REACTIVE POWER -				1	9
absorption of r capacitors, syr requirements: E developments	r and voltage control - interaction betw eactive power - Methods of voltage conchronous condensers - Static VAR Elements of an excitation system - Type and future trends – Modeling of exci link modeling to control reactive powe	ontrol - System s of ex tation	Shunt ns - Ty citation systems	reactors pes of system: s – Aut	, Shunt c SVC - E DC, AC,	apacitors, Series Excitation system Static and recent
and the second se	PUTER CONTROL OF POWER SYSTE	199879-1				9
center and its f SCADA and EN	uter control of power systems, conce functions, system monitoring, data acqui MS functions, network topology, state es alert, emergency, in-extremis and rest	sition a	and cont	rol, syste rity anal	em hardw ysis and	are configuration, control, operating
			12	13	Ir	

TEX	T BOOK(S):
1.	Allen J. Wood and Bruce F. Wollenberg, "Power Generation Operation and Control", Wiley India Pvt. Ltd., Third Edition, 2014.
2.	Prabha Kundur, "Power System stability and control", Tata McGraw Hill publishing company Ltd., New Delhi, Third Edition 2012.
REF	ERENCES:
1.	Gupta B.R and Vandana singhal, "Power System Operation and Control", S.Chand and company Ltd., New Delhi, 2014.
2.	Sivanagaraju.S and Sreenivasan.G, "Power System Operation and Control", Pearson education, New Delhi, 2010.

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Department	ELECTRICAL AND ELECTRON	ICS E	ENG	INEE	RING	R 2019	Semester VII P
Course Code	Course Name	Hou	rs/M	/eek	Credit	Total	Maximum
Course cours		L	Т	P	С	Hours	Marks
19EE702	ELECTRIC POWER UTILIZATION AND ENERGY AUDITING	3	0	0	3	45	100
State - Second State - And the State of the second second	tive (s): The purpose of learning this cour		to				
	d the purpose of electric heating and welc e the need of illumination.	ang.					
	d the various electrolytic process and ene	ergy s	tora	ge sy	stem.		
	e of industrial based drives and traction sy	stem		নাগ্য এক			
	the steps involved in energy audit. mes: At the end of this course, learners w	vill be	abl	o to			
	e need of electric heating and welding.		au	e 10			
	the usage of illumination in energy conse	ervatio	on.				
Understand	ding the storage of energy with battery typ	bes,					
Interpret th Summarize	e topology of drives used in industries and the procedure involved in energy auditin	d trac	tion	syste	enerav	conservat	ion
Unit I ELE	CTRIC HEATING & WELDING	gan	a new		chergy	conscivat	9
Electric Heatin	g-need of electric heating. Modes of	hea	t tra	ansfe	r- Resis	stance he	eating - Infrared
heating - Arc t	furnaces- Induction Heating- High freque	ency	edc	ly cu	rrent he	ating- Di	electric heating -
Choice of fre	equency Resistance welding – arc we wer supply for arc welding- arc welding wi	elding	- R	adiat	ion We	lding- Ul	trasonic welding-
		ith D.	C ar	Id A.	U .		
	JMINATION ENGINEERING	ainati		F MI		A MOOD	9
	light -Definitions- Polar curves -Determ - incandescent lamps, sodium vapo						
lamps - desi	gn of illumination systems - indoor ligh	ting	sche	mes	- factor	y lighting	- outdoor lighting
	d lighting - street lighting - Energy Efficier						
	CTROLYTIC PROCESSES AND STORA						9
	polarization factor - preparation wo						
	 Methods of charging and maintenance and Li-ion battery Components and main 						
	CTION SYSTEM	tenas	5-0	apat	ity rating	g of balle	9
	of traction- Systems of Electric Traction	- Tra	ick E	Electr	ification	comparis	
and AC system	ns of Railway electrification. Typical Spe	eed -	Tin	ne cu	irves- F	actors aff	fecting Schedule
	ied Speed-time Curve- Mechanics of						
traction and rec	r. Energy output from the driving axles- ent trends	Dete	rmir	ation	or spe	cific ener	gy output A.C.
	RGY CONSERVATION AND AUDIT	1					9
	generation - load curves - number and	size	of u	nits -	- cost of	electrica	
need for electr	ical energy conservation-methods - energy	rgy e	fficie	ent e	quipmen	it - energ	y management -
	g. Economics of power factor improvem	nent ·	– de	esign	for imp	rovement	t of power factor
	apacitors – power quality issues.		_	*			
TEXT BOOK(S		P		- 00			and the second second
	"Electric Power", 15th Edition , Khanna P	2 Martin Starting	202225200			tana Lin	ited New As
Internation		Powe	Γ,	vviie	y Eas	tern Lin	nited, New Age
^{3.} J.B.Gupta,	"Utilisation Electric power and Electric Tra	actior	", S	.K.Ka	taria an	d Sons,10	0 th edition 2013.
REFERENCE(S				D		0.0	005
	"Art and science of Utilisation of Electrica						
	wa, "Generation, Distribution and I al Pvt I to 3rd edition 2010	Utilisa	a tioi	0	Elect	rical En	ergy", New Age
Internation							

De	epartment	ELECTRICAL AND ELECTRO					and the local division in the local division	Semester VII PC
Cou	rse Code	Course Name	Hour		-	Credit	Total	Maximum Marks
000	inde obue	Course Name	L	T	P	С	Hours	Maximum marks
19	19EE703 POWER SYSTEM SIMULATION LABORATORY		0	0	2	1	30	100
Cou	irse Object	tive (s): The purpose of learning this c	ourse is	to				
		e students to solve the power system				software	e progra	ms
Cou	Irse Outco	mes: At the end of the course, learner	's will b	e abl	e to			
		the transmission line parameters.						
	Develop	the mathematical model of transmiss	sion line	es, bi	us in	npedanc	ce and a	dmittance matrix.
	Analyze	he load flow problem using different	technic	ques,	, syn	nmetrica	al and ur	nsymmetrical
	faults.							
		transient stability problem in single						
		e the economic dispatch of generati						
		the small signal stability analysis in					ous syste	em.
	Analyze	oad frequency dynamics of single a	nd two	area	syst	em.		
	19. I	List of Ex	perime	nts		1 11 - 1	200	
1.	Computa	tion of Parameters and Modeling of	Transm	issio	n Lir	nes.		Company of the local sector
2.	Formation	n and solution of Bus Admittance an	d Impe	danc	e Ma	atrices.		
3.		fland Flass Decklasse Haine Occurs						
4.	Solution of	of Load Flow Problems Using Gauss			and	Foot De	nounlos	
1.50	Fault Ana	of Load Flow Problems Using Gauss	n-Raph	ison	and	Fast-De	ecoupied	Methods.
5.		of Load Flow Problems Using Newto	n-Raph	ison	and	Fast-De	coupled	Methods.
5. 6.		of Load Flow Problems Using Newto Ilysis nal Stability Analysis of Single-Mach	nine Infi	inite	Bus	System		Methods.
		of Load Flow Problems Using Newto	nine Infi	inite	Bus	System		Methods.
6.	Transient	of Load Flow Problems Using Newto Ilysis nal Stability Analysis of Single-Mach Stability Analysis of Single-Machine agnetic Transients in Power System	nine Infi e Infinite s	inite e Bus	Bus s Sys	System stem		Methods.
6. 7.	Transient	of Load Flow Problems Using Newto Ilysis nal Stability Analysis of Single-Mach Stability Analysis of Single-Machine	nine Infi e Infinite s	inite e Bus	Bus s Sys	System stem		Methods.
6. 7. 8. 9.	Transient	of Load Flow Problems Using Newto alysis nal Stability Analysis of Single-Mach Stability Analysis of Single-Machine agnetic Transients in Power System requency Dynamics of Single- Area	nine Infi e Infinite s	inite e Bus	Bus s Sys	System stem		Methods.

1360

Department	Electrical and Elect	tronics	Engineering			R 2019	Semester VII	EEC
Course Code		Hours / Week Credit				Total		
Course Code	Course Name	L	Т	Р	С	Hours	Maximum Marks	
19EE704	PROJECT WORK - PHASE I	0	0	2	1	30	100	
the technical pro review the resear	ve: To impart the practical knowled ocedures in their project work. To p rch articles, journals and conference nning stage for their final presentation	provide e proce	an e	expos	ure to th	ne stude	nts to refer, re	ad and

Methodology

The student individually works on a specific topic approved by the head of the division under the guidance of a faculty member who is familiar in this area of interest. The student can select any topic which is relevant to the area of electrical and electronics engineering. The topic may be theoretical or case studies. At the end of the semester, a detailed report on the work done should be submitted which contains clear definition of the identified problem, detailed literature review related to the area of work and methodology for carrying out the work. The students will be evaluated through a viva-voce examination by a panel of examiners including one external examiner.

Chairman - BoS Dept. of EEE - ESEC

Chairman - Bo3 14 Art EEE - 85EC

Department	Electrical and Electronics Engineering						R 2019 Semester VII			
Course Code	0	Hours	s / W	eek	Credit	Total	Maximum Marks			
Course Code	Course Name	L	Т	P	С	Hours	s Maximum I	arks		
19EE705	COMPREHENSIVE REVIEW	0	0	2	0	30	100			
the technical ba	ve: To impart the technical knowl sed test in their program. To provi elevant to their program	Contraction of the second second								

Methodology

Comprehensive Assessment shall be conducted by the department through (i) online with 50 objective questions for50 marks and (ii) viva-voce for the remaining 50 marks, covering all the courses from I B.E. I Semester to IV B.EEE VII Semester. The viva-voce will be conducted by Comprehensive Assessment Committees (CACs), each consisting of three faculty members (out of whom at least two are seniors). The CACs reconstituted by the Principal on the recommendations of the Head of the Department. The HoDs of the respective departments are given the responsibility of preparing question bank/question paper for conducting the online examination

man - BoS Dept. of EEE - ESEC

Department	ELECTRICAL AND ELECTRON		(11.92) M. 1445 (27.	Contraction of the States	RING	R 2019	Semester-VI	II HS
Course Code	Course Name	Но	1	Week	Credit	Total	Maximum N	larks
	oo u oo riuno	L	Т	Ρ	С	Hours		
19HS801	PROFESSIONAL ETHICS FOR ENGINEERS	3	0	0	3	45	10	00
and the second of the second state of the seco	ive (s): The purpose of learning this			to				
	It human values, work ethics coopera the rights of others and to instill mor			values	and loy	alty		
 Enable the society 	student in their engineering professi	on w	/ho e>	kplore	the ethic	al issues	in technologic	al
engineering	lls enhancement and hence abilities g programme such as group work					aspects c	of the	
	nes: At the end of this course, learne							
	engineering ethics theory with sustair			- 100 (CON)				
10. TE-11	od character and follow high profess							
	to shape a better character by follow	-						
	nd resolve moral issues occurred dur						nesa, tara tana sa katikan	
Resolve ma	oral and ethical problems through ex	plora	ation a	and as	sessme	nt by esta	ablished experi	ments
Unit I HU	JMAN VALUES							.9
	hics - Honesty - Integrity - Values Illy - Caring and Sharing - Self-Co							
	my - baring and bhanng - ben-be	Jund	ence	- 00	laye -	Co-opera	ation - Commi	unem
Empathy.					llage -	Co-opera	ation - Commi	
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Department ELECTRICAL AND ELECTRONICS ENGINEERING							Semester VIIIEEC
	121				Credit	Total	Maximum Marks
Course Code	Course Name	L	T	P	С	Hours	Waximum Warks
19EE802	PROJECT WORK	0	0	12	6	180	100

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

Develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination. The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepare a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department

Course Outcomes:

On Completion of the project work students will be in a position to take up any challenging practical Problems and find solution by formulating proper methodology.

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Department	ELECTRICAL AND ELECTRON				and the second second second	R 2019	Semester II	HS
Course Code	Course Name	Hou	Hours / Week		Credit	Total Hours	Maximum M	larks
19HX201	ENGLISH FOR ENGINEERS	3	0	0	• 3	45	100	
	ve (s): The purpose of learning this		is to		19 5 10		The second second	1
	ne usage of grammar in English lang							
Develop I	istening skills which will enable to lis	sten lec	tures	and o	compreh	end differe	ent types of tex	ts.
	the reading skill to comprehend tech		riting	IS.				
ACCUMENTS A	writing skills to express thoughts free							
Develop s	speaking skills to speak fluently in re	al cont	exts.					
	es: At the end of this course, learne heir language usage in LSRW skills.		be ab	le to:				
	istening skills to understand sentence		0.000	linton	otiona			
	e ability to understand different writi			inton	ations.			
	the writing skills to express the ideas			oro				
	cate fluently in pair / team.	s or the	lean	leis.				
		1	199	5.5				9
Voice(Active & Pa	assive) - Reported speech - Condition	onals -	Collo	cation	s - Disco	ourse mar	kers - One wo	
substitution - Phra	asal verbs - Error identification							
Unit II LISTEN								9
Listening for spec	ific information - Identifying sentend	ce stres	s - R	hythm	1 - Intona	ition		
Unit III READI	and the second se							9
Reading graphs a	and charts - Skimming and scanning	texts -	- Ider	ntifying	g topic se	entences	 Understandin 	g the
structure of a text			11				ALC: NOT A	
Unit IV WRITIN								9
review (book and	etter and Resume - Recommendati movie) - Transcoding (interpreting	charte	epon & dia	arame	ng (accid	ent and s	urvey) - vvriting	g
Unit V SPEAK		Charts	o ula	gram	5)			9
	 Turn taking (initiating and respondence) 	ding an	nronr	iatelv	- Negot	iating - Ex	changing -	5
Language Function	ons: suggesting - comparing and col	ntrastin	a - E	xpres	sina - fin	dina out f	acts. attitudes	and
opinions			•		3	J		_
TEXT BOOK(S):				194				
1. Communicat	ive English by KN Shoba, Lourdes,	Joavani	Ray	en Pu	ublished	by Cambr	idge university	1
Revised Edit								1
REFERENCE(S):							A	1
Speaking Ski	fort, Pamela Rogerson, Trish Stott, ills for Business English, Cambridge	: Camb	ridge	Unive	ersity Pre	ess, 2002.	and the state of the state	99 - 17 1119 7 2010
Purposes. Ur	ndinning and Beverly Holmstrom, nited Kingdom: Cambridge Universit	y Press	, 200	4.				
3 Murphy, Ray Intermediate	mond. English Grammar in Use learners Of English Ived. United Kin	– A : ngdom:	Self-S Cam	Study bridge	Referer e Univers	ice and sity Press	Practice Book 2012.	For
	Oxford Guide to Effective Writing a							ersity

Chairman - BoS Dept. of EEE - ESEC

Depai	rtment	ELECTRICAL AND ELECTRO					R 2019	Semester II	_
Course	Code	Course Name	Ho		Week	Credit	Total	Maximur	n
225-022-0001-005	See thank et a		L	Т	P		Hours	Marks	
1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	HX202	HINDI	3	0	0	3	45	100	
0 F	lelp student each them	(s): The purpose of learning this ts to acquire the basics of Hindi how to converse in Hindi on var s acquire the ability to understan	ious occa	asions		text in F	lindi		
Course	Outcomes	: At the end of this course, learn	ners will b	be abl	le to:				
0 C	communicat	e effectively with: (a) Improved	fluency	in Hir	ndi (b)	Clarity	on the ba	isic sounds d	of
· t	he Hindi lar	nguage (c) Proper vocabulary							
Unit I		PHABET							9
ntroduc	tion - Vow Visarg -Tal	e & Feminine Nouns ending in a els - Consonants - Plosives - ble of Alphabet -Vocabulary.	Fricativ	es -	Nasal	sounds	s - Vowel	Signs - Ch	and
Jnit II									9
Gender	s (Masculine	e & Feminine Nouns ending in a	,e,i,o, u,)- Ma	sculin	e & Fem	inine - Re	ading Exercis	ses.
Unit III		UNS AND TENSES	an anna		5	and the second			9
Cateron			Contrary Charles and Charles	man source many		0 1		afinita 9 Ind	ofini
oronour	ns - Relativ	nouns - Personal Pronouns - S ve pronouns - Present tense gative Sentences.	econd p - Past t	ersor	n (you - Fu	i & hon ture ter	orific) - Do Ise - Ass	efinite & Ind ertive & Ne	efini gativ
oronour Sentend Unit IV	ns - Relativ ces - Interro	ve pronouns - Present tense gative Sentences. FIED VOCABULARY	- Past t	ense	- Fu	ture ter	nse - Ass	ertive & Ne	gativ
Sentend	ns - Relativ ces - Interro	ve pronouns - Present tense gative Sentences. FIED VOCABULARY	- Past t	ense	- Fu	ture ter	nse - Ass	ertive & Ne	gativ
pronour Sentend Unit IV Parts c	ns - Relativ ces - Interro CLASSII of body - F	ve pronouns - Present tense gative Sentences.	- Past t	ense	- Fu	ture ter	nse - Ass	ertive & Ne	gativ 9 sons
oronour Sentend Unit IV Parts of Profess	ns - Relativ ces - Interro CLASSII of body - F ions.	ve pronouns - Present tense gative Sentences. FIED VOCABULARY Relatives - Spices- Eatables-	- Past t	ense	- Fu	ture ter	nse - Ass	ertive & Ne	gativ
pronour Sentend Unit IV Parts of Profess Unit V Model S	ns - Relativ ces - Interro CLASSII of body - F ions. SPEAKII Sentences -	ve pronouns - Present tense gative Sentences. FIED VOCABULARY Relatives - Spices- Eatables-	- Past t Fruit &	ense Vege	- Fu	ture ter	nse - Ass	ertive & Ne	gativ 9 sons
pronour Sentend Unit IV Parts of Profess Unit V Model S TEXT B	ns - Relativ ces - Interro CLASSII of body - F ions. SPEAKII Sentences - OOK(S):	ve pronouns - Present tense gative Sentences. FIED VOCABULARY Relatives - Spices- Eatables- NG Speaking practice for various of	- Past t Fruit &	Vege	- Fu	ture ter	hes - Ass	ertive & Ne	gativ 9 sons 9
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Pronour Sentend Parts of Profess Unit V Model S TEXT B 1. Ele 20 2 Co	ns - Relativ ces - Interro CLASSII of body - F ions. SPEAKII Sentences - COOK(S): ementary Hin 13 Iloquial Hind	ve pronouns - Present tense gative Sentences. FIED VOCABULARY Relatives - Spices- Eatables- NG Speaking practice for various of	- Past t Fruit & ccasions. veryday \$	ense Vege Situat	- Fu tables	s - Clot	hes - Ass	ertive & Ne	gativ 9 sons 9
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B Chairman - BoS Dept. of EEE - ESEC

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oyal F	Publish	ers and D	Distributors P	vt.
Fear	Past N2 e {na as - I nika s Ec	Past tense o N2 yoriadj e {nani/dhok as - N1 (Pla nika - gojum s Edward F ort Books , 20	Past tense of Noun se N2 yoriadj des - N e {nani/dhoko/dhare/itl as - N1 (Place) ye V nika - gojumo - Tech s Edward P. Trimnell ort Books , 2013	Past tense of Noun sentences and N2 yoriadj des - N1 tho N2 e {nani/dhoko/dhare/ithsu} ga ichik as - N1 (Place) ye V masu form nika - gojumo - Technical Japan s Edward P. Trimnell Publisher:

Depart	ment	ELECTRICAL AND ELECTRON				Credit	R 2019 Total	Semester II Maximum	HS
Course (Code	Course Name	HOU	T	P	Credit	Hours	Marks	
104	X204	FRENCH	3	0	0	3	45	100	11.50.000
		ve (s): The purpose of learning this of					1		<
		udents acquire the basics of French							
		them how to converse in French in va			aiona				
		mes: At the end of this course, learned				_			101.1.1
	Dutcor	e familiar with the basics of French la		ne or	d star	t conver	sing in Fr	ench	
		abet Français	anguag	ye an	u stai	CONVEN	ong min		6
		cais (alphabets) - Les Accents França	oic (the	0.000	onte i	n French	n) - aigu -	arave - circo	
Alphabel	Franç	écrire son nom dans le français (spe			namo	in Fron	ch) - Les	noms de iour	s de la
trema ce	edille -	of the week)	ennyo	ne -s	name	Intren	CH) - LC3	noms de jour	o de le
			nie ot o	nnóo	N.				6
Unit II	Nur	nbers, month & year (Nombre, mo mois de l'année (Months) - Num		à)	Jumbor	s 1 to 1	00) GRAM	Section 1
		mois de rannee (montris) - Nur	lero i	a	100 (1	vumbers	5 1 10 1		W/ XII XE
:Conjuga	alson								
	10	nguaga Skille & Grammar (Compé	itoncos	ling	uistiau	les et ar	ammaire)		10
Unit III		nguage Skills & Grammar (Compé	tences	s ling	uistiqu Profes	ues et gr	ammaire)	l'endroits cor	10
Unit III Moyens	de tra	ansport (Transport) - Noms de Pro	ofessio	ns (F	Profes	sions) ·	- Noms o	d'endroits cor	nmuns
Moyens (Places)	de tra	ansport (Transport) - Noms de Pro onalités (Nationalities) ECOUTER : (ofessio (Listen	ns (F ing) l	Profes Écoute	sions) · er I - alp	- Noms on habet as	d'endroits cor sociéà des pr	nmuns énoms
Moyens (Places) français	de tra - Natio - Éc	ansport (Transport) - Noms de Pro onalités (Nationalities) ECOUTER : (couter et répondre PARLER (S	ofessio (Listen	ns (F ing) l	Profes Écoute	sions) · er I - alp	- Noms on habet as	d'endroits cor sociéà des pr	nmuns énoms
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Moyens (Places) français (Introduc Unit IV	de tra - Natio - Éo cingone G	ansport (Transport) - Noms de Pro onalités (Nationalities) ECOUTER : (couter et répondre PARLER (S eself)LIRE :Lireles phrases simples rammar (et grammaire)	ofessio (Listen Speakir	ns (F ing) I ng)Pre	Profes Écoute ésntat	sions) er I - alp ion -	- Noms o bhabet as même /	d'endroits cor sociéà des pr Présentez -	nmuns énoms Vous
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C Know th	a combinational logic circuits using	various C	MOS	log	c Design			
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	a Sequential logic circuits using val	nous civio.	3 105	JIC L	esign.			
Design of	of arithmetic building blocks	etratoqu						
Learn th Course Outcom	e concept of ASIC implementation es: At the end of this course, learn	ers will be	able	to:				
Explain	the basic CMOS circuits and the C	MOS proce	ess t	echi	nology.			
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	nd device modeling, Scaling princi	ples and fu	unda	men	tal limits,	CMOSI	nverter scalin	g,
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Examples of Co static and dynam Unit III SEQU Static and Dyna and memory cor Unit IV DESIG Data path circu accumulators, M Unit V IMPLE Full custom an architectures, Fi TEXT BOOK(S): 1. Jan Rabae Second Ed 2. M.J. Smith 3. TN.Weste, REFERENCE(S)	mbinational Logic Design, Elmorenic CMOS design, Power dissipation ENTIAL LOGIC CIRCUITS mic Latches and Registers, Timing tool circuits, Low power memory of NING ARITHMETIC BUILDING B its, Architectures for ripple carry lultipliers, dividers, Barrel shifters, MENTATION STRATEGIES d Semi-custom design, Standard PGA interconnect routing procedure ey, AnanthaChandrakasan, B.Niko ition, Prentice Hall of India, 2003. "Application Specific Integrated C K.Eshraghian, "Principles of CMOS):	on –Low po ircuits LOCKS) adders, ca Speed and d cell des es. blic, "Digita ircuits", Ad S VLSI Des	power pelin arry area ign I Into disso sign"	des nes, look a tra and egra on V , Se	gn princi clock stra ahead deoff cell libr ted Circo /esley, 1 cond Edi	ples ategies, M adders, H aries, Fl uits: A D 997 tion, Add	Memory archit High speed a PGA building Design Perspe	gates gates ecture g dders bloc ective"
Examples of Co static and dynam Unit III SEQU Static and Dyna and memory cor Unit IV DESIG Data path circu accumulators, M Unit V IMPLE Full custom an architectures, Fi TEXT BOOK(S): 1. Jan Rabae Second Ed 2. M.J. Smith 3. TN.Weste, REFERENCE(S)	mbinational Logic Design, Elmorenic CMOS design, Power dissipation ENTIAL LOGIC CIRCUITS mic Latches and Registers, Timing tool circuits, Low power memory of NING ARITHMETIC BUILDING B its, Architectures for ripple carry lultipliers, dividers, Barrel shifters, MENTATION STRATEGIES d Semi-custom design, Standard PGA interconnect routing procedure ey, AnanthaChandrakasan, B.Niko ition, Prentice Hall of India, 2003. "Application Specific Integrated C K.Eshraghian, "Principles of CMOS): aker, Harry W.LI., David E.Boyee,	on –Low po ircuits LOCKS) adders, ca Speed and d cell des es. blic, "Digita ircuits", Ad S VLSI Des	power pelin arry area ign I Into disso sign"	des nes, look a tra and egra on V , Se	gn princi clock stra ahead deoff cell libr ted Circo /esley, 1 cond Edi	ples ategies, M adders, H aries, Fl uits: A D 997 tion, Add	Memory archit High speed a PGA building Design Perspe	gates gates ecture g dders bloc ective"

Ben Chairman - BeS Dept. of EEE - ESEC

4.2

Department	ELECTRICAL AND ELECTRO						Semester V PE
Course Code	Course Name	Hours		-	Credit	Total	Maximum Marks
and the second second	PRINCIPLES OF SENSOR	L	Т	Р	С	Hours	
19EEX03	TECHNOLOGY	3	0	0	3	45	100
	tive (s): The purpose of learning this c		0				
	tand the concepts of measurement tech						
	ne different sensors with various param						
	ne various sensors used to measure va	arious phy	sical	para	ameters		
	ne smart sensors			•			
mecha	e fundamentals of signal conditioning onics system development		1		and com	municati	on systems used in
	mes: At the end of this course, learned						
	se in various calibration techniques an	and the second		for s	sensors		
222	he various sensors in the Automotive a	12.0					
D Apply Study	he various sensors in the Mechatronics	s applicati	ions				
	he basic principles of various smart se the DAQ systems with different set	neore for i	roal t	imo	applicatio		se la tamin d'anna y dia minter estre
	TRODUCTION	115015 101 1	eart	inte	applicatio	115	9
	Aeasurement - Classification of	errors -	- Er	ror	analysis	- St	atic and dynamic
characteristic	of transducers - Performance n	neasures	of	sens	sors - C	lassifica	
	tion techniques – Sensor Output Signa						
	DTION, PROXIMITY AND RANGING S						9
Motion Sense	rs - Potentiometers, Resolver, Encod	ers – Opt	tical,	Mag	gnetic, In	ductive,	Capacitive, LVDT -
	hro – Microsyn, Accelerometer.,– GPS		oth, F	Rang	e Senso	rs – RF	beacons, Ultrasonio
	ective beacons, Laser Range Sensor (L RCE, MAGNETIC AND HEADING SE			-			9 .
the set of	Load Cell, Magnetic Sensors -type	the second s	nle	real	irement	and ad	
resistive - Ha	Effect – Current sensor Heading Sens	sors - Co	mpas	ss. G	Gvroscope	e. Inclino	meters.
Unit IV O	TICAL, PRESSURE AND TEMPERAT	TURE SE	NSO	RS			9
Photo conduc	tive cell, photo voltaic, Photo resistive	, LDR – I	Fiber	opt	ic sensor	s - Pres	sure - Diaphragm,
Bellows, Piez	pelectric – Tactile sensors, Tempera	iture – IC), Th	erm	istor, RT	D, Ther	mocouple. Acoustic
Sensors – flo	v and level measurement, Radiation S	Sensors -	Sma	rt Se	ensors -	Film sen	sor, MEMS & Nanc
Sensors, LAS	ER Sensors.	TEMO				the second second	9
	- Filtering - Sample and Hold circuits		Acou	initio	n: Cinala	ohonno	
data acquisiti	n – Data logging - applications - Auto	omobile	Aero	snac	e Home	annlian	ces Manufacturing
Environmenta	monitoring.	omobilo, i		opuc		applian	ses, manaraotanng
TEXT BOOK			110			1.1.1	
1. Ernest C	Doebelin, "Measurement Systems - A	pplication	is an	d De	sign", Ta	ta McGra	aw-Hill, 2009.
2. Sawney	A K and Puneet Sawney, "A Course i 12th edition, Dhanpat Rai & Co, New I	n Mechar	nical	Mea	suremen	ts and Ir	nstrumentation and
3. Patrana	is D, "Sensors and Transducers", 2nd	Edition, P	HI, N	lew	Delhi, 20	10.	1.1
REFERENCE				- and the			
1. John Tu	rner and Martyn Hill, "Instrumentati ons, 1999.	on for E	ingin	eers	and So	cientists",	Oxford Science

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	ELECTRICAL AND ELECTRONI					1.00	Semester V	PE
Course Code	Course Name	Hour	′s/Wo ∏T	P	Credit C	Total Hours	Maximum Ma	arks
19EEX04	COMMUNICATION ENGINEERING	L 3	0	0	3	45	100	
	ive (s): The purpose of learning this co			-				
Unders	stand the various analog modulation							
	stand the various pulse modulation							
	 A second s							
	stand the various digital modulation he various coding							
	he spread spectrum							
Course Outco	mes: At the end of this course, learners	will be	able	to:				
	the receiver using analog modulation			2000				
	the receiver using pulse modulation							
	the receiver using digital modulation							
	and decode the various theorem							
	s the spread spectrum				. П. Ц.,	1.0		
	ALOG MODULATION							9
Amplitude Moc	ulation - AM, DSBSC, SSBSC, VSB - I	PSD, m	odula	ators	s and der	nodulato	rs – Angle	
modulation - F	M and FM - PSD, modulators and dem	odulato	rs –	Sup	erheteroo	lyne rece	eivers	
Unit II PU	LSE MODULATION							9
Low pass sam	pling theorem – Quantization – PAM – Vocodér - Time Division Multiplexing, F	Line c	odin cy D	g – ivisio	PCM, DF on Multip	PCM, DN lexing.	I, and ADPCM	And
ADIVI, Channel								
Unit III DIC	ITAL MODULATION AND TRANSMIS	SION						9
Unit III DIC Phase shift key	ring – BPSK, DPSK, QPSK – Principles	SION of M-a	ry sig	gnali	ng M-ary	PSK & C	QAM – Compar	
Unit III DIC Phase shift key	ITAL MODULATION AND TRANSMIS ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi	SION of M-a	ry sig	gnali	ng M-ary rn, equal	PSK & C	QAM – Compar	isor
Unit III DIC Phase shift key ISI – Pulse sha Unit IV INF	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING	sion of M-a ters – E	ry sig Eye p	gnali batte	rn, equal	PSK & 0		isor 9
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of inf	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING primation – Entropy – Source coding the	sion of M-a ters – E	ry sig Eye p - Shi	gnali batte	rn, equal	PSK & C	Huffman Coding	isor 9 g, L2
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of infCoding – Char	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING prmation – Entropy – Source coding the nel capacity – Shannon-Hartley law –	sion of M-a Iters – E eorem - Shanno	ry sig Eye p - Sha	gnali batte anno imit	rn, equal on–Fano – Error c	PSK & C	Huffman Coding	isor 9 g, L2
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of infCoding – CharSyndrome calc	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING prmation – Entropy – Source coding the nel capacity – Shannon-Hartley law – ulation – Convolution Coding, Sequenti	SION of M-a lters – E eorem - Shannc al and \	ry sig Eye p - Sha on's I /itert	gnali batte anno imit	rn, equal on–Fano – Error c	PSK & C	Huffman Coding	9 9 9, L2 odes
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of infCoding – CharSyndrome calcUnit VSP	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING prmation – Entropy – Source coding the nel capacity – Shannon-Hartley law – ulation – Convolution Coding, Sequenti READ SPECTRUM AND MULTIPLE A	SION of M-a lters – E eorem - Shannc al and \ CCESS	ry sig Eye p – Sha on's I /itert	gnali batte anno imit bi de	rn, equal on–Fano – Error o coding	PSK & C izers coding, I control co	Huffman Coding des – Cyclic co	9 g, Li odes 9
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of infCoding – CharSyndrome calcUnit VSPPN sequences	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING prmation – Entropy – Source coding the nel capacity – Shannon-Hartley law – ulation – Convolution Coding, Sequenti READ SPECTRUM AND MULTIPLE A – properties – m-sequence – DSSS –	SION of M-a ters – E eorem - Shanno al and \ CCESS Process	ry sig Eye p – Sha on's I /itert	gnali batte anno imit bi de	rn, equal on–Fano – Error o coding	PSK & C izers coding, I control co	Huffman Coding des – Cyclic co	9 g, Li odes 9
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of infCoding – CharSyndrome calcUnit VSPPN sequencesand tracking –	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING prmation – Entropy – Source coding the nel capacity – Shannon-Hartley law – ulation – Convolution Coding, Sequenti READ SPECTRUM AND MULTIPLE A – properties – m-sequence – DSSS – Multiple Access – FDMA, TDMA, CDM/	SION of M-a ters – E eorem - Shanno al and \ CCESS Process	ry sig Eye p – Sha on's I /itert	gnali batte anno imit bi de	rn, equal on–Fano – Error o coding	PSK & C izers coding, I control co	Huffman Coding des – Cyclic co	9 g, Li odes 9
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of infCoding – CharSyndrome calcUnit VSPPN sequencesand tracking –TEXT BOOK(S	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING prmation – Entropy – Source coding the nel capacity – Shannon-Hartley law – ulation – Convolution Coding, Sequenti READ SPECTRUM AND MULTIPLE A – properties – m-sequence – DSSS – Multiple Access – FDMA, TDMA, CDMA S):	SION of M-a ters – E eorem - Shannc al and \ CCESS Process	ry sig Eye p - Sha on's I /itert	gnali batte annc imit bi de gain	rn, equal on–Fano – Error c coding , Jammin	PSK & C izers coding, I control co	Huffman Coding des – Cyclic co S – Synchroniz	9 g, Li odes 9
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of infCoding – CharSyndrome calcUnit VSPPN sequencesand tracking –TEXT BOOK(S1.H Taub,	ring – BPSK, DPSK, QPSK – Principles uping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING ormation – Entropy – Source coding the ulation – Convolution Coding, Sequenti READ SPECTRUM AND MULTIPLE A – properties – m-sequence – DSSS – Multiple Access – FDMA, TDMA, CDM/ S): D L Schilling, G Saha, "Principles of Cor	SION of M-a ters – E eorem - Shannc al and \ CCESS Process \ nmunic	ry sig Eye p - Sha on's I /itert	gnali batte annc imit bi de gain	rn, equal on–Fano – Error c coding , Jammin	PSK & C izers coding, I control co	Huffman Coding des – Cyclic co S – Synchroniz	9 g, Li odes 9
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of infCoding – CharSyndrome calcUnit VSPPN sequencesand tracking –TEXT BOOK(\$1.H Taub,2.S. Havkir	ving – BPSK, DPSK, QPSK – Principles uping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING ormation – Entropy – Source coding the ulation – Convolution Coding, Sequenti READ SPECTRUM AND MULTIPLE A – properties – m-sequence – DSSS – Multiple Access – FDMA, TDMA, CDM/ 5): D L Schilling, G Saha, "Principles of Cor "Digital Communications" John Wiley 2	SION of M-a ters – E eorem - Shannc al and \ CCESS Process \ nmunic 2005	ry sig Eye p - Sha on's I /itert sing g	gnali anno imit bi de gain	rn, equal on–Fano – Error c coding , Jammin	PSK & C izers coding, I control co g – FHS e, TMH 2	Huffman Coding des – Cyclic co S – Synchroniz	9 g, L2 odes 9 atio
Unit III DIC Phase shift key ISI – Pulse sha ISI – Pulse sha INF Unit IV INF Measure of inf Coding – Char Syndrome calc Unit V Unit V SP PN sequences and tracking – TEXT BOOK(\$ 1. 1. H Taub, 2. S. Havkir	ring – BPSK, DPSK, QPSK – Principles uping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING ormation – Entropy – Source coding the ulation – Convolution Coding, Sequenti READ SPECTRUM AND MULTIPLE A – properties – m-sequence – DSSS – Multiple Access – FDMA, TDMA, CDM/ S): D L Schilling, G Saha, "Principles of Cor	SION of M-a ters – E eorem - Shannc al and \ CCESS Process \ nmunic 2005	ry sig Eye p - Sha on's I /itert sing g	gnali anno imit bi de gain	rn, equal on–Fano – Error c coding , Jammin	PSK & C izers coding, I control co g – FHS e, TMH 2	Huffman Coding des – Cyclic co S – Synchroniz	9 g, L2 odes 9 atio
Unit III DIC Phase shift key ISI – Pulse sha ISI – Pulse sha INF Unit IV INF Measure of inf Coding – Char Syndrome calc Coding – Char Unit V SP PN sequences and tracking – TEXT BOOK(\$ 1. 1. H Taub, 2. S. Haykir 3. B.P.Lathi 2007 REFERENCE(\$	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING prmation – Entropy – Source coding the nel capacity – Shannon-Hartley law – ulation – Convolution Coding, Sequenti READ SPECTRUM AND MULTIPLE A – properties – m-sequence – DSSS – Multiple Access – FDMA, TDMA, CDM/ S): D L Schilling, G Saha, "Principles of Cor "Digital Communications" John Wiley 2 , "Modern Digital and Analog Communi S):	SION of M-a ters – E eorem - Shannc al and \ CCESS Process A nmunic 2005 cation \$	ry sig Eye p - Sha on's I /iterk ising g ation	gnali patte anno imit bi de gain sys	rn, equal on–Fano – Error o coding , Jammin stems" 3/ , 3rd edit	PSK & C izers coding, I control co g – FHS e, TMH 2 ion, Oxfo	Huffman Coding des – Cyclic co S – Synchroniz 007. rd University Pi	9 g, L2 odes 9 atio
Unit IIIDICPhase shift keyISI – Pulse shaUnit IVINFMeasure of infCoding – CharSyndrome calcUnit VSPPN sequencesand tracking –TEXT BOOK(S1.H Taub,2.S. Haykir3.B.P.Lathi2007REFERENCE(1.H P Hsu,	ring – BPSK, DPSK, QPSK – Principles ping – Duo binary encoding – Cosine fi ORMATION THEORY AND CODING prmation – Entropy – Source coding the nel capacity – Shannon-Hartley law – ulation – Convolution Coding, Sequenti READ SPECTRUM AND MULTIPLE A – properties – m-sequence – DSSS – Multiple Access – FDMA, TDMA, CDMA S): D L Schilling, G Saha, "Principles of Cor "Digital Communications" John Wiley 2 , "Modern Digital and Analog Communi	SION of M-a ters – E eorem - Shannc al and \ CCESS Process A nmunic 2005 cation S cation S	ry sig Eye p - Shi on's I /iterk ising g ation	gnali patte anno imit ji de gain sys ms"	rn, equal on–Fano – Error o coding , Jammin stems" 3/ , 3rd edit	PSK & C izers coding, I control co g – FHS e, TMH 2 ion, Oxfo	Huffman Coding des – Cyclic co S – Synchroniz 0007. Ind University Pl	9 g, L2 odes 9 atio

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epartment	ELECTRICAL AND ELECTRONIC			and the second se		Semester V PE
ourse Code	Course Name	Hours		Credit	Total	Maximum Mark
19EEX05	HYBRID ELECTRIC VEHICLES	3	T P 0 0	-	Hours 45	100
		-	-		40	100
urse Object Explain fundame Explain p electronic Analyze Discuss o Demonst configura managen urse Outcon Explain t fundame Analyze vehicles. Develop t Explain t technolog	tive (s): The purpose of learning this court the basics of electric and hybrid electric ntals. Dug – in hybrid electric vehicle architect cs devices used in hybrid electric vehicles various electric drives suitable for hybrid electric different energy storage technologies used rate different configurations of electric tion by different techniques, sizing of ment. mes: At the end of this course, learners w he basics of electric and hybrid elect ntals the use of different power electronics of the electric propulsion unit and its control the use of different energy storage of gies and control and select appropriate tect	se is to tric ve ture, d lectric v d for hy c vehi compo vill be a ric veh devices for app devices chnolog	hicles, esign vehicle brid ele cles a onents ble to: icles, and e lication used	their and and comp s. ectric vehi and its and desi their arch electrical of electri for hyb	chitecture ponent siz cles and t componer ign optim nitecture, machines c vehicles rid electr	, technologies an zing and the powe their control nts, hybrid vehic ization and energ technologies and in hybrid electric
Analyze	different power converter topology used for	or elect	ric veh	icle applic	ation	
	CTRIC AND HYBRID ELECTRIC VEHIC					9
active effort lergy consum	of Electric Vehicles, Performance of I and Transmission requirement, Vehicle aption Concept of Hybrid Electric Drive T electric Drive Trains, Parallel hybrid electri	e perfo rains, /	rmance Archite	e, Tractiv	e effort i	in normal driving,
it II ENE	RGY STORAGE FOR EV AND HEV		_			9
	e requirements, Battery parameters, Type operation, Types of Fuel Cells, PEMFC					
the second s	CTRIC PROPULSION		-			9
	n, DC motor drives and speed control, In					
	Reluctance Motor Drive for Electric Vehicl				ontrol of D	
the second se	GIGN OF ELECTRIC AND HYBRID ELECTERIC Drive Train Design: Operation				trategios	Sizing of major
nponents, po rallel Hybrid	blectric Drive Train Design: Operating wer rating of traction motor, power rating Electric Drive Train Design: Control strate design of electric motor drive capacity, tr	of engi	ne/gen f parall	erator, de	esign of Pl drive train	PS , design of engine
it V POV	VER ELECTRONIC CONVERTER FOR I	BATTE	RY CH	ARGING		9
lirectional DC	ods for battery, Termination methods, C-DC converter, Design of Z-converter charger topology, Transformer less topolo	for bat	ing fro ttery c	om grid, harging, l	The Z-c High-freq	onverter, Isolated uency transformer
	ein, "Electric and Hybrid Vehicles: Design	Funda	mental	s", CRC F	Press, 2nd	d Edition, 2003.
James Lar	minie, John Lowry, "Electric Vehicle Tech :	nology"	, Wiley	publication	ons, 1st E	dition, 2003.
Fundamer	, Y. Gao, S. Gay and Ali Emadi, Modern ntals, Theory, and Design, CRC Press, 20	05				
	ain, Electric and Hybrid Vehicles: Design I S. Williamson, Energy Management St					
	Springer, 2013.	alogiot			ing ing ing in	
the second se						
C.C. Char	and K.T. Chau, Modern Electric Vehicle M. Abul Masrur, David Wenzhong Gao, H					

Department	ELECTRICAL AND ELECTRONIC	Hours			Credit	Total	Semester V	and the second second
Course Code	Course Name	L	T	P	C	Hours	Maximur	n Marks
19EEX06	CAD OF ELECTRICAL MACHINES	3	0	0	3	45	10	0
Course Objecti Select pr electrical Design co Apply cor Apply cor phase Inc Course Outcor Unders Unders Unders Unders Unders Course Outcor Course Outcor Cou	CAD OF ELECTRICAL MACHINES ive (s): The purpose of learning this court oper materials based on their proper machine design. In puter aided optimization techniques for mputer aided optimization techniques for mes: At the end of this course, learners of tand general concepts of CAD tand and implement CAD for Electrical E tand and implement CAD of DC Machine tand and implement CAD of Single phase cept of Computer Aided Design Avantages & Limitations of Computer A art of electrical machines for overall	desigr desigr desigr for de will be a e r e Induc	o and n of f sign able ent ctior	sele dc m trans of to:	ection cr achines sformers Single p	iterion, l hase Inc	IS standards	otor 9 uter aided
	uction machines.	Cat.		00	machine	, transic	i ayrion	
Jnit IIBasntroduction, SMagnetic CircuitHeat DissipationTypes of EncloseJnit IIIDC	uction machines. ic Concepts of Electrical Machine Des pecification, Output Coefficient, Import t Calculations, General Procedure for Con, Standard Rating of Electrical Machines sures, General Design Procedure, Steps Machines equential Steps for Design of Each Par	sign rtance Calculat es, Ve to Get	of tion ntila Opt	Spe of Ai tion imal	cific Loa mp-Turns Schemes Design.	dings, E s, Heatin s, Quanti	Electrical Ma g & Cooling, ity of Cooling	9 terials, Modes o Medium
Unit II Bas Introduction, S Magnetic Circuit Heat Dissipation Types of Enclose Unit III DC Introduction, Se SciLab.	uction machines. ic Concepts of Electrical Machine Des pecification, Output Coefficient, Impor t Calculations, General Procedure for C n, Standard Rating of Electrical Machine sures, General Design Procedure, Steps Machines equential Steps for Design of Each Par	sign rtance Calculat es, Ve to Get	of tion ntila Opt	Spe of Ai tion imal	cific Loa mp-Turns Schemes Design.	dings, E s, Heatin s, Quanti	Electrical Ma g & Cooling, ity of Cooling	9 Modes o Medium 9 ATLAB 8
Unit II Bas Introduction, S Magnetic Circuit Heat Dissipation Types of Enclos Unit III DC Introduction, Se SciLab. Unit IV Trans	uction machines. ic Concepts of Electrical Machine Des pecification, Output Coefficient, Impoi t Calculations, General Procedure for C n, Standard Rating of Electrical Machine sures, General Design Procedure, Steps Machines equential Steps for Design of Each Par insformers:	sign rtance Calculat es, Ver to Get t and F	of ntila Opt Prog	Spe of Ai tion imal rami	cific Loa mp-Turns Schemes Design. ming -Sir	dings, E s, Heatin s, Quanti nultaneo	Electrical Ma g & Cooling, ity of Cooling usly using M	9 Modes c Medium 9 ATLAB 8
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Department	ELECTRICAL AND ELECTRONIC		_				Semester VI PE
Course Code	Course Name	Hou	-		Credit	Total	Maximum Marks
		L	Т	P	С	Hours	
19EEX07	Power Electronic Applications to Renewable Energy	3	0	0	3	45	100
	ve (s): The purpose of learning this cours						
	stand the various Non-Conventional sour						
Explain	n the DC to DC converters for Solar PV s	ource	of e	nerg	у		
Explain	the inverters and its control techniques	for a g	grid d	conne	ected sys	stem	
I Unders	stand the characteristics of a solar PV and	d wind	d pov	ver s	ources		
Explain	the types of distributed generators and	batter	ies ir	1 DG	and mic	cro grid sy	ystem
ourse Outcom	es: At the end of this course, learners wi	ill be a	ble t	0:	1		Propagation and the second
	e knowledge on Non-Conventional energ						Sector Sector
Analyz	e various technologies and for renewable	e ener	gy sy	yster	ns		
Develo	p stand alone DG sets and micro grid sy	stems	fron	n ren	ewable	energy so	ource
	e knowledge on wind energy systems			and a			
0 Unders	stood the concept of back to back control	led/ ur	ncon	trolle	ed conve	rter	
	ODUCTION TO RENEWABLE SOURCE				and a second second	al da anti-	9
	scenario, Wind, solar, hydro, geotherma						
	hotovoltaic effect, basics of power gene						
temperature, d	urnal variation, shading, Modules, conn	ection	ns, ra	ating	s, Powe	r extracti	on (MPP) tracking
and MUDI coh	emes; standalone systems, grid interface		ide .	ALI	JL, IOAds		
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Course Code	Course Name	Hour	S/We	P	Credit C	Hours	Maximum	Marks
19EEX08	SPECIAL ELECTRICAL MACHINES		0	0	3	45	-	100
	tive (s): The purpose of learning this c		to				The second	
Impart k motors.	nowledge on the Construction, principl	e of ope	eratio	n, co	ontrol and	d perform	nance of step	ping
Impart k reluctan	nowledge on the Construction, princ ce motors.							
magnet	nowledge on the Construction, princip brushless D.C. motors.						in some to the second	
synchro	nowledge on the Construction, princip nous motors.							
Impart k synchro	nowledge on the construction, princip nous reluctance motor, linear induction	motor a	perat	ion epul	and perfection	ormance or.	of hysteres	is moto
Course Outco	mes: At the end of this course, learne	rs will be	e able	e to:		1.00		
Acquire	the knowledge on construction and op	eration	of ste	eppe	r motor.		1. 107. Jos.	
	the knowledge on construction and op							
Acquire	the knowledge on construction and op	eration	of pe	rma	nent mag	net brus	hless D.C. m	notors.
	the knowledge on construction and op				nent mag	gnet sync	hronous mot	tors.
	and design controllers for Special Ele	ctrical N	lachi	nes.				9
Unit I ST	EPPER MOTORS	-				ationa	Lincor An	-
Characteristics	features –Principle of operation - s – Drive circuits – Closed loop control	- Conce	ept of	f lea	d angle -	Applicat	ions.	
						the local is not set of the local set of		
Unit II SV	/ITCHED RELUCTANCE MOTORS (S	RM)		Ū.				9
Constructiona	features -Principle of operation	- Torg	ue	pred	iction-Cl	naracteri	stics Stead	y stat
Constructiona performance	features –Principle of operation prediction – Analytical Method – Pow	- Torg	ue trolle	pred rs –	iction–Cl Control	naracteri	stics Stead I drive- Sen	y stat
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Chairnan - 8o3 Cept of GEE - 886C

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Chairman - BoS Dept. of EEE - ESEC

Depart	ment	ELECTRICAL AND ELECTRONICS	ENGI	NEE	RIN	G	R 2019	Semester V	I PE
Course	Code	Course Name	Hour		12051		Total	Maximum M	Marks
		DEGION OF ELECTRICAL MACUNES		T	P	C	Hours	100	_
19EE		DESIGN OF ELECTRICAL MACHINES		0	0	3	45	100	
Course		tive (s): The purpose of learning this course etic circuit parameters and thermal rating of		o tur		of alact	rical maa	hinco	
0						or electi	ical mac	nines.	
0		edge of armature and field systems for D.C.							
0		edge of Core, yoke, windings and cooling synony of stator and rotor of induction machines a							
0		portance of computer aided design method		ionit	5110		11103.		
Course		mes: At the end of this course, learners wil		ole to):				-
		MMF calculation and thermal rating of vario				ectrical r	nachines	inita da B	
0	Design	armature and field systems for D.C. maching	ines.						
۵	Desigr	core, yoke, windings and cooling systems	of tran	nsfor	mei	rs.			
0	Desigr	stator and rotor of three phase squirrel cag	ge and	I slip	ring	inducti	on motor		
0	Desigr	stator and rotor of synchronous machines							4.17
Unit I		RODUCTION	ZALCIA SI	teles in	a destro	and the second second	Carlo Borballo	and the state of the second	9
Major c	onside	rations in Electrical Machine Design -Ele	ctrical	Eng	jine	ering N	laterials	- Space fac	tor -
		cific Electrical and Magnetic loadings -Then				tions -H	eat flow -	 Temperatur 	re rise
		materials -Rating of machines - Standard s	pecific	catior	1S .	GH AL			
Unit II	and the second se	MACHINES							9
circuit ca	alculati	ons – Main Dimensions – Choice of Spec ons – Carter's Coefficient -Net length of Irc es – Design of Armature – Design of com	on -Re	eal &	Ap	parent	flux dens	ities - Select	tion of
circuit ca number using de	alculation of pole polesign va	ons – Carter's Coefficient -Net length of Irc es – Design of Armature – Design of com alues.	on -Re	eal &	Ap	parent	flux dens	ities - Select	tion of iction
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Depar	rtment	ELECTRICAL AND ELECTRONICS					R 2019	Semester VI	PE
	e Code	Course Name	Ηοι	No. Contraction		Credit	Total	Maximum M	/larks
Course	e coue		L	Т	Ρ	С	Hours		
	EX10	SYSTEM IDENTIFICATION AND ADAPTIVE CONTROL	3	0	0	3	45	100	
		ve (s): The purpose of learning this course							
D In	troduce	students to the fundamentals of system ide	ntifica	ation				una dala af du	n anaia
		e students with the theoretical backgroun	d for	deve	elopir	ig variou	us linear	models of dy	namic
sy	stems		ahtai	ning	mod	al actim	ator		
	npart an	understanding of the various techniques in ne students with the tools necessary for	opiai	lyzin	niou		of exp	erimental dat	a and
	valuating	the performance of candidate model struc	tures	iyziii	ig un	- quanty	, or exp	chinicinal dat	a and
0 Fa	amiliarizo	the students with Adaptive Control and M	odel I	Pred	ictive	Control			
		nes: At the end of this course, learners will					w.		
	poly the	principles in system identification							
		d the basic properties/limitations of differer	nt idei	ntific	ation	techniqu	Jes		
	tilize var	ious methods of estimating the system para	amete	ers ite	erativ	ely.			
DD	istinauis	h between various types of learning me	chan	isms	üN	lake us	se of dif	ferent metho	ds for
p	rediction								
DD	emonstr	ate an understanding of various control tec	hniqu	es th	nat re	quire pa	rameter	identification.	
Unit	I INT	RODUCTION						Section and the second section of the second se	9
Introdu	uction to	Identification techniques System Identifi	icatio	n ba	isic c	oncepts	, persist	ently exciting	input,
input	signals,	persistent excitation, Nonparametric M	ethoc	IS:	Irans	ient and	alysis, F	MAX Box le	nkine
Correl	ation A	halysis and Spectral Analysis , Various .) , Least Square Estimation, Levinson Algo	types		NIOU	er struc	ation	IVIAA, DOADE	intino,
			JILLIII	, ne	cuisi	Ve Louin	ation.		9
Unit		RAMETER ESTIMATION imation using prediction error method and	inetr	umo	ntal v	ariahle	method	maximum like	-
Paran	neter est	nvergence and Consistency, Model Validat	tion	ume	nital v		metriou,	maximani inc	milood
Unit		LMAN FILTER		-	7				9
Kalma	n Filter	State model for a continuous process with	mea	sure	ment	and pro	cess noi	se, Kalman F	ilter as
a state	e estima	tior, Discrete state model, Discrete time Ka	Iman	Estir	mator	Predic	tion as fil	tering.	1.44
Unit	IV LE	ARNING SYSTEMS AND METHODS				2			9
Learn	ing Syst	ems and Methods Learning and pattern re	ecogn	ition	, Para	ametric	and non	parametric tr	aining
metho	ods, Line	ar discreminant function, Learning system	ns wit	h ar	nd wit	hout su	pervisior	, Decision the	eoretic
	ds, Bay	esian learning.	14		- 011	1.5		4	
Unit	V IN	RODUCTION TO ADAPTIVE CONTROL	-						9
Introd	uction to	Adaptive Control, Effects of Process Var	iation	s, V	ariou	s Adapti	ve Sche	mes, the MIT	Rule,
Deter	mination	of the Adaptation Gain, Lyapunov Theory	, De	sign	Of M	RAS US	ang Lyap	btoining contr	
		I Predictive Control: MPC strategy, MPC e	eleme	ints,	Obje	clive fur	iction, O	blaining conti	or law,
	and the second se	algorithms.		7-1		-			10.00
ICAL	BOOK(S	rstrom& P. Stoica, "System Identification	" Pr	entic	P Ha		iuna "S	vstem Identif	ication
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19EX11 MEMS TECHNOLOGY 1 P C Hours Course Objective (s): The purpose of learning this course is to Provide an overview of MEMS and its applications. 100 3 45 100 Course Objective (s): The purpose of learning this course is to Provide an overview of MEMS and its applications. 100 3 45 100 Impart knowledge about the various sensors and actuators. Understand about the various materials used in MEMS. 100 100 3 45 100 Gain a fundamental understanding of standard micro fabrication techniques and the issues surrounding them. Apply knowledge of micro fabrication techniques and applications to design and manufacturing of an MEMS device or a micro system. 100 2 2 2 2 100 3 45 100 Course Outcomes: At the end of the course, learners will be able to 1 2 Exhibit the products, evolution and nature of MEMS and Microsystems and demonstrate the applications of MEMS and Microsystems in various industries. 1	19EEX11			NEERIN		R 2019	Semester VII P
19EX11 MEMS TECHNOLOGY 1 P C Hours Course Objective (s): The purpose of learning this course is to Provide an overview of MEMS and its applications. 100 3 45 100 Course Objective (s): The purpose of learning this course is to Provide an overview of MEMS and its applications. 100 3 45 100 Impart knowledge about the various sensors and actuators. Understand about the various materials used in MEMS. 100 100 3 45 100 Gain a fundamental understanding of standard micro fabrication techniques and the issues surrounding them. Apply knowledge of micro fabrication techniques and applications to design and manufacturing of an MEMS device or a micro system. 100 2 2 2 2 100 3 45 100 Course Outcomes: At the end of the course, learners will be able to 1 2 Exhibit the products, evolution and nature of MEMS and Microsystems and demonstrate the applications of MEMS and Microsystems in various industries. 1		Course Name	Hour				Maximum Mark
Course Objective (s): The purpose of learning this course is to Provide an overview of MEMS and its applications. Impart knowledge about the various sensors and actuators. Understand about the various materials used in MEMS. Gain a fundamental understanding of standard micro fabrication techniques and the issues surrounding them. Apply knowledge of micro fabrication techniques and applications to design and manufacturing of an MEMS device or a micro system. Course Outcomes: At the end of the course, learners will be able to Exhibit the products, evolution and nature of MEMS and Microsystems and demonstrate the applications of MEMS and Microsystems in various industries. Comprehend the operation of actuators, motors, valves, pumps, and fluidics used in Microsyster Identify various materials for fabricating MEMS devices Analyze the manufactured micro system in terms of thermal and mechanical constraints Dift I OVERVIEW OF MEMS Introduction to MEMS, Typical MEMS products, Evolution of Microfabrication ficrosystems and Minaturization, Application of Microsystems in Automotive Industry, Application actuator Actuation Using Thermal Forces, Actuation Using Piezoelectric Crystals, Actuation Using Electrost for eactuate Actuation Using Thermal Forces, Actuation Using Piezoelectric Crystals, Actuation Using Electrost forces. MEMS with Micro actuators – Microgrippers, Micromotors, Microvalves, Micropumps. Microelectroites and Substrates - Glass and Fused Quartz Substrates, Silicon Carbide and Diamo Silicon - Chemical Vapor Deposition – Working Principle of CX thaterials and Substrates - Glass and Fused Quartz Substrates, Silicon Carb		MEMS TECHNOLOGY			10.01		
Provide an overview of MEMS and its applications. Impart knowledge about the various sensors and actuators. Understand about the various materials used in MEMS. Gain a fundamental understanding of standard micro fabrication techniques and the issues surrounding them. Apply knowledge of micro fabrication techniques and applications to design and manufacturing of an MEMS device or a micro system. Course Outcomes: At the end of the course, learners will be able to Exhibit the products, evolution and nature of MEMS and Microsystems and demonstrate the applications of MEMS and Microsystems in various industries. Comprehend the operation of actuators, motors, valves, pumps, and fluidics used in Microsystem Identify various materials for fabricating MEMS devices Identify and describe the most commonly used fabrication processes in making MEMS devices Analyze the manufactured micro system in terms of thermal and mechanical constraints Jnit I OVERVIEW OF MEMS Notorelations, Application of Microsystems in Automotive Industry, Application for Microsystems and Minorelectronics, Multidisciplinary Nature of Microsystems Design and Manufactur Microsystems in Other Industries. Jnit II SENSORS AND ACTUATORS Microsensors – Biomedical sensors, optical sensors, pressure sensors, thermal sensors. Micro actuators – Microgrippers, Microontors, Microvalves, Micropumps. Microselectroneters. Microfuldics. Introduction to Keffs with Micro actuators – Microgrippers, Micromotors, Microvalves, Micropumps. Microselectroneters. Microsensors – Biomedical sensors, optical sensors, pressure sensors, thermal sensors. Micro actuator Actuation Using Piezoelectric Crystals, Actuation Using Electrost Actuation Using Thermal Forces, Actuation Using Piezoelectric Crystals, Actuation Using Electrost Microselectronetes. Init II MATERIALS FOR MEMS Microserystems and Nitrofes. Dit III MA	Course Objectiv				3	40	100
 Apply knowledge of micro fabrication techniques and applications to design and manufacturing of an MEMS device or a micro system. Course Outcomes: At the end of the course, learners will be able to Exhibit the products, evolution and nature of MEMS and Microsystems and demonstrate the applications of MEMS and Microsystems in various industries. Comprehend the operation of actuators, motors, valves, pumps, and fluidics used in Microsystem Identify various materials for fabricating MEMS devices Identify and describe the most commonly used fabrication processes in making MEMS devices Analyze the manufactured micro system in terms of thermal and mechanical constraints Init I OVERVIEW OF MEMS Microsystems and Minitaturization, Application of Microsystems Design and Manufactur Microsystems and Minitaturization, Application of Microsystems in Automotive Industry, Application Microsystems in Other Industries. Actuation Using Thermal Forces, Actuation Using Piezoelectric Crystals, Actuation Using Electrosta forces. MEMS with Micro actuators – Microgrippers, Micromotors, Microvalves, Micropumps. Microsenters. Microfluidics. Init II MATERIALS FOR MEMS Material System: Silicon, Silicon Oxide and Nitride, Thin Metal Films, Othaterials and Substrates- Glass and Fused Quartz Substrates, Silicon Carbide and Diamouallium Arsenide, Polymers. Important Material Properties and Physical Effects – Piezo resistiviezoelectricity, Thermoelectricity. MitOROSYSTEM FABRICATION Photolithography – Light sources, Photoresists development, Photoresist Removal and Piaking. Ion Implantation, Diffusion, Oxidation – Chemical Vapor Deposition – Working Principle of CV 	Impart knoUnderstand	wledge about the various sensors a l about the various materials used	and actua in MEMS		ation tech	iniques a	and the issues
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	ERENCES:
1	Nadim Maluf, Kirt Williams, "An Introduction to Microelectromechanical Systems Engineering" 2 nd Edition, Artech House Publishers, 2004.
2	Julian W. Gardner, Vijay K. Varadan, Osama O. Awadelkarim, "Microsensors, MEMS, and Smart Devices", Wiley Chichester, 2001.

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Department	ELECTRICAL AND ELEC					R 2019	Semester-V	II PE
Course Code	Course Name	Ho	urs /	Week	Credit C	Total Hours	Maximum M	larks
19EEX12	DIGITAL SIGNAL PROCESSING	3	0	0	3	45	100	
 Apply the p Study about Study the f Understand 	ve (s): The purpose of learning principles of discrete-fourier tra- ut discrete time systems and to inite word length effects in sign d the effects of finite register le	nsform learn a nal proc	about	FFT alg	gorithms.			
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 Apply DFT Design of c Realize dig Discuss fin 	es: At the end of this course, I algorithm for signal analysis digital filter for the given specifica- ital filter for the given specifica- ite word length effects processor for real time applica	cation tion	: .=. e	-		(1 × 7 42.40	ter int Peter	• • •
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circular convolut	ion - Overlap add and save me	thod.		2		cy algoin		
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Department	ELECTRICAL AND ELECTRON	ICS E	ING	NEEF	CONTRACTOR AND A CONTRACT OF	R 2019	Semester VII	PE
Course Code	Course Name	Hou	rs / V	Veek	Credit	E. B. (2003)	Maximum Ma	arks
and the second se			T	P	C	Hours 45	10	0
19EEX13	DIGITAL INSTRUMENTATION	3	0	0	3	45	10	0
 Discuss to the Teach the di Study on bus Teach graph Involve discu Course Outcome Use digital in Perform consequential and Analyze the meters for meters for meters 	(s):The purpose of learning this coule e students on the fundamentals build gital data communication technique a communication standards and work ical programming using GUI for instr assions/ practice/exercise onto revision s: At the end of the course, learners tegrated circuit logic family chips. The purpose of the course is the fundamental principles of electro- ters, easurements.	ding b king pr umen ng & f will be activ use d	locks incip t buik amilia amilia amilia amilia amilia amilia amilia amilia	les ding arizing e to us y dev	g the co ing d vices fo	oncepts a igital te r digital c	cquired chniques, bi ircuits, use dig	
enabling the	m to understand current technology a ployability and entrepreneurship ca bedded systems design.	and to	adap	ot to r	new dev	vices and	technologies.	
Unit I DATA A	CQUISITION SYSTEMS							9
Unit II INSTRUI Introduction, Mod –Digital Modulatio handshaking, se standards interfac design ,advantag configuration of : I	of operation- Heterodyne converter for frequency, Per Ans-Digital storage Oscilloscope-digital MENT COMMUNICATION Idem standards, Data transmission In Basic requirements of Instrument E rial bus- basics, Message transfer ises .General considerations -advant ges and limitations ,general con HART network, Mod Bus, Field bus. LINSTRUMENTATION BASICS	n sys Bus C r, - R	asur ay in stems omm S-23 and	terfac - Ti unica 2, U: disac	nt, Sing ce. me Div tions st SB, RS Ivantag	vision M tandards, S-422, Et es-Instrui	ultiplexing (TI interrupt and o hernet Bus- O mentation network	Data 9 DM) data CAN vork
Block diagram ,ro GUI – Virtual Ir	ole,and Architecture for VI— tool b nstrumentation for test, control de reation of panels,icons-Loops-Array	sign-r	nodu	lar p	rogram	ming-cor	nceptual and	prog
	URING PROGRAMMABLE INSTRU	JMEN	ΤΑΤΙ	ON				9
Microprocessor b standards – Dat hardware simulat	ased system design –Peripheral In a acquisition with processor and on of I/O communication blocks - ervo motor control- PID control.	terfac with	es sy √I –	/stem Virtu	al Inst	rumentati	on Software a	and D -
Unit V CASE S								9
pressure and lev Note: Class room /learning process Relays/Solenoids,	d DAS, Data loggers, VI base rel development system- DSO interfa discussions and tutorials can inclu s: Discussions/Exercise/Practice Digital I/O – Counter, Timer-servo	ace -di de the on	gital e foll Wo	contr owing rkben	oller for g guide ich fo	colour vi lines for or Digi	deo display. improved teac	
TEXT BOOK(S): 1. Gregory J. CAMBRIDO	Pottie / William J. Kaiser, Princi GE UNIVERSITY PRESS (CUP),201	ples 6	Of E	mbeo	dded N	letworked	l Systems De	sigr

Chairman - Bos Dept. of EEE - ESEC

2.	Mathivanan, "PC based Instrumentation Concepts and practice", Prentice-Hall India, 2009
З.	Jovitha Jerome, "Virtual Instrumentation using Labview"PHI, 2010.
REF	ERENCES:
1.	Jonathan W Valvano, "Embedded Microcomputer systems", Brooks/Cole, Thomson, 2010.
2.	H S Kalsi, "Electronic Instrumentation" Second Edition, Tata McGraw-Hill, 2006.

1325 Chairman - BoS Dept. of EEE - ESEC

	ELECTRICAL AND ELECTRO	NICS EN	IGINE	ERI	NG		Semester	VII PE
Course Code	Course Name				Credit	Total	Maximum	Marks
		L	T	P	C 3	Hours 45	100	-
19EEX14	EHVAC TRANSMISSSION (s):The purpose of learning this c	3	0	0	3	45	100	
 Impart know Know the ca Understand Teach Coro 	ledge on EHVAC transmission cor loculation of electrostatic fields of A the energisation of lines na effects and radio interference the steady state and transient limit	ncepts C lines						
 Apply the k Calculate el Analyze the Remember 	s: At the end of the course, learne nowledge on EHVAC transmission ectrostatic fields of AC lines energisation of lines the Corona effects and radio interfi- eady state and transient limits in A	concept erence	e able ts	to				
Unit I INTROD	UCTION					Land Dia		9
EHVAC Transmis	sion line trends and preliminary and parameters-Bundle conductors egative and zero sequence imped	: Prope	ties -	-Indu	lctance	and Ca	pacitance	of EHN ation
Unit II ELECTR	OSTATIC FIELDS							9
of high electrost	and voltage gradients – Calc atic field on biological organisms ts of actual transmission lines – Vo	and hur	nan b	eing	s – Sur	tace vol	tage gradie	–Effe ents an
and the state of the state of the state		0 0	100 Std - 014	177				
	CONTROL	2.11						9
Electrostatic indu phase single and overvoltage in El	tion in un energized lines – Me d double circuit lines – Un energi V lines: No load voltage – Charg compensation – Static VAR com	gized lir ging cur	ies. F rents	owe	er Frequ	iency Vo	oltage cont	or three
Electrostatic indu phase single an overvoltage in El Shunt and Series	ction in un energized lines – Me d double circuit lines – Un energi V lines: No load voltage – Charg compensation – Static VAR com	gized lin ging cur pensatio	ies. F rents n.	owe	er Frequ	iency Vo	oltage cont	or three
Electrostatic indu phase single and overvoltage in El- Shunt and Series Unit IV CORON Corona in EHV waves due to Measurements of	ction in un energized lines – Me d double circuit lines – Un energi IV lines: No load voltage – Charg	gized lin ging cur pensatio FERENC Charge Corona, e to Coro	rents n. E voltag	ge d	er Frequ bower fr liagram- eration,	equency Attenua	ation of tr	or three rol and ontrol - 9 aveling limits.
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Department	ELECTRIC	CAL AND ELECTRO					R 2019		_
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Course Objectiv			3	0	0	3	45	100	-
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 Apply the I Apply the of Test the sy Test the st 	pasic concepts concepts of stat	of state variable repr te equation. bility and observability near systems.	esentati			an marif	an a		
		EPRESENTATION			No.	10.1			1
iniqueness of sta	te model-State	tate equation for Dy Diagrams-Physical S	ynamic System a	Systemand Stand	ems- ⁻ State	Time inv Assignm	ariance a ient.	and linearity-	
	TION OF STAT	A STATE ALL COMPANIES AND A COMPANIES AND AND A COMPANIES.				1			1
		solutions to Continuo	ous-time						
		uations-State transit e of Eigen values and	tion ma			t's prop	erties-Eva	aluation of m	atr
Exponential-Syste Unit III CONT General concept – Time Invariant	em modes- Role ROLLABILITY of Controllabilit systems - Obs	uations-State transit e of Eigen values and AND OBSERVABILI ty - General concept servability tests for C	tion ma d Eigen ITY of Obse Continue	ervat	ors. oility 8	& Contro	llability te nt systen	ests for Continuests for Continuests	Jou
Exponential-System Jnit III CONT General concept Time Invariant and Observability Torms of State methrough Pole As	em modes- Role ROLLABILITY of Controllabilit systems - Obs y of state mode odel. State Fe signment – Sta	uations-State transit e of Eigen values and AND OBSERVABIL ty - General concept servability tests for C el in Jordan Canonic edback Controllers ate observers: Full or	tion mail d Eigen ITY of Obse Continuc cal form and Ot	ervations - Co	ors. oility 8 Time ontrol /ers:	& Contro e Invaria lability a State F	llability te nt systen nd Obser	ests for Contin ns - Controlla rvability Cano	Joi bili nic
exponential-System Jnit III CONT General concept Concept Time Invariant Concept and Observability Forms of State m forms of State m Pole As Jnit IV NON-L	em modes- Role ROLLABILITY of Controllabilit systems - Obs of state mode odel. State Fe signment – State INEAR SYSTE	uations-State transit e of Eigen values and AND OBSERVABILI ty - General concept servability tests for C el in Jordan Canonic edback Controllers ate observers: Full or MS	tion ma d Eigen ITY of Obse Continuc cal form and Ot rder and	vecto ervat ous - - Co oserv I redu	ors. Dility 8 Time ontrol vers: uced	& Contro e Invaria lability a State F order.	llability te nt systen nd Obser eedback	ests for Continu ns - Controlla rvability Cano Controller de	Jou bili nic
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Department	ELECTRICAL AND ELECTRONIC	S ENGI	NEE	RING	G	R 2019	Semester VII PE
and the second second	Course Name	Hour	s/W	eek	Credit	Total	Maximum Mark
Course Code	Course Name	L	Т	P	С	Hours	
19EEX16	SMART GRID	3	0	0	3	45	100
 Know the evolution Learn differ Learn differ Understand 	(s): The purpose of learning this co volution of electric grid ent Smart Grid technologies in tran- ent Smart Grid technologies in dis the concept of smart meters, AMI the high performance computing for	nsmissio tribution I, PMU.	on si i side	Э	oplication	15.	
 Understand Realize the a system for Explain the Implement Describe control Unit I INTROI 	es: At the end of the course, learner d the issues and challenges that re fundamental elements, internation or monitoring and control of smart t e challenges faced by distribution n PMU and Intelligent Electronic De ommunication systems, networking DUCTION ctric Grid - Concept, Definitions	emain to nal polic transmis networks evices in g and se	be s sion and sma ensir	olve and sys pro art gr ng te	initiative tem. wide sm rid monil chnolog	s of sma art netwo toring an ies invol	ork. Id protection. Ved in smart grid
functions, opport Grid – National	unities, challenges and benefits and International initiatives in Sma GRID TECHNOLOGIES ON TRA	s - Diff art Grid.	ferer	nce	betweer	n conve	ntional & Smar
Automation, Trai control. Unit III SMART DMS, Volt/VAi management, H	ers, Smart energy resources, Sm nsmission systems: EMS, FACTS GRID TECHNOLOGIES ON DIS control, Fault Detection, igh-Efficiency Distribution Trans Vehicles (PHEV).	and HV TRIBUT	DC, FION	Wid I SIC and	e area r DE servic	e rest	ig, Protection and 9 oration, Outage
Unit IV SMART	METERS AND ADVANCED MET	TERING	INF	RA	STRUC'	TURE	9
Introduction to S protocols, standa (PMU), Intellige	Smart Meters - Advanced Meterin ards and initiatives, AMI needs nt Electronic Devices (IED) & their PERFORMANCE COMPUTING FO	ng infras in the applicat	struc sma tion f	ture rt g for n	(AMI) (rid - P nonitorin	drivers a hasor N g & prot	ection.
Local Area Netv over Powerline (Security for Sma	vork (LAN) - House Area Network BPL) - IP based Protocols-Basics art Grid.	(HAN)	- W	ide /	Area Ne	twork (V	VAN) - Broadbar
Borlase, Cl	ids Advanced Technologies and RC. 2018.						
Grid: Tech	anayake, Nick Jenkins, KithsiriLiya nology and Applications", John Wile	ey,2012			10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	moh, Smart Grid Fundamentals of D	Jesign a	nu A	alay	515, IEEE	- press 2	.012.
REFERENCES:	rlase"Smart Grid: Infrastructure, Te	echnolo		nd S	olutions	CRC	Press 2012
2 Vehbi C. Cecati	Güngör, Dilan Sahin, Taskin Koc and Gerhard P. Hancke, Sm gies and Standards IEEE Transact	ak, Sali nart Gi	h Er rid	güt, Tec	Concet hnologie	tina Buc s: Con	cella, Carlo

13br Chairman - BoS

Department	ELECTRICAL AND ELEC	CTRONICS EN	GINEE	RING		R 2019	Semester \	/II PE
Course Code	Course Name	Hours			dit	Total	Maximu	
	FIBER OPTICS AND LAS	ED	TF	c	-	Hours	Marks	
19EEX17	INSTRUMENTS	3	0 0) 3		45	100	
	e (s): The purpose of learning t							
	students to the basic concepts							
	equate knowledge about the In		ations	of opti	cal f	ibres.		
	students to the Laser fundame							
Provide ade Provide ade	equate knowledge about Indus	strial application	n of las	ers.				
	equate knowledge about holog	All second and the second second second	Million Server Scould	No. State Contraction	ions	of Lasers	5.	
	es: At the end of the course, le d the principle, transmission,				n ch	aracterist	ics of optic	al
	gained knowledge on optic	al fibers for i	to upo	/	om	municatio	n modium	
as sensor	as well which have imp	ar libers for i	cations	in	nro	numication	manufaci	l an
industrial a	nd biomedical applications.	portant appli	oution		pre	Judotion,	manarao	unn
Understand	laser theory and laser gene	ration system.		in the Policy		a sur fill and sur	and and and and and	in Date
Apply laser	theory for the selection of la	sers for a spe	cific In	dustri	al a	nd medica	al applicati	on.
Jnit I OPTICA	L FIBRES AND THEIR PRO	PERTIES						9
construction of	optical fiber cable: Guiding	mechanism in	n optio	cal fib	er a	and Basic	c compone	ent (
ptical fiber com	nunication, -Principles of lig	ht propagation	throu	gh a f	ibre	: Total in	ternal refle	ctio
cceptance angle	e (0a), Numerical aperture	and Skew	mode,	-Dif	fere	nt types	of fibres	an
neir properties:	Single and multimode fib	ers and Step	index	and	gra	ided inde	ex fibers,-	fibr
haracteristics: N	lechanical characteristics an	nd Transmissi	on ch	aracte	risti	cs, – Ab	sorption l	osse
Scattering loss	es – Dispersion – Connect	tors and splice	ers -F	ibre te	ermi	nation -	Optical sou	irce
Init II INDUST	de (LED), - Optical detector RIAL APPLICATION OF OP	S: PIN DIODE.	-0	*:	-			1
	NAL ALLEGATION OF OF							
ibre optic senso	ors: Types of fiber optics ser	nsor, Intrinsic	senso	r- Te	mpe	rature/ P	ressure se	9 ensor
ibre optic senso xtrinsic sensors ensor) – Fibre	ors: Types of fiber optics ser Phase Modulated Fibre optic instrumentation syste	nsor, Intrinsic Optic Senso m: Measurem	senso r and ent of	Disp	lace	ment se	ensor (Ext t back met	enso rinsi hod
ibre optic senso xtrinsic sensors sensor) – Fibre Optical domain	Prs: Types of fiber optics ser Phase Modulated Fibre optic instrumentation syste reflectometers, Fiber Sca	nsor, Intrinsic Optic Senso m: Measurem ttering loss	senso r and ent of Me	Disp atteni asure	lace Lation	ment se on (by cu nt, Fibe	ensor (Ext t back met er Abso	enso rinsi hod
ibre optic sensor xtrinsic sensors Sensor) – Fibre Optical domain Aeasurement, Fi	Price Types of fiber optics ser Phase Modulated Fibre optic instrumentation system reflectometers, Fiber Sca ber dispersion measurement	nsor, Intrinsic Optic Senso m: Measurem ttering loss nts, End refle	senso r and ent of Me ction	Disp atteni asure metho	lace uatio mer d a	ment se on (by cu nt, Fibe nd Near	ensor (Ext t back met er Absor field sca	enso rinsi hod rptio nnin
ibre optic sensor xtrinsic sensors Sensor) – Fibre Optical domain Measurement, Fi echniques – D	prs: Types of fiber optics ser Phase Modulated Fibre optic instrumentation syste reflectometers, Fiber Sca ber dispersion measuremen ifferent types of modulat	nsor, Intrinsic Optic Senso m: Measurem attering loss nts, End refleo ors: Electro-0	senso r and ent of Me ction optic r	Disp attent asure metho nodula	lace uation mer d a ator	ment se on (by cu nt, Fibe nd Near (EOM)	ensor (Ext t back met er Absor field sca –Interferor	enso rinsi thod rptio nnin netri
ibre optic sensor xtrinsic sensors ensor) – Fibre optical domain feasurement, Fi echniques – D nethod of meas	ors: Types of fiber optics ser , Phase Modulated Fibre optic instrumentation syste reflectometers, Fiber Sca ber dispersion measuremen ifferent types of modulat urement of length – Moin	nsor, Intrinsic Optic Senso m: Measurem attering loss nts, End refleo ors: Electro-0	senso r and ent of Me ction optic r	Disp attent asure metho nodula	lace uation mer d a ator	ment se on (by cu nt, Fibe nd Near (EOM)	ensor (Ext t back met er Absor field sca –Interferor	enso rinsi hod rptio nnin netri
ibre optic senso xtrinsic sensors Sensor) – Fibre Optical domain Measurement, Fi echniques – D nethod of meas urrent, voltage, I	prs: Types of fiber optics ser Phase Modulated Fibre optic instrumentation syste reflectometers, Fiber Sca ber dispersion measuremen inferent types of modulat urement of length – Moint iquid level and strain.	nsor, Intrinsic Optic Senso m: Measurem Ittering loss nts, End refleo ors: Electro-o e fringes – I	senso r and ent of Me ction optic r Measu	Disp atteni asure metho nodula remer	lace uatio mer d a ator nt o	ment se on (by cu nt, Fibe nd Near (EOM)	ensor (Ext t back met er Absor field sca –Interferor	enso rinsi hod) rptio nnin netri
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1.	J.M. Senior, 'Optical Fibre Communication – Principles and Practice', Prentice Hall of India, 1985
2.	J. Wilson and J.F.B. Hawkes, 'Introduction to Opto Electronics', Prentice Hall of India, 2001
3.	Eric Udd, William B., and Spillman, Jr., "Fiber Optic Sensors: An Introduction for Engineers and Scientists ", John Wiley & Sons, 2011.
REF	ERENCES:
1	G. Keiser, 'Optical Fibre Communication', McGraw Hill, 1995
2	M. Arumugam, 'Optical Fibre Communication and Sensors', Anuradha Agencies, 2002.
3	John F. Ready, "Industrial Applications of Lasers", Academic Press, Digitized in 2008

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REF	ERENCES:
1.	J. Nie and D. Linkens, (1998), 'Fuzzy Neural Control: Principles, algorithms and applications,' Prentice Hall India.
2.	S.V. Kartalopoulas (2000), 'Understanding Neural networks and Fuzzy Logic,' IEEE Press and Prentice Hall India.

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Course Code	Course Name	-	s/Week			Maximum	Marks
19EEX21	HIGH VOLTAGE ENGINEERING	L		C 3	Hours 45	100	
 Provide a Study the Provide k Learn the Know to Course Outcom Identify an Illustrate Propose Employ te Carry out internation Unit I TRAN Natural causes ightning strokes switching surge control of overvo Unit II ELEC Gases dielectrice equation – crite fields and cor 	HIGH VOLTAGE ENGINEERING ive (s):The purpose of learning this count in overview of transient over voltages in a various breakdown theories in gases, so nowledge about the various generation different measuring techniques of high conduct High Voltage tests on power so nes: At the end of the course, studen and analyze the causes of overvoltage in the different breakdown mechanisms in various methods to generate high voltage echniques to measure various types of h nondestructive testing on high voltage and standards. SIENT OVERVOLTAGES IN ELECTRIC of over voltages: Lightning phenomena s- mathematical model for lightning, C s- characteristics of switching surges- oltage due to switching- Travelling wave TRICAL BREAKDOWN IN GASES, SO cs: Ionization processes – Breakdowr rion for breakdown - Streamer theor ona discharges: Corona Discharges - ssifications of liquid dielectrics-Pure li	3 arse is t electric solids a methor voltage system ts will a pow solid, I e equip c POW a –cha over vc power s on tr LIDS / theor y – Pa Vacuu	0 0 c power and liquic ds of hig e and cu n equipm be able ver system iquids, g urrents. rrents & pments a vER SYS rge form bltages of frequen ransmiss AND LIC ries: Tow aschen's minsula	3 systems ls. h voltage rrents. ents as to m. aseous of voltages and outli STEMS ation in due to s cy overvion lines UIDS vnsend's law- B ation -Va	45 e and cu per India & vacuu & vacuu ine the the clou witching voltage i otheory creakdow	an and Inte m. Indian and Ids- mecha I surges: O in power s - current vn in non- preakdown.	rnation 9 nism o prigin o ystems 9 growth uniform
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REF	ERENCES:
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					GINEERING	R2019	Semester VIII PE
Course	Course Name	-	-	Week		Total	Maximum Marks
Code		L	C	Р	C	Hours	
19EEX22 Course Object	POWER QUALITY ive (s):The purpose of lea	3	3 this	0 COUISE	3 is to	45	100
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	nd the principle of operat e on DVR&DSTATCOM.	ion c	of va	rious ty	pes of powe	r quality r	nonitoring devices an
Unit I I	NTRODUCTION TO POW	VER	QUA	LITY			9
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faulted condition	1 - Estimation of the sag	sev	<i>rity</i>	- Mitig	ation of volt	age sag,	Static transfer switch
and fast transfe swell.	er switches Capacitor s	g sev switch	<i>rity</i>	- Mitig	ation of volt	age sag,	Static transfer switch e - Mitigation of voltage
and fast transfe swell. Unit III I	er switches Capacitor s	switch	verity hing	- Mitig - Lighti	ation of volt ning - Ferro	age sag, resonance	e - Mitigation of voltag
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Unit	1	LIGHTNING, SWITCHING AND TEM	NPOF	RAR	YOV	ER VOL	TAGES	32.4.14	9
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Departm	ent	ELECTRICAL AND ELECTRONICS	SEN	IGIN	EER	ING	R2019	Semeste	r VIII PE
Course C	ode	Course Name	Ho	urs/V		Credit	Total	Maxim	
19EEX	24	ADVANCED POWER SYSTEM	L	Т	P	C	Hours	Marl	
1		ANALYSIS	3	0	0	3	45	100)
□ Intr □ Imp □ Per □ Per	oduc art ir form form	tive (s): The purpose of learning this course different techniques of dealing with span- depth knowledge on different methods optimal power flow solutions in detail. short circuit fault analysis and understare different numeric al integration methods	arse of po nd th	matrower	flow	solutions	s. different	type of fai	
		mes: At the end of the course, studer					3	, ,	
□ Ana □ Ana □ Ana	alyze alyze alyze	e concepts of sparse matrix for large sca power system studies that needed for th the optimal power flow that needed for to the short circuit studies of power system the transient stability studies of power sy	ne tra rans n.	ansm miss	issic	n system	planning	j .	
Unit I	and a large	SOLUTION TECHNIQUE	-1 . ht	196221110	and the other	arthere, there	NT - I - A - ATO T	व ने विकृतियां की सांस्थान	9
Bifactoriza matrices. Unit II Power flow V buses: I Unit III Problem method, L AC power	tion a w equ Revie state inea	POWER FLOW ANALYSIS and Gauss elimination methods; Repeat POWER FLOW ANALYSIS Juation in real and polar forms; Review of two of Fast Decoupled Power Flow metho OPTIMAL POWER FLOW ment; Solution of Optimal Power Flow r Sensitivity Analysis; LP methods – W variables and detailed cost functions; S	f Ne d: S ow	wton ensit (OPI	usir 's m ivitv F) -	ethod for factors fo The great variable	solution; or P-V bu radient r es only -	Adjustme s adjustme nethod, N - LP meth	9 ent of P- ent. 9 lewton's nod with
	rithm	Bus Incremental costs.							
Unit IV		SHORT CIRCUIT ANALYSIS							9
Computer bus volta unsymmet	meth ges,		sequ	ence	cor	nponents	. Derivat	ion of equ	ations fo
Unit V	2	TRANSIENT STABILITY ANALYSIS							9
model; Fa	for	Numerical Integration Methods: Eule simulation of SMIB and multi-machin influencing transient stability, Numerica	ne s	syste	m v	vith class	sical syn	ge-Kutta chronous n methods	methods
TEXT BO			_						
Nev	N YO	d and B.F.Wollenberg, "Power Generat k, 1996.		*					
Cor	npan	" Computer Techniques in Power y Limited, New Delhi, 2006.	Sys	tem	Ana	alysis",Ta	ta McGi	raw-Hill F	Publishing
REFEREN						16			
IEE	E Tra	ey and W.S.Meyer, "Solution of Large S ans. on Automatic Control, Vol : AC-18, p	p:33	3-34	6, A	ug 1973.			
2 K.Z. pp:7	olleni 75-96	kopf, "Bi-Factorization: Basic Computation; Book on "Large Sparse Set of Linear S	tiona	al Alg ems"	goriti Edit	nm and or: J.K.Re	Program erd, Acade	ming Tecl emic Press	nniques s, 1971.
		r, "Power System Stability and Control", I							



Department	ELECTRICAL AND ELECTRONICS	ENG	INE	ERIN	IG	R2019	Semester VIII PE
Course	Course Name	Ho		Nee	Credit	Total	Maximum
Code	Course Name	L	T	Ρ	С	Hours	Marks
19EEX25	EMBEDDED SYSTEMS DESIGN	3	0	0	3	45	100
 Provide Embedde Teach Commun Introduce Discuss different Involve concepts Course Outcoon Design realistic outcoon 	the fundamentals of Emb ication in processors, Input/output inte on processor scheduling algorithms, E on aspects required in develop Phases & Modeling of embedded syste Discussions/ Practice/Exercise acquired to improve employability skills mes: At the end of the course, studen	b erfa Basic oing em c nts	asic ded cing cs of a onto will t ess enviro	Rea ne r be at to	w emb evising ble to meet	r Mod erating sy bedded p	eling , Bus stem processor, familiarizing the
Describe Design re Understa Apply the Unit I I Introduction to processor & r	the embedded network and interrupts a eal time embedded systems using the co- ind the role of embedded systems in ind e software development for embedded s NTRODUCTION TO EMBEDDED SYS Embedded Systems –Structural nemory devices- DMA, Memory	servi once lustr yste TEN uni	ce m epts y ems. IS ianag	n Egeme	TOS. Embedde ent me	thods-	memory mapping,
	ment concept, Timer and Counting device EMBEDDED NETWORKING AND INT						
Embedded Ne protocols - RS sources , Pro concept— mult	tworking: Introduction, I/O Device 232 standard – RS485 –USB – ogrammed-I/O busy-wait approach tiple interrupts – context and perio -Introduction to Basic Concept Devi	Por In with ods	ts & ter out for	& B Integ inte co	uses– 3 grated 9 errupt 9	Serial Bu Circuits service	us communication (I2C) – interrupt mechanism- ISR
Unit III I	RTOS BASED EMBEDDED SYSTEM	DES	IGN		1		9
Introduction to in RTOS, Mult communication- synchronization priority inher µC/OS-II, RT Lin	basic concepts of RTOS- Ta iprocessing and Multitasking, Preer shared memory, message p between processes-semaphores, itance-comparison of commercial F nux.	nptiv assi I RTO	pro ve a ing-, Mailb	and I oox,	non-pre nterproce pipe	emptive ess Co s, pri	ority inversion, Il RTOS, VxWorks,
Software Deve In circuit emulat and Co-Desig Architectural, Diagrams.	SOFTWARE DEVELOPMENT TOOLS elopment environment-IDE, assemb or, Target Hardware Debugging, gn. Overview of UML, Scope of UML basic elements-Diagram- Mode	oler, n UML eling	eed m tec	foi Iodel hniq	r Hard ing, Cc ues - st	ware-Soft onceptual	ware Partitioning model of UML, Behavioral, Activity
Unit V	EMBEDDED SYSTEM APPLICATION	DEV	'ELC	PM	ENT		9
(EDLC), Case software for to following Guid Case studies	ferent Phases & Modeling of the studies on Smart card- Adaptive key inputs. Note: Class Room D delines for improved Teaching /Le through Exercise/Discussions on D card -Adaptive Cruise control in a	e C iscu earni esid	ruise ssior ng n	e co ns Pro De	and Tu cess: F velopme	n a Ca utorials Practice nt of en	r -Mobile Phone can include the through any of mbedded Products

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1	Rajkamal, 'Embedded system-Architecture, Programming, Design', TMH, 2011
2	Peckol, "Embedded system Design", JohnWiley & Sons, 2010
RE	ERENCES:
1	Shibu.K.V, "Introduction to Embedded Systems", TataMcgraw Hill, 2009
2	Lyla B Das," Embedded Systems-An Integrated Approach", Pearson 2013
3	Elicia White, "Making Embedded Systems", O'Reilly Series, SPD, 2011
4	Bruce Powel Douglass, "Real-Time UML Workshop for Embedded Systems, Elsevier, 2011
5	Simon Monk, "Make: Action, Movement, Light and Sound with Arduino and Raspberry Pi", O'Reilly Series ,SPD,2016.
6	Tammy Noergaard, "Embedded System Architecture, A comprehensive Guide for Engineers and Programmers", Elsevier, 2006
7	Jonathan W.Valvano,"Embedded Microcomputer Systems ,Real Time Interfacing",Cengage Learning,3rd edition,2012
8	Michael Margolis, "Arduino Cookbook, O'Reilly Series ,SPD,2013

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Dep	artment	ELECTRICAL AND ELECTRONIC	S EN	GINE	ERIN	IG	R2019	Semester VIII P
	ourse	Course Name	Hou	rs / V	Veek	Credit	Total	Maximum
	Code	Course Name	L	Т	Ρ	С	Hours	Marks
	EX26	HIGH VOLTAGE DIRECT CURRENT TRANMISSION	3	0	0	3	45	100
	Understa transmis Analyze Study ab	ive (s):The purpose of learning this c and the concept, planning of DC powe sion. HVDC converters. out the HVDC system control. harmonics and design of filters.	ourse er tran	is to smis	sion a	and com	parison wi	th AC Power
		nes: At the end of the course, stud	lents	will Ł	e ab	le to		
	Understa Analyze Acquire I Understa	and the principles and types of HVDC and understand the concepts of HVD knowledge on DC link control. and the concepts of reactive power m vledge about Planning of DC power t	syste C cor	em. Iverte emen	ers. t, har	monics a	and power ison with a	flow analysis. AC power
Unit		NTRODUCTION						9
DC trans trend	Power transmission –	nsmission technology – Comparison Description of DC transmission sy technology – DC breakers – Opera oplications of MTDC systems.	stem	– PI	annir	na for H	VDC tran	smission – Moder
Unit		ANALYSIS OF HVDC CONVERTER	s	-	-			9
Choi	ice of conv	ed converter – Analysis of Graetz erter configuration – Converter bridg SC topologies and firing schemes.	circui je cha	t with racte	n and eristic	d withou s – Anal	t overlap ysis of a	 Pulse number 12 pulse converter
Unit		CONVERTER AND HVDC SYSTEM	CONT	ROL	_			9
Print	ciples of Do	C link control – Converter control cha ent and extinction angle control – s introllers – Control of VSC based HV	aracte Startir	ristics g an	s – S	ystem co opping o	ontrol hier of DC link	archy – Firing ang – Power control
Unit	t IV	REACTIVE POWER AND HARMON	IICS C	CONT	ROL			9
Rea Gen	eration of h	er requirements in steady state—S narmonics –Design of AC and DC filte	ers– A	ctive	filter	active po s.	ower-SVC	and the second
Unit	t V I	POWER FLOW ANALYSIS IN AC/D	C SYS	STEN	IS			9
Per stud		n for DC quantities–DC system mode	I –Incl	usior	n of c	onstraint	s –Power	flow analysis -cas
TEX	T BOOK(S):						
1	Second	K. R., "HVDC power transmission Edition, 2010.						
2	London,	Wilson Kimbark, "Direct Current Tr Sydney, 1971.						
3	Internati	Das Begamudre, "Extra High V onal (P) Ltd., New Delhi, 1990.	/oltage	e AC	C Tra	ansmissi	on Engin	eering", New Ag
REF	ERENCES			-		1000		and the second second
1	Kundur F	P., "Power System Stability and Contr	ol", M	cGra	w-Hil	1, 1993.	T	i
2	Garrawa	amson and Hingorani N G, "High Vol y Limited, London, 1960.						A State of the second second
3	Arrillaga	J., "High Voltage Direct Current Tran	nsmiss	sion",	Pete	er Pregrir	nus, Londo	on, 1983.
4	S. Kama 2011.	kshaiah, V. Kamaraju, 'HVDC Trans	missio	on', T	ata N	/IcGraw I	Hill Educa	tion Private Limite

0	artment	ELECTRICAL AND ELECTRONIC	S EN	GINE	ERIN	IG	R2019	Semester	VIII PE
	ourse	Course Name	Hou	rs / \	Neek	Credit	Total	Maxim	
	Code		L	Т	Ρ	С	Hours	Marl	KS
19	EEX27	ENERGY CONSERVATION AND MANAGEMENT	3	0	0	3	45	100)
		ive (s): The purpose of learning this of							No. 1
		and the concept of Energy Conserv	ation	and	mana	igement.			
		he electrical systems.							
		he thermal systems.							
		he energy economics.		ation					
Cour		e various case studies of energy content of the course, studies: At the end of the course, studies				la to		1000	
	Apply the with energy Apply the Apply the Apply the	knowledge of the technology, ecor y conservation and energy auditing energy efficiency methods in electri energy efficiency methods in mecha economics aspects in energy mana economic performance in various re	cal systemics anical gemen	s and stem syste	d regu s. ems.	Ilation re		es associat	
Unit		INTRODUCTION	arum	e ap	plicati	ons.			9
		es of energy management and energy			~~~~~	nt nlann	ing condu	oting onorg	
(pre-a	audit, audit	and post-audit), energy audit instrur rgy saving measures/ projects, case	nents,	ene	rgy a	udit repo	rt, monitor	ing, evaluat	ing and
Unit	11	ELECTRICAL SYSTEMS		C		- 4	75.6.11		9
Com	ponents of	EB billing – HT and LT supply, T	ransfo	orme	rs, C	able Siz	ing, Conc	ept of Capa	acitors,
Efficie		mprovement, Harmonics, Electric , Illumination – Lux, Lumens, Typ nation.							
Unit I	11	THERMAL SYSTEMS			10.74				9
Stoic	hiometry,	Boilers, Furnaces and Thermic F	luid H	leate	ers –	Efficien	cy compu	tation and	
meas	ures. Stea			. oure					-
Unit I		m: Distribution &Usage: Steam Tra Refractories.			ensate		ery, Flash		encon
	TV Econor	m: Distribution &Usage: Steam Tra Refractories. E CONOMICS			ensate		ery, Flash		encon
Energ Life C	Cycle Cost	Refractories. E CONOMICS nics – Discount Rate, Payback P	ips, C	onde				Steam Utili	encon ization, 9
Life C	V E	Refractories. ECONOMICS nics – Discount Rate, Payback P ing -ESCO concept. CONOMIC PERFORMANCE INDI	eriod,	Inte	ernal	Rate of	Return, I	Steam Utili	encon ization, 9 it Value
Life C Unit V Payba Ratio, propo Energ Energ TEXT	Cycle Cost V E ack - Sin , E/D rationality psals, profig gy conservery gy Efficient BOOK(S) R Energ training.co	Refractories. ECONOMICS mics – Discount Rate, Payback P ing -ESCO concept. CONOMIC PERFORMANCE INDI ple and Discounted, Net Presen o, Life cycle/levelized cost. Final tability index, life cycle costing apply vation in vehicles, energy conservation Technologies, Energy Conservation y Manager Training Manual (com, a website administered by Bur	eriod, eriod, ces t Val ncial roach vation on Pra 4 Vo reau o	Inte ue, inte in b actice	ernal Intern uation estme puildir e – Ca es)	Rate of nal Rate n of en- ent decis ngs, Pov ase Stud	Return, I of Retur ergy proje ion and un ver quality dies.	Steam Utili Net Presen n, Benefit ects, evalu ncertainty. y issues re w.energym	encon ization, 9 It Value 9 Ito Cos ation o elated to
Life C Unit V Payba Ratio, propo Energ Energ TEXT	Cycle Cost V E ack - Sin ack - Sin bsals, profig conservery gy Efficient BOOK(S) R Energ training.co under Min	Refractories. ECONOMICS mics – Discount Rate, Payback P ing -ESCO concept. CONOMIC PERFORMANCE INDI ple and Discounted, Net Presen b, Life cycle/levelized cost. Final tability index, life cycle costing apply vation in vehicles, energy conservation rechnologies, Energy Conservation y Manager Training Manual (om, a website administered by Bur istry of Power, Government of India	eriod, eriod, ces t Val ncial roach vation on Pra 4 Vo reau o	Inte ue, inte in b actice	ernal Intern uation estme puildir e – Ca es)	Rate of nal Rate n of en- ent decis ngs, Pov ase Stud	Return, I of Retur ergy proje ion and un ver quality dies.	Steam Utili Net Presen n, Benefit ects, evalu ncertainty. y issues re w.energym	encon ization, 9 It Value 9 Ito Cos ation o elated to
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Life C Unit V Payba Ratio, propo Energ Energ TEXT 1 REFE 1 2	Cycle Cost V E ack – Sin ack – Sin bsals, profigy conserving gy Efficient BOOK(S) R Energ training.cc under Min RENCES: Witte. L.C Publ, Was Callaghn,	Refractories. ECONOMICS mics – Discount Rate, Payback P ing -ESCO concept. CONOMIC PERFORMANCE INDI pole and Discounted, Net Presen o, Life cycle/levelized cost. Final tability index, life cycle costing apply vation in vehicles, energy conservation rechnologies, Energy Conservation y Manager Training Manual (om, a website administered by Bur istry of Power, Government of India ., P.S. Schmidt, D.R. Brown, Indus hington, 1988. P.W. Design and Management for E	eriod, eriod, t Val ncial roach vation on Pra 4 Vo reau a, 200 trial E nergy	Inte ue, evalu , inve in k int k interior ereg	ernal Intern uation estme ouildir e – Ca es) nergy	Rate of nal Rate n of en- ent decis ngs, Pov ase Stud available Efficien nagemention, Per	Return, I of Retur ergy proje ion and u ver quality dies. e at ww cy (BEE) nt and Uti gamon Pre	Steam Utili Net Presen n, Benefit ects, evalu ncertainty. y issues re w.energym , a statutor	encon ization, 9 to Cos ation o elated to nanager y body
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Department Course	ELECTRICAL AND ELECT				Credit	R2019 Total	Semester VI	
Code	Course Name	L	T	P	C	Hours	Maximum	Marks
19EEX28	ROBOTICS AND CONTROL	3	0	0	3	45	100	
 Know the Study the Understand Get know 	ive (s):The purpose of learning e various parts of robots and e various kinematics and inve- and the Euler, Lagrangian for vledge on trajectory planning e control of robots for some s	fields o erse kir mulatio for rob	of robo nemation of F pot.	otics. tics of Robot	robots. dynamics	5.		
 Explain t Analyze Analyze Write pro 	mes: At the end of the cours he basic concepts of working the function of sensors in the the actuators, manipulators a ogram to use a robot for a typ ots in different applications	of rob robot and grip	oot opers	in Rol		0		
Unit I	BASIC CONCEPTS							9
Definition and freedom – Asin	origin of robotics – different t nov"s laws of robotics – dynamics	types o mic sta	of rob abiliza	otics -	- various f robots.	generation	ns of robots - o	degrees of
Unit II	POWER SOURCES AND							9
speed arrange	umatic and electric drives – ments – path determinati	deter	minat micro	o ma	chines i	n robotics	gearing ratio – s – machine	variable
speed arrange ranging – las Unit III – Construction pneumatic ma	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip nipulator control circuits –	deter	minat micro tic an 5 ANE dyn	o mao d tacti D GRII amics	chines i le senso PPERS and fo	n robotics rs. orce cont	s – machine rol – electro	variable vision – 9 nic and
speed arrange ranging – las Unit III Construction pneumatic ma considerations Unit IV	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip inipulator control circuits – KINEMATICS AND PATH P	deter on – per opt TORS ulator end	minat micro tic and S ANE dyn effec ING	o mao d tacti D GRII amics tors –	chines in le senso PPERS and fo - U vario	n robotics rs. orce cont ous types	rol – machine rol – electro of grippers -	variable vision – 9 nic and design 9
speed arrange ranging – las Unit III Construction pneumatic ma considerations Unit IV Solution of i Climbing Tech Unit V Multiple robots – robot cell de	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip inipulator control circuits – KINEMATICS AND PATH P nverse kinematics proble niques – robot programming CASE STUDIES s – machine interface – rok sign – selection of robot.	deter on – ber opt TORS oulator end PLANN m – g langu	minat micro tic and S ANE dyn effec ING mult uages	o mad d tacti) GRII amics tors –	chines in le senso PPERS and for - U varion	n robotics rs. orce cont ous types Jacobian	a – machine rol – electro of grippers - work envelo	variable vision – 9 nic and - design 9 op – hill 9
speed arrange ranging – las Unit III Construction pneumatic ma considerations Unit IV Solution of i Climbing Tech Unit V Multiple robots – robot cell de TEXT BOOK(S	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip inipulator control circuits – KINEMATICS AND PATH P nverse kinematics proble niques – robot programming CASE STUDIES is – machine interface – rob sign – selection of robot.	deter on – ber opt TORS oulator end PLANN m – g langu	minat micro tic and S ANE dyn effec ING multi uages	o mad d tacti) GRII amics tors –	chines in le senso PPERS and for - U varion solution	n robotics rs. Drce cont Dus types Jacobian	 machine rol – electro of grippers - work envelo mufacturing approximation 	variable vision – 9 nic and - design 9 op – hill 9 oplications
speed arrange ranging – lase Unit III Construction pneumatic ma considerations Unit IV Solution of i Climbing Tech Unit V Multiple robots – robot cell de TEXT BOOK(S 1 Mikell P. 2 Ghosh,	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip inipulator control circuits – KINEMATICS AND PATH P nverse kinematics proble niques – robot programming CASE STUDIES a – machine interface – rot sign – selection of robot. a): Weiss G.M., Nagel R.N.,	deter on – ber opt TORS oulator end PLANN m – g langu pots in	minat micro tic and ANE dyn effec ING mult uages man	o mad d tacti) GRII amics tors –	chines in le senso PPERS and for - U varion solution uring and ustrial Ro	n robotics rs. Drce cont Dus types Jacobian d non- ma	 machine rol – electro of grippers - work envelo mufacturing ap Mc Graw - Hill S 	variable vision – 9 nic and design 9 op – hill 9 oplications
speed arrange ranging – lase Unit III Construction pneumatic ma considerations Unit IV Solution of i Climbing Tech Unit V Multiple robots – robot cell de TEXT BOOK(S 1 Mikell P. 2 Ghosh, Publishe REFERENCES	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip inipulator control circuits – KINEMATICS AND PATH P nverse kinematics proble niques – robot programming CASE STUDIES is – machine interface – rob sign – selection of robot. Weiss G.M., Nagel R.N., Control in Robotics a rs, Chennai, 1998.	- deter on - ber opt TORS oulator - end PLANN m - g langu pots in Odraj and	minat micro tic and S ANE dyn effec ING multi uages man N.G., Autor	o mad d tacti D GRII amics tors – iple s iple s , "Indu mation	chines in le senso PPERS and for - U varion solution uring and ustrial Ro	n robotics rs. Drce cont Dus types Jacobian Jacobian d non- ma obotics", N	 machine rol – electro of grippers - work envelo mufacturing ap Mc Graw - Hill S Integration 	variable vision – 9 nic and design 9 op – hill 9 oplications
speed arrange ranging – lase Unit III Construction pneumatic ma considerations Unit IV Solution of i Climbing Tech Unit V Multiple robots – robot cell de TEXT BOOK(S 1 Mikell P. 2 Ghosh, Publishe REFERENCES 1 Deb. S.F	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip inipulator control circuits – KINEMATICS AND PATH P nverse kinematics proble niques – robot programming CASE STUDIES is – machine interface – rob sign – selection of robot. Weiss G.M., Nagel R.N., Control in Robotics a rs, Chennai, 1998.	- deter on - ber opt TORS oulator - end PLANN m - g langu pots in Odraj and	minat micro tic and S ANE dyn effec ING multi ages man N.G., Autor	o mad d tacti D GRII amics tors – iple s iple s , "Indu mation	chines in le senso PPERS and for - U varion solution uring and ustrial Ro :: Sens n", John N	n robotics rs. Drce cont Dus types Jacobian Jacobian d non- ma obotics", N or Base Wiley, USA	a – machine rol – electro of grippers – work envelo nufacturing ap <u>Ac Graw-Hill S</u> d Integration	variable vision – 9 nic and design 9 pp – hill 9 pplications Singapore, Allied
speed arrange ranging – las Unit III Construction pneumatic ma considerations Unit IV Solution of i Climbing Tech Unit V Multiple robots - robot cell de TEXT BOOK(S 1 Mikell P. 2 Ghosh, Publishe REFERENCES 1 Deb. S.F 2 Klafter R Hall of Ir	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip inipulator control circuits – KINEMATICS AND PATH P nverse kinematics proble niques – robot programming CASE STUDIES s – machine interface – rok sign – selection of robot. S – machine interface – rok sign – selection of robot. Control in Robotics a rs, Chennai, 1998. S: R., "Robotics Technology and f .D., Chimielewski T.A., Negir ndia, New Delhi.	deter on – per opt TORS oulator end PLANN m – g langu pots in Odraj and flexible n M., "F	minat micro ic and S ANE dyn effec ING mult uages man N.G., Autor	o mad d tactii D GRII amics tors – iple s iple s mufactu mation ic Eng	chines in le senso PPERS and for - U varion solution uring and ustrial Ro :: Sens n", John N ineering	n robotics rs. Drce cont Dus types Jacobian Jacobian d non- ma obotics", N or Base <u>Wiley, US</u> – An integ	a – machine rol – electro of grippers – work envelo nufacturing ap <u>Ac Graw-Hill S</u> d Integration	variable vision – 9 nic and design 9 pp – hill 9 pplications Singapore, Allied
speed arrange ranging – las Unit III Construction pneumatic ma considerations Unit IV Solution of i Climbing Tech Unit V Multiple robots – robot cell de TEXT BOOK(S 1 Mikell P. 2 Ghosh, Publishe REFERENCES 1 Deb. S.F 2 Klafter R Hall of Ir 3 Mc Kerro	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip inipulator control circuits – KINEMATICS AND PATH P nverse kinematics proble niques – robot programming CASE STUDIES s – machine interface – rot sign – selection of robot.): Weiss G.M., Nagel R.N., Control in Robotics a rs, Chennai, 1998. 3: R., "Robotics Technology and f .D., Chimielewski T.A., Negir idia, New Delhi.	deter on – per opt TORS oulator end PLANN m – g langu pots in Odraj and flexible n M., "F	minat micro ic and S ANE dyn effec ING mult uages mult uages Man Autor	o mad d tactii D GRII amics tors – iple s iple s mufactu mation ic Eng n Wes	chines in le senso PPERS and for - U vario solution uring and ustrial Ro : Sens n", John V ineering	n robotics rs. Drce cont Dus types Jacobian Jacobian d non- ma obotics", N or Base <u>Wiley, US</u> – An integ	a – machine rol – electro of grippers - work envelo mufacturing ap <u>Ac Graw-Hill S</u> d Integration A. rated approach	variable vision – 9 nic and design 9 pp – hill 9 pplications Singapore, Allied
speed arrange ranging – las Unit III Construction pneumatic ma considerations Unit IV Solution of i Climbing Tech Unit V Multiple robots – robot cell de TEXT BOOK(S 1 Mikell P 2 Ghosh, Publishe REFERENCES 1 Deb. S.F 2 Klafter R Hall of Ir 3 Mc Kerro 4 Barry Le	umatic and electric drives – ments – path determinati er – acoustic – magnetic, fik MANIPULATORS, ACTUA of manipulators – manip inipulator control circuits – KINEMATICS AND PATH P nverse kinematics proble niques – robot programming CASE STUDIES s – machine interface – rok sign – selection of robot. S – machine interface – rok sign – selection of robot. Control in Robotics a rs, Chennai, 1998. S: R., "Robotics Technology and f .D., Chimielewski T.A., Negir ndia, New Delhi.	deter on – per opt TORS oulator end PLANN m – g langu pots in Odraj and flexible n M., "F	minat micro ic and S ANE dyn effec ING mult uages man N.G., Autor Robot	o mad d tactii D GRII amics tors – iple s iple s inufactu mation mation ic Eng	chines in le senso PPERS and for - U vario solution uring and ustrial Ro ustrial Ro science solution uring and ustrial Ro solution ustrial Ro solu	n robotics rs. Drce cont Dus types Jacobian Jacobian d non- ma <u>obotics", N</u> or Base <u>Wiley, US</u> – An integ	 machine rol – electro of grippers - work envelo mufacturing ap <u>Ac Graw - Hill S</u> Integration A. rated approach ng. 	variable vision – 9 nic and - design 9 op – hill 9 oplications Singapore, n, Allied ", Prentice

Chairman - BoS Dept. of EEE - ESEC

Dep	artment	ELECTRICAL AND ELECTRONICS E	NGIN	NEE	RING		R2019	Semester VIII PE
	ourse		Hou			Credit	Total	Maximum
	ode	Course Name	L	Т	Ρ	С	Hours	Marks
19	9EEX29	FLEXIBLE AC	3	0	0	3	45	100
Col	urse Obie	TRANSMISSION SYSTEMS ctive (s): The purpose of learning this c		ic t	_			L
		tand the concept of flexible AC transn				e associa	ted prob	lems
		v the static devices for series and shu						ierrio.
		the operation of controllers for enhance				nission ca	apability.	
		stand the concept of emerging FACT						1
	Review	v the coordination in FACTs controller	S.					
Cou	Irse Outo	omes: At the end of the course, stud	ents	will	be a	ble to		
		the reactive power in transmission lin						
		be and model the SVC for voltage con					insient st	ability.
		the TCSC to enhance the power flow						
0		ine the VI characteristics and appli	catio	n of	s ST	ATCOM	& Mode	and identify the
		tions of UPFC.	o in t		mino	ion line 9	ovalaia	the evention of
		the coordination of various controller devices.	Smu	ans	11155	ion line o	explain	the overview of
Unit		INTRODUCTION						9
	100.04	of flexible AC transmission - reactive	0 00	wor	cont	rol in ol	octrical n	
		mpensated transmission line – serie						
devi			a an	u 31	unit	compens	ation. O	
Unit	Red Reverse and an	STATIC VAR COMPENSATOR (SV		02.112			والمرجع والجاريب	9
2000 CON 100	2012.00	rol by SVC – advantages of slope in		ami	ic ch	aracterist	tics _ inf	and the second sec
		ge. Applications - enhancement of tr						
		t of power system damping – preventi						ponor numeror
Unit		THYRISTOR CONTROLLED SERII						9
		the TCSC - different modes of ope						variable reactance
		eling for stability studies. Application						
enha	ancemen	t of system damping - voltage collaps	e pre			8		
Unit	10 A.	EMERGING FACTS CONTROLLE						9
		ronous Compensator (STATCOM) -						
		Controller (UPFC) - Principle of o						
	Vola Distance	UPFC for power flow studies-mode	ling	of L	IPEC	using f	MAILAE	Simulink. Future
Unit		ACTS Technology. CO-ORDINATION OF FACTS CON	TROI	1 -	De			9
		oller interactions – SVC–SVC intera				inction o	f multiple	
		techniques – Quantitative treatment of						
		nsmission line. Case study of FACTS				unation.	Optimar	location of 1 ACTO
	T BOOK		oona	0.10.				
1		n Mathur, Rajiv K.Varma, "Thyristor -	Base	ed F	acts	Controlle	ers for Ele	ectrical
1		ission Systems", IEEE press and Johr					Call.	
2		G. Hingorani, "Understanding FACTS						
2	Transm	ission Systems", Standard Publishers	Distr	ibut	ors. [Delhi- 11	0 006.	
REF	ERENCE							
1	K.R.Pa	diyar," FACTS Controllers in Pov	ver	Trar	nsmis	sion an	d Distri	bution", New Age
	Internat	ional (P) Limited, Publishers, New De	lhi, 2	008.				
2		n, "Flexible A.C. Transmission Sy ers (IEEE), 1999.	ystem	ıs",	Insti	tution o	f Electri	cal and Electronic
3		od, "HVDC and FACTS controllers – A	Applic	atio	ns of	Static C	onverter	s in Power System"
		2004, Kulwar Academic Publishers						

Department	ELECTRICAL AND ELECTRONICS	ENG	SINE	ERIN	G	R2019	Semester VIII PE
Course				Neek	Credit	Total	Maximum
Code	Course Name	L	Т	Ρ	С	Hours	Marks
19EEX30	RESTRUCTURED POWER SYSTEM	3	0	0	3	45	100
Course Object	ive (s): The purpose of learning this co	urse	is to)		4765	
	the restructuring of power industry an	nd ma	arket	t mode	els.		
Impart kn	owledge on fundamental concepts of	cong	estic	on mai	hagemer	It. Niccion ri	abte
Analyze t	he concepts of locational marginal price e knowledge in ancillary source manage	cing a	and	financ	ai transi	hission n	ynis.
	about various power sectors in India.	gerne	a II.				
	mes: At the end of the course, stude	ents	will	be ab	le to		The log way of
	wledge on restructuring of power indu						
	nd basics of congestion management						
Attain kn	owledge about locational margin prices	s and	fina	ancial	transmis	sion right	S
	nd the significance ancillary services a			ng of tr	ansmiss	ion netwo	
	wledge on the various power sectors i				DUCTO		9
	RODUCTION TO RESTRUCTURING						
Introduction: De	regulation of power industry, Restru- various power systems – Fundamen	cturi	of F	Econor	nics. Co	nsumer	behavior Supplier
behavior Marke	t equilibrium, Short and long run cos	ts V	ario		sts of pro	oduction	- Market models:
Market models	based on Contractual arrangements,	Com	pari	son of	various	market	models, Electricity
vis - a - vis othe	er commodities, Market architecture, C	Case	stuc	iy.			
Unit II TR/	ANSMISSION CONGESTION MANAG	SEM	ENT	1.0			9
Introduction: D	Definition of Congestion, reasons f	for t	rans	sfer c	apability	limitatio	n, Importance of
congestion man	nagement. Features of congestion	n ma	anac	gemen	t – Cla	assificatio	on of congestion
management n	nethods - Calculation of ATC - Non -	- mar	ket	metho	ds – Mai	rket meth	ods -Nodal pricing
 Inter zonal ar alleviation meth 	nd Intra zonal congestion managemen	nt – F	TICE	area	congesti	on mana	gement - Capacity
Unit III LO	CATIONAL MARGINAL PRICES AND) FIN	AN		RANSM	ISSION	RIGHTS 9
Mathematical p	reliminaries: - Locational marginal pri	cing-	- Lo	ssless	DCOPF	model f	or LMP calculation
- Loss compe	ensated DCOPF model for LMP cal	culat	ion	– AC	OPF mo	odel for	LMP calculation -
Financial Trans	smission rights – Risk hedging functi	ionali	ty -	Simult	aneous	feasibility	test and revenue
adequacy - FT	TR issuance process: FTR auction, F	TR	allo	cation	- Treati	ment of I	revenue shortfall -
	ding of FTRs - Flow gate rights -	- FI	Ra	and m	arket po	ower - F	TR and merchant
transmission in	CILLARY SERVICE MANAGEMENT		PE		OF TR	ANSMIS	SION
UNIT NET	WORK						
Introduction of	ancillary services - Types of Ancilla	ary s	ervi	ces -	Classific	cation of	Ancillary services -
Load generatio	n balancing related services – Voltage	e cor	trol	and re	eactive p	ower sup	port devices - Black
start capability	service - How to obtain ancillary servi	ce -	CO-	optimi	zation of	energy a	and reserve services
- I ransmission	pricing – Principles –classification– ricing paradigm – Composite pricing paradigm	aradi	am.	– Meri	ts and de	emerits of	f different paradiom.
Unit V RE	FORMS IN INDIAN POWER SECTOR	2	gin	WICH		Sinone o	9
	Framework of Indian power secto		Ref	form i	nitiatives	- Avail	ability based tariff-
Electricity act20	003 – Open access issues – Power exe	chan	ge -	- Refo	rms in th	e near fu	ture.
TEXT BOOK(S):			6			
systems	nad Shahidehpour, Muwaffaq Alomo : operation, trading and volatility" Pub.	, 200	11.				
2 Kankar systems	Bhattacharya, Jaap E. Daadler, Ma ", Kluwer Academic Pub., 2001.	th H	.J.	Boolea	an, "Ope	eration of	restructured power
REFERENCES	a a contraction						
1 Paranjot	hi, S.R. , "Modern Power Systems" Pa	ranjc	thi,	S.R.,	New Age	e Internat	ional, 2017.
2 Sally Hu	nt." Making competition work in electric	city",	Joh	n Wille	ey and Se	ons Inc. 2	2002.
3 Steven S	Stoft, "Power system economics: des	signir	ng n	narkets	s for ele	ctricity",	John Wiley & Sons

BL Chairman - BoS Dept. of EEE - ESEC

Department	ELECTRICAL /	AND ELECTRO	NICS E	NGI	NEE	RING	R 2019	Semeste	er OE
Course Code	Course N	200	Hours	/ W	leek	Credit	Total	Maximum	Mark
oouise ooue	Course N	ame	L	Т	Ρ	С	Hours	Waximum	Warks
19EEY01	WIND ENERGY C		3	0	0	3	45	100	
 Know the Learn the Understand Understand 	ve (s):The purpose of components of Wind e design and control pri ad the concepts of fixe ad the variable speed s ne grid integration issu	energy conversion inciples of Wind ad speed system system in wind e	on syste turbine. in wind	ems. ene				ns.	
 Analyze ti Analyze ti Analyze ti Explain th 	nes: At the end of the ne performance of WE ne control mechanism ne different types of ge e characteristics of ge ne steady-state and dy	CS and select a for wind turbine enerator for fixed nerators for vari	i suitable i speed able spe	wind	e. 1 turl cons	tant freq	uency sy	stems.	r de com
Unit I INTRO	DUCTION					2		1	9
HAWT - VAW	of WECS-WECS s	chemes-Power	icy-Roto	or S	elec	wind-s	imple m	ting-Classifi comentum considera	theory
stall control-Scl	emes for maximum po	ower extraction.				sparst.		, i i i i i i i i i i i i i i i i i i i	
	SPEED SYSTEMS					100			9
Generating Sys	tems- Constant sp	beed constant	frequ	enc	ion (/stems Senerato	- Choice	of Wind S	ators-
Model of wind to analysis.	s- Synchronous Gene Irbine rotor - Drive Tra	ain model- Gene	Cage Inc rator mo	odel	for §	Steady st	ate and	Transient st	ability
Model of wind to analysis. Unit IV VARIA	Irbine rotor - Drive Tra	ain model- Gene	rator mo	odel	for S	Steady st	ate and ⁻	Transient st	ability
Model of wind to analysis. Unit IV VARIA Need of varia frequency syst	Irbine rotor - Drive Tra	ain model- Gene MS S-Power-wind son and son an	rator mo	chai	for S acte	Steady st eristics-Vi le speed	ate and ⁻ ariable I genera	Fransient st speed cor tors model	ability 9 nstant ling -
Model of wind to analysis. Unit IV VARIA Need of varia frequency syst Variable speed	Irbine rotor - Drive Tra BLE SPEED SYSTEI Ible speed systems ems synchronous ge	ain model- Gene MS S-Power-wind s nerator- DFIG- nemes,	rator mo	chai	for S acte	Steady st eristics-Vi le speed	ate and ⁻ ariable I genera	Fransient st	ability 9 nstant ling -
Model of wind to analysis. Unit IV VARIA Need of varia frequency syst Variable speed Unit V GRID Wind interconn supply of ancill	ABLE SPEED SYSTEM ABLE SPEED SYSTEM able speed systems ems synchronous gent variable frequency sch CONNECTED SYSTEM ection requirements, ary services for frequency ction impact on stead	ain model- Gene MS s-Power-wind s nerator- DFIG- nemes, MS low-voltage rid uency and volta	speed PMSG e throu ge cont	chai -Va gh rol,	for s racte riab (LVF curr	Steady st eristics-V le speed RT), ran ent prac	ate and ariable genera	Fransient st speed cor tors model limitations, d industry t	ability 9 nstant ling - 9 and rends
Model of wind to analysis. Unit IV VARIA Need of varia frequency syst Variable speed Unit V GRID Wind interconne supply of ancill wind interconne modelling issue.	ABLE SPEED SYSTEM BLE SPEED SYSTEM Bable speed systems ems synchronous gen variable frequency sch CONNECTED SYSTE ection requirements, ary services for frequ ction impact on stead	ain model- Gene MS s-Power-wind s nerator- DFIG- nemes, MS low-voltage rid uency and volta	speed PMSG e throu ge cont	chai -Va gh rol,	for s racte riab (LVF curr	Steady st eristics-V le speed RT), ran ent prac	ate and ariable genera	Fransient st speed cor tors model limitations, d industry t	ability 9 nstant ling - 9 and rends
Model of wind to analysis. Unit IV VARIA Need of varia frequency syst Variable speed Unit V GRID Wind interconne supply of ancill wind interconne modelling issue.	ABLE SPEED SYSTEM BLE SPEED SYSTEM Bable speed systems ems synchronous gen variable frequency sch CONNECTED SYSTE ection requirements, ary services for frequ ction impact on stead	ain model- Gene MS s-Power-wind s nerator- DFIG- nemes, MS low-voltage rid uency and volta dy-state and dyr	e throu ge cont	odel chai -Va gh rol, erfor	for s racte riab (LVF curr man	Steady st eristics-Va le speed RT), ran ent prac ice of the	ate and ariable genera	Fransient st speed cor tors model limitations, d industry t	ability 9 nstant ling - 9 and rends
Model of wind the analysis. Jnit IV VARIA Need of variate of var	Arbine rotor - Drive Transless BLE SPEED SYSTEM able speed systems ems synchronous geny variable frequency sch CONNECTED SYSTEM ection requirements, ary services for frequency ction impact on stead wind Energy convers	ain model- Gene MS s-Power-wind s nerator- DFIG- nemes, MS low-voltage rid uency and volta dy-state and dyr	e throu ge cont namic pe	odel chai -Va gh rol, erfor lall,	for s racte riab (LVF curr man 1990	Steady st eristics-Va le speed RT), ran ent prac ice of the	ate and ariable genera prate tices and power	Fransient st speed cor tors model limitations, d industry t system incl	ability 9 nstant ling - 9 and rends
Model of wind to analysis. Unit IV VARIA Need of varia requency system Variable speed Unit V GRID Wind interconne supply of ancille wind interconne modelling issue TEXT BOOK(S) 1. L.L.Freris 2. S.N.Bhad	ABLE SPEED SYSTEM ABLE SPEED SYSTEM Able speed systems ems synchronous gen variable frequency sch CONNECTED SYSTEM ection requirements, ary services for frequency ction impact on stead	ain model- Gene MS s-Power-wind s nerator- DFIG- nemes, MS low-voltage rid uency and volta dy-state and dyr ion Systems, Pr ee,Wind Electric	speed PMSG e throu ge cont namic pe	chai -Va gh rol, erfor lall, ms,(for \$ racte riab (LVF curr man 1990 Dxfo	Steady st eristics-Va le speed RT), ran ent prac ice of the D. rd Univer	ate and ariable genera prate tices and power	Fransient st speed cor tors model limitations, d industry t system incl	ability 9 nstant ling - 9 and rends
Model of wind to analysis. Unit IV VARIA Need of varia frequency syste Variable speed Unit V GRID Wind interconne supply of ancill wind interconne modelling issue. FEXT BOOK(S) 1. L.L.Freris 2. S.N.Bhad 3. Ion Bolde REFERENCES :	ABLE SPEED SYSTEM ABLE SPEED SYSTEM Able speed systems ems synchronous gen variable frequency sch CONNECTED SYSTEM ection requirements, ary services for frequency ction impact on stead	ain model- Gene MS s-Power-wind s nerator- DFIG- nemes, MS low-voltage rid uency and volta dy-state and dyr ion Systems, Pr ee,Wind Electric erators, Taylor &	e throu ge cont namic pe	chai -Va gh rol, erfor lall, s gro	for s racte riab (LVF curr man 1990 Dxfoi up, 1	Steady st eristics-V. le speed RT), ran ent prac ice of the D. rd Univer 2006.	ate and ariable genera tices and e power	Fransient st speed cor tors model limitations, d industry t system incl	ability 9 nstant ling - 9 and rends uding
Model of wind to analysis. Unit IV VARIA Need of varia frequency syst Variable speed Unit V GRID Wind interconne supply of ancill wind interconne modelling issue. TEXT BOOK(S) 1. L.L.Freris 2. S.N.Bhac 3. Ion Bolde REFERENCES: 1 E.W.Gold	Arbine rotor - Drive Transler ABLE SPEED SYSTEM able speed systems ems synchronous geny variable frequency sch CONNECTED SYSTE ection requirements, ary services for frequency ction impact on stead	ain model- Gene MS s-Power-wind s nerator- DFIG- nemes, MS low-voltage rid uency and volta dy-state and dyr ion Systems, Pr ee,Wind Electric erators, Taylor &	e throu ge cont namic pe	chai -Va gh rol, erfor lall, s gro	for s racte riab (LVF curr man 1990 Dxfoi up, 1	Steady st eristics-V. le speed RT), ran ent prac ice of the D. rd Univer 2006.	ate and ariable genera tices and e power	Fransient st speed cor tors model limitations, d industry t system incl	ability 9 nstant ling - 9 and rends uding
Model of wind to analysis. Unit IV VARIA Need of varia frequency syst Variable speed Unit V GRID Wind interconne supply of ancill wind interconne modelling issue. TEXT BOOK(S) 1. L.L.Freris 2. S.N.Bhad 3. Ion Bolde REFERENCES: 1 E.W.Gold 2 N. Jenkin	ABLE SPEED SYSTEM ABLE SPEED SYSTEM Able speed systems ems synchronous gen variable frequency sch CONNECTED SYSTEM ection requirements, ary services for frequency ction impact on stead	ain model- Gene MS S-Power-wind s nerator- DFIG- nemes, MS Iow-voltage rid uency and volta dy-state and dyr ion Systems, Pr ee,Wind Electric erators, Taylor & Electricity by wi plogy, John Wile	e throu ge cont namic pe rentice H cal Syter Francis	chai -Va gh rol, erfor lall, s gro	for \$ racte riab (LVF curr man 1990 Dxfo Dxfo 2xfo	Steady st eristics-V. le speed RT), ran ent prac ice of the D. rd Univer 2006.	ate and ariable genera tices and e power	Fransient st speed cor tors model limitations, d industry t system incl	ability 9 nstant ling - 9 and rends uding

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Department	ELECTRICAL AND ELECTRON	ICS E	NGI	NEE	RING	R 2019	Semester (OE
	Course Name	Hours		1.1	Credit	Total	Maximum Ma	rks
Course Code		L	T	P	С	Hours		
19EEY02	ILLUMINATION SYSTEMS	3	0	0	3	45	100	
 Impart ki Determir Impart th Provide 	tive (s):The purpose of learning this count nowledge on illumination. The the calculation and measurement of il the design procedure for interior lighting a the characteristic curve for different lamp the characteristic curve for exterior lighting	lumina ind ext	tion. terior	ligh ftwa	re.			
 Explain t Design t Design t Explain t 	mes: At the end of the course, learners the characteristics of various light source the lighting procedure for exterior environ the lighting procedure for interior environ the characteristic curve for different lamp by the characteristic curve for exterior light	es. Iments ments os usin	s. g sot	ftwai	re. ware.			
Unit I LAN	GUAGE OF LIGHT, LIGHTING AND AC	CESS	ORI	ES				9
Quality of Ligh	Light & Lighting, Light & Vision, Light nting. Light sources: Daylight, Incandes signs, LED-LCD displays.	& Colo scent,	or, E Elec	Basic tric	c Concer Discharg	ots and L je, Fluore	Jnits, Quantity escent, Arc lan	and nps,
	CULATION AND MEASUREMENT OF	EXTER	RIOR	LIG	HTING	1. A.	The day	9
Polar curves, line and surfa	Lighting calculations, Solid angle, Inversice sources. Photometry and Spectro Flood, Street, Aviation and Transport lig	se squ - pho	are	and	cosine la	aws, Illum ells. Glare	nination from po e, Lighting De	oint, sign
Unit III INTE	RIOR LIGHTING	1.2					9	9
Lighting desig Theatres and	n procedure for Industrial, Residentia Hospitals, Different Light manufacturing	al, Of indust	fice, ries,	De Indi	partment an stand	al stores ards for l	s, Indoor stadi ighting.	lium,
	IGN OF LAMPS		31					9
Calculation of calculation. P for Various la	pes of lamps, Measure the luminan a fluorescent lamp required for the pro ot the candlepower, power consumed, mps and compare with the theoretical c	ject u , curre urves.	sing ent c	DIAI	⊥ux and n v/s vo	verifies rolltage ch	esult with manu aracteristic cur	ual rve
	CTICAL ANALYSIS AND DESIGN OF							9
consumed, cu with the theor		tensity curve	dist of ex	tribu xterio	tion. Plo or lightin	ot the ca ig, lumina	andlepower, po aries and comp	ower pare
TEXT BOOK		a fro	m E	dico	n'e Lan	nn to th	ne Laser, Vis	ions
Commu	B. Murdoch,"Illumination Engineerin inications, Washington DC, USA, 2004.	U						
	Lindsey, "Applied Illumination Engineering	ng", Pr	entic	e Ha	all of Indi	a, new L	2000.	1
REFERENCE	5: abiles "Cimplified Decises of Building Ligh	ting"	lohn	\A/ile	and Q	ons 201	3	
	chiler,"Simplified Design of Building Ligh	ung ,	50111	vviie	by and o	0113, 2015		-
3 Marc S	hting Handbook, 2005. chiler, "Simplified Design of Building Ligt	ntina"	Johr	n Wil	ev and S	Sons. 201	1.	
4 Ronald	N. Helms, M. Clay Beicher, "Lighting for e Hall, 2011							

_	epartment Course	ELECTRICAL AND ELECT			Neek		R 2019	Semester	0
	Code	Course Name	L	T	P	Credit C	Total Hours	Maximum Ma	arks
	19EEY03	POWER PLANT ENGINEERING	3	0	0	3	45	100	
 	 Provide a in their op Review th Overview Review th Understar 	ve (s):The purpose of learning n overview of thermal Power peration and maintenance e Diesel and gas turbine and co the working of Nuclear power p e power generation from renew ad the applications of power s and environmental hazards a	Plants ombined lant able en plants	and d cyc ergy whil	detail le pow source e exte	er plants. es end their	knowled	ge to power	pla
- [[[Explain th Explain th Combined Explain th Explain th plants. Explain th 	nes: At the end of the course, le e layout, construction and work ne layout, construction and w l cycle power plants. e layout, construction and work e layout, construction and work he applications of power pla s and environmental hazards a	ing of th vorking ing of th ing of th ants w	ne co of t ne co ne co hile	mpone he co mpone mpone exten	ents inside mponents ents inside ents inside d their	s inside a e nuclear e Renewa knowledg	a Diësel, Gas power plants. ble energy pov e to power	s ar wer pla
Uni		BASED THERMAL POWER P			the co	sis or ele	curical ene	rgy production	ı. 9
Ra Boi	nkine cycle lers, Turbine	- improvisations, Layout of s, Condensers, Steam & Heat ht system, Feed water treatmer	modern rate, Si	coa ubsys	stems	of therma	l power p	lants -Fuel ar	s, F
Un	it II DIESE	L, GAS TURBINE AND COME	BINED C	YCL	E PO	NER PLA	NTS	A State of the second	9
Tu		oual & Brayton Cycle - Anal plants. Combined Cycle Pov							
-		EAR POWER PLANTS							9
Rea	sics of Nucle actors: Boilin uterium- U	ar Engineering, Layout and su	, Pre	ssuri	zed	Water	Reactor	(PWR), Ca	anad
		R FROM RENEWABLE ENER	GY	20.00	11-12-1-1-		1		9
Hyo Tur	dro Electric I bines. Princi	Power Plants– Classification, ple, Construction and workin hermal, Biogas and Fuel Cell p	Typica Ig of V	Vind,	Tidal	nd assoc , Solar	iated con Photo Vo	nponents inclu oltaic (SPV),	udir
Un	it V ENER	GY, ECONOMIC AND ENVIRO	NMEN	AL	SSUE	S OF PO	WER PLA	ANTS	9
Pov rela tec	we Tariff typ htive merits hnologies inc	es, Load distribution paramet & demerits, Capital & Opera luding Waste Disposal Options	ters, lo ating C	ad c ost	urve, of diff	Comparis erent po	on of sit wer plant	e selection c	rite con
	(T BOOK(S)			-		-0			
1.	2008.	"Power Plant Engineering", Thi			L				
2.	Edition, Sta	Elliott, Kao Chen and Robe ndard Handbook of McGraw –			ekamp	, "Power	Plant Er	ngineering", S	ecc
RE	ERENCES:								
1		.M., "Power Plant Technology",							
2	Godfrey Bo	oyle, "Renewable energy", Ope Iniversity, 2004.	en Unive	ersity	, Oxfo	rd Univer	sity Press	s in associatio	n w
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Course	Course Name	Ηοι	Service and	Neek	Credit	Total	Maximum	Marks
Code		L	Τ	Ρ	С	Hours	maximum	
19EEY04		3	0	0	3	45	S. Parson	100
Impa Impa Prov Impa Impa Impa Impa Unde	bjective (s): The purpose of learning this art the electrical properties and charact vide the physics behind the semiconduct art the polarization concepts in dielectric art the electrical properties and charact erstand of the electrical engineering ma stries	eristic ctor ar c mate eristic	s of nd m erials s of	condu agneti s insula	c materia ting mate	lls. rials	work in diffe	erent
 Anal Appl Expl Anal 	utcomes: At the end of the course, lea lyze the electrical properties and chara ly the semiconductor and magnetic mar- lain the polarization concepts in dielectrical lyze the electrical properties and chara ze the electrical engineering material in	cterist terials ric ma cterist	tics o in e iteria tics o	of conc lectric ls of insul	lucting m al applica lating mat	itions		
Unit I C	CONDUCTING MATERIALS							9
variation	f metallic conduction on the basis of conductivity with temperature a electric properties; material for brush	and	com	oositio	n, mate	rials for	electric re	esistors- ses and
Unit II 🕴	SEMICONDUCTORS AND MAGNETIC	C MAT	TERI	ALS				9
intrinsic semicondu Classificat	NDUCTORS: Mechanism of condu semiconductors, the energy gap, uctors, basic ideas of amorphous tion of magnetic materials- origin of magnetic materials, magneto ma	types and f perm	orga orga naner	sem anic s nt ma	semicond gnetic di	ors. Hall uctors. ipoles, fe	effect, co Magnetic m rromagnetis	m, hard
Unit III I	DIELECTRICS MATERIALS						1	9
dielectrics	polarization under static fields- ele in alternating fields, Factors influ materials, complex dielectric constant	encing	g di	electri	c streng	th and	capacitor m	avior of naterials.
Unit IV I	INSULATING MATERIALS	. I			1.1	1110	2000.20	9
fiber, woo	materials (mica, glass, porcelain, as od, plastics and Bakelite), resins and (air, SF6 and nitrogen) and ageing of	d vari	nishe	es, liq	c materia uid insul	als (pape ators(tran	r, rubber, c sformer oil)	otton silk gaseous
Unit V	MATERIALS FOR SPECIAL APPLICA	TION	IS		1.12			9
collection	for solar cells, fuel cells and battery. A and solar selective coatings, Cold mirr Iloys for breaker and switch contacts.	Aateria or coa	als fo ating	or coa s, hea	tings for a at mirror o	enhanced coatings, a	solar therm antireflection	al energy coatings
TEXT BO						R . I.		1
1. Elect	rical Engineering Materials Adrianus J	Dekke	er, Pl	hi Lea	rning Pub	khanna D	ublishere N	w Delhi
2. Elect 3. Elect	rical and Electronic Engineering Materi rical Properties of Materials, 8th Editior	hv S	olvm	ar. I	Oxford U	niversity I	Press- New I	Delhi.
4 Introd	duction to Electrical Engineering Mate	erials	4th	Edn. 2	2004 Edit	tion by In	dulkar C, S	
the second se						10		.Chand 8
REFEREN	VCES: ourse In Electrical Engineering Materials) att					.Chand 8

2	Electrical Engineering Materials by Alagappan and N and Kumar N
3	An Introduction to Electrical Engineering Materials by Indulkar C S and Thiruvengadam S
4	Electrical Engineering Materials by Rakesh Dogra
5	Electrical Engineering Materials and Electrical Components by K B Raina and Bhattai

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Cours	e Code	C	ourse Name	H	Hours/			Total Hours	Maximu Marks	
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			ourpose of learning		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			10		
			al elements of Ro							
			he direct and inve		natics					
			ator differential m							
		것 이사가 실망하는 이 이렇게 있는 것은 것을 깨끗을 다른	th planning techn							
			s and control of n		rs				eres Inges	
	Understa Analyze Explain t Demons	and basic con mathematica he differentia trate the vario	end of the course, icept of robotics. I representation fo I motion, add stat ous path planning and control in rob	or robotics ics in robo technique	i. otics es.	able to				
Unit I		CONCEP								9
Brief			ot-Technology-R	obot class	sificatio	ns an	d specifi	cations-D	esign and	contr
issue	s- Variou	s manipulato	rs – Sensors - wo	rk cell - Pr	rogram	ning la	inguages			
Concession and the	ee and and a state		VERSE KINEMA		-0		0 0		1.5	9
Unit		ECT AND IN	on of Robots - I	Desition	and only	ntotio	n Hor	nogonool	ue transform	
soluti	t Kinen on.	natics-Inverse	ion using the e kinematics- SC	Denavit H CARA robo	lattenbe ots- So	lvabilit	y – Solu	ition met	hods-Closed	d for
soluti Unit Linea	t Kinen on. III MA Ir and an	natics-Inverse NIPULATOR gular velociti	ion using the e kinematics- SC DIFFERENTIAL es-Manipulator Ja	Denavit H CARA robo	lattenbe ots- So AND S' rismatic	Ivabilit	y – Solu S	ition met	hods-Closed	9 9
Unit Linea singu	t Kinen on. III MA ar and an ilarity - St	natics-Inverse NIPULATOR gular velociti atic analysis	ion using the kinematics- SC DIFFERENTIAL es-Manipulator Ja - Force and mome	Denavit H CARA robo	lattenbe ots- So AND S' rismatic	Ivabilit	y – Solu S	ition met	hods-Closed	9 nd a
soluti Unit Linea singu Unit	t Kinen on. III MA Ir and an Ilarity - St IV PA	NIPULATOR gular velociti atic analysis ITH PLANNIN	ion using the kinematics- SC DIFFERENTIAL es-Manipulator Ja - Force and mome G	Denavit H CARA robo MOTION acobian-Pi ent Balanc	lattenbe ots- So AND S rismatic ce.	Ivabilit TATIC and	y – Solu <mark>S</mark> rotary joi	nts-Inver	hods-Closed	9 nd a 9
soluti Unit Linea singu Unit Defin	t Kinen on. III MA ar and an Iarity - St IV PA [*] ition-Join	NIPULATOR gular velociti atic analysis FH PLANNIN t space teo	ion using the kinematics- SC DIFFERENTIAL es-Manipulator Ja - Force and mome	Denavit H CARA robo MOTION acobian-Pr ent Balance p-degree	Antenbe ots- So AND S rismatic ce.	Ivabilit TATIC and omial-	y – Solu <mark>S</mark> rotary joi Cubic p	nts–Inver	hods-Closed se -Wrist ar	9 nd a 9 spa
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soluti Unit Linea singu Unit Defin techr Unit Lagra	t Kinen on. III MA ir and an Ilarity - St IV PA ition-Join nique - P V DY angian m	NIPULATOR gular velociti atic analysis TH PLANNIN t space teo arametric des NAMICS ANI echanics-2D0	ion using the kinematics- SC DIFFERENTIAL es-Manipulator Ja - Force and mome G chnique-Use of scriptions - Straigh CONTROL OF Manipulator-L	Denavit H CARA robo MOTION acobian-Pr ent Balanc p-degree nt line and	Antenbe ots- So AND S rismatic ce. polyn circular Euler f	Ivabilit TATIC and omial- r paths	y – Solu s rotary joi Cubic p s - Positic ation-Dyn	nts–Inver olynomia on and ori	hods-Closed rse -Wrist an I-Cartesian ientation plan odel –Manip	9 nd a 9 spa nning 9
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 Apply the Analyze ti Analyze ti Differentia 	nes: At the end of the course, learners will electrical drives for various industrial appl ne characteristics and performance of vari ne starting methods of various motors ate the conventional and solid state contro ate the conventional and solid state contro	licatio ous c	ons drive DC di	moto rives		and a subject of		
Unit I INTR	ODUCTION							8
Unit II DRIV Mechanical ch motors – Brak single phase	and three phase induction motors.		s of		ous typ	bes of	load and	d
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	C Motor starters – Typical control quirrel cage and slip ring induction motors		uits	for	shunt	and se	eries motor	
Unit IV CON	VENTIONAL AND SOLID STATE SPEED		NTR	OL O	EDCI			
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Speed control	of DC series and shunt motors – Using controlled rectifiers and DC chopped	Arm	atur	e an	d field			s - 10
Speed control control system -	of DC series and shunt motors – Using controlled rectifiers and DC chopped VENTIONAL AND SOLID STATE SPEED	Arm ers –a	atur appli	e an icatior	d field ns.	control,	, Ward-Leo	s - 10
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Course Code Course Name I T P C Hours Marks 19EEY07 INSTRUMENTATION 3 0 0 3 45 100 ourse Objective (s): The student should be made to: Gain knowledge on basic concepts of medical instrumentation. Know about bio-potential and bio-sensor. Know about clinical medical instruments. Know about clinical medical instruments. Apply bio potential & biosensor in medical instruments. Source Outcomes: At the end of the course, learners will be able to Apply bio potential & biosensor in medical instruments. Explain the function of bio amplifiers. Perform Electrical and non-electrical physiological measurements Explain about medical equipment designing procedure Unit 1 BASIC CONCEPTS OF MEDICAL INSTRUMENTATION AND BIO SENSORS Sease BASIC CONCEPTS OF MEDICAL INSTRUMENTATION and its propagation. Electrode- measurement constraints- classification of biomedical instruments- biostatistics-regulations of medicaes. Sease BIO POTENTIAL & BIO SENSORS: Origin of bio potential and its propagation. Electrode- miterface. half cell potential. Types of electrodes and its application. Recording problems - measurer with two electrodes. BIOSENSOR: Need of sensors, working principle of biosensor, various type Biosensors and its applications, bio transducers, bio interface. Seasersensensensensensenes and its applications, bio transducers, bio interface.	Department	ELECTRICAL AND ELECTRO					and the state of t	Semester	
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Instruction Instrumentation Ourse Objective (s): The student should be made to: Gain knowledge on basic concepts of medical instrumentation. Know about bio-potential and bio-sensor. Know about medical equipment design and developments Course Outcomes: At the end of the course, learners will be able to Apply bio potential & biosensor in medical instruments. Explain the function of bio amplifiers. Explain the function of bio amplifiers. Explain the function of bio amplifiers. Explain about medical equipment designing procedure Unit I EASIC CONCEPTS OF MEDICAL INSTRUMENTATION AND BIO SENSORS SE BASIC CONCEPTS OF MEDICAL INSTRUMENTATION AND BIO SENSORS SE BASIC CONCEPTS OF MEDICAL INSTRUMENTATION AND BIO SENSORS SE BASIC CONCEPTS OF MEDICAL INSTRUMENTATION Terminology of medicine and medevices, generalized medical instrumentation system, alternative operational modes, memeasurement constraints- classification of biomedical instruments-biostatistics-regulations of mediciner, and its applications, bio transducers, bio interface. BIO POTENTIAL & BIO SENSORS: Origin of bio potential and its propagation. Electrode-site and its applications, bio transducers, bio interface. Se Biosignals characteristics – frequency and amplitude ranges. ECG – Einthoven's triangle, standa ead system. EEG – 10-20 electrode system, unipolar, bipolar and average mode. EMG- unipola solation amplifier am ACC ca amplifier. Se	19EEY07		3	0	0	3	45	100	
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2.	Design of Biomedical Devices and Systems, Third Edition- Paul H. King, Fries, Arthur T. Johnson- CRC Press-2014	Richard C.
REF	ERENCES:	
1	Developing Biomedical Devices-Design, Innovation and Protection.by Giuseppe, Barbieri, Massimo, Colombo, Barbara-poliMi springer briefs-2014	Andreoni,
2	Medical Instruments and Devices: Principles and Practices by Steven Joseph D. Bronzino, Donald R. Peterson- CRC Press –first edition -2017	Schreiner,

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Basic importa custon genera modeli Unit III Creativ blocks map-T concer Unit IV Humar enviror Unit V	module ance o mer requ ation of ing, simu I CRE. vity and Creativi heory ots. / HUM n factor mental	in des f definitio irements- alternativ ulation, te ATIVITY I problem ty metho of innova IAN AND s in de aspects- r ERIAL AN	ign proces n of proble Quality F e solutions sting and o N DESIGN solving-ve ds-brainsto ative proble SOCIETAL sign, ergo narketing as	em-structured unction Dep - Analysis and evaluation (Ba ertical and la rming, Syne em solving (ASPECTS nomics, use spects-team a SSES IN DES	proble oloymer nd sele asics or ateral ectic, fe (TRIZ) er frien aspects SIGN	m, r nt (r ection nly) think orce - cc ndly -lega	eal life QFD)- n-Detail ing-inve fitting onceptua design al aspec	ention-pa metho al deco	m- gath t desig and dr sycholog ods, mir mpositio tics an entation a	ring in n spec awings- nical vie nd may n creat d visus aspects	ew, r p, co ting c	9 9 9 9 9 9 9 9 9 9 9 9 9 9
Basic importa custom genera modeli Unit III Creativ blocks map-T concep Unit IV Human environ Unit V Materia existin of m	module ance o ner requ ation of ng, simu I CRE . vity and Creativi heory ots. / HUM n factor nmental r MAT al select g design	in des f definitio irements- alternativ ulation, te ATIVITY I problem ty metho of innova IAN AND s in de aspects- r ERIAL AN ion for pe i-economia uring prod	ign process n of proble Quality F e solutions sting and o N DESIGN solving-ve ds-brainsto ative proble SOCIETAL sign, ergo marketing as ND PROCES formance of cs of mate	em-structured unction Dep - Analysis a evaluation (Ba ertical and la rming, Syne em solving (ASPECTS nomics, use spects-team a	proble oloymer nd sele asics or ateral ectic, fo (TRIZ) er frien aspects SIGN s of main meth	m, r nt (⁽ cctior hly) think borce - cc hdly teria nods	eal life QFD)- n-Detail ing-inve fitting nceptua design al aspec	proble produc design ention-pa metho al deco	m- gath t desig and dr sycholog ds, mir mpositio tics an entation a new des materia	ering in n spec awings- ical vie nd map n creat d visus aspects sign sub	al as	9 9 9 9 9 9 9 9 9 19 19 19 1
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Basic importa custon genera modeli Unit III Creativ blocks map-T concep Unit IV Humar enviror Unit V Materia existin of m assem TEXT I 1. G T. J. 2. J. M REFER	module ance o ner requ ation of ng, simu I CRE. vity and Creativi heory ots. / HUM n factor nmental / MAT al select g design nanufactu bbly(DFA) BOOK(S eorge E ata Mc (C oseph E IcGraw I RENCES	in des f definitio irements- alternativ ulation, te ATIVITY I problem ty metho of innova AN AND s in de aspects- r ERIAL AN ion for pe -economic uring prod). : : : : : : : : : : : : : : : : : :	ign process n of proble Quality F e solutions sting and o N DESIGN solving-ve ds-brainsto ative proble SOCIETAL sign, ergo marketing as ND PROCES formance of cs of mate cess, process , "Engineer 2008 7, Charles ational editio	em-structured unction Dep - Analysis and evaluation (Ba ertical and la rming, Syne em solving (ASPECTS nomics, use spects-team a SSES IN DES characteristics erials-selectio ess systems- ing Design: R. Mische on, 2009	proble oloymer nd sele asics or ateral ectic, fi (TRIZ) er frien aspects SIGN s of ma n meth - Desig A Mate	m, r (ectior hly) think orce - cc dly -lega terials erials	eal life QFD)- n-Detail ing-inve fitting onceptua design al aspect selector recyclin or manu a and F	problem production design ention-parametho al deco procession procession procession procession	m- gath t desig and dr sycholog ods, mir mpositio tics an entation a new des materia bility (D	ering in n spea awings- ical vie nd may n creat d visus aspects sign sub is selec FM) -	ew, r p, co ting c al as ostituti tion- Desig	9 9 9 9 9 9 9 9 9 19 19 10 10 10 10 10 10 10 10 10 10
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	partment	ELECTRICAL AND ELECTRON		2.02.01.20.00	C. S. Branner		R 2019	Semester
C	ourse	Course Name	Ho	urs/\	Neek	Credit	Total	Maximum Mark
(Code	oourse Maine	L	Т	Р	С	Hours	Maximum Wark
19	EEZ01	ELECTRICAL AND ELECTRONICS CIRCUIT DESIGN	1	0	0	1	15	100
Cour	rse Objective	(s): The purpose of learning this co	urse	s to				
	Understand th	e concepts of basic electrical and e	lectro	nics	syste	m.		
	Analyze the el	ectrical and electronics circuit desig	ning.					
Cou	rse Outcome	s: At the end of this course, learners	s will I	oe al	ole to:			
	Interpret the b	asic ideas of electrical and electroni	cs sy	stem				
		cepts of electrical and electronics cir						
	ule:1							
Elect	trical elements	s-Resistor, inductor, capacitor-trar	sform	ner-re	egulat	ed powe	er supply-	designing of
filters	s uncontrollab	le devices-diodes.			-			
	ule:2							and the second second
			or of	rec	tifiers-	 half was 	ave rectifi	er, full wave 15
		ion and construction of rectifier-typ	es o	1000	100.000.000			0 10
recti	ifier and bridge		es o					15
recti Mod	ule:3	e rectifiers.				fior on		
recti Mod Oper	ule:3 rational ampl	e rectifiers. ifier-analyze op amp circuit-ope				fier app		
recti Mod Oper funct	ule:3 rational amplition application	e rectifiers.				fier app		
recti Mod Oper funct	ule:3 rational amplition application ERENCE(S):	e rectifiers. ifier-analyze op amp circuit-ope ns of the diode, BJT, MOSFET.	eratior	nal	ampli		olication-fi	lter transfer
recti Mod Oper funct REF	ule:3 rational amplition application ERENCE(S): Rashid M.H,' Delhi,2003.	e rectifiers. ifier-analyze op amp circuit-ope ns of the diode, BJT, MOSFET. Power Electronics Circuits, Devices	eratior	nal Appl	ampli	ns", Pea	olication-fi	lter transfer
recti Mod Oper funct	ule:3 rational amplition application ERENCE(S): Rashid M.H,' Delhi,2003. https://www.e	e rectifiers. ifier-analyze op amp circuit-ope ns of the diode, BJT, MOSFET.	and electr	nal Appl onic-	ampli ication circui	ns", Pea	olication-fi	lter transfer

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	epartment	ELECTRICAL AND ELECTR		74	WALLARY TO SEA		R 2019	Semester	
С	ourse	Course Name	Hoi		Week	orcare	Total	Maximum N	/ lark
1 2	Code		L	Т	P	С	Hours		
19E	EZ02	PCB DESIGN	1	0	0	1	15	100	
Cou		e (s): The purpose of learning th							
	Understand	the concepts of circuit design, a	nalysis and	d lay	out.				
		PCB designing.			-	-			
Cou	irse Outcom	es: At the end of this course, lea	arners will	be a	able to	:			
	Interpret the	analysis of PCB circuit designin	g.						
	Apply the co	incepts inverter and rectifier circu	uit design i	in P	CB.				
	dule:1								
Sim	nle Analog (Circuit Design - Part Editor-Con Circuits- Creation of Simple Did	ntiguration	its -	Bus	creation	- Multip	le Schematic	
Sim page Moc Prim Ana Ana Moc Circ Edit Laye	ple Analog (e Project - M dule:2 hary Analysis lysis, Second lysis, Digital dule:3 uit Modificat or Netlist Cr out Design -	Circuits- Creation of Simple Dig Iultiple Schematic Folder Project s -Bias point Analysis, Trans dary Analysis – Parametric simulation- Footprint Creation - ion for PCB Design - PCB La reation - Quick Placement - A Creation of Simple Inverter Cir	gital Circui -Design Pi ient Analy Analysis, Pad Desig yout Crea utomatic f rcuit, Recti	its - roce /sis, Tei Jn - I tion Rout	Bus essing. DC mpera PCB \$ - Ne ting- (Circu	creation sweep ature Ar Symbol C w Board Circuit C	- Multipl Analysis, halysis, I Creation File Cre Creation,	le Schematic AC sweep Monte Carlo eation - PCB Analysis and	15
Sim page Mod Prim Ana Ana Mod Circ Edit Layo Add	ple Analog (e Project - M dule:2 hary Analysis lysis, Second lysis, Digital dule:3 uit Modificat or Netlist Cr out Design - ers and Sub	Circuits- Creation of Simple Dig Iultiple Schematic Folder Project s -Bias point Analysis, Trans dary Analysis – Parametric simulation- Footprint Creation - ion for PCB Design - PCB La eation - Quick Placement - A Creation of Simple Inverter Cir tractor, Amplifier Circuits - PCB	gital Circui -Design Pi ient Analy Analysis, Pad Desig yout Crea utomatic f rcuit, Recti	its - roce /sis, Tei Jn - I tion Rout	Bus essing. DC mpera PCB \$ - Ne ting- (Circu	creation sweep ature Ar Symbol C w Board Circuit C	- Multipl Analysis, halysis, I Creation File Cre Creation,	le Schematic AC sweep Monte Carlo eation - PCB Analysis and	15
Sim page Mod Prim Ana Ana Mod Circ Edit Layo Add	ple Analog (e Project - M dule:2 hary Analysis lysis, Second lysis, Digital dule:3 uit Modificat or Netlist Cr out Design - ers and Sub ERENCE(S)	Circuits- Creation of Simple Dig Iultiple Schematic Folder Project s -Bias point Analysis, Trans dary Analysis – Parametric simulation- Footprint Creation - ion for PCB Design - PCB La eation - Quick Placement - A Creation of Simple Inverter Cir tractor, Amplifier Circuits - PCB	gital Circui -Design Pi ient Analy Analysis, Pad Desig yout Crea utomatic F rcuit, Recti Layout Design	its - roce /sis, Tel gn - I tion Rout ifier sign	Bus essing. DC mpera PCB \$ - Ne ting- (Circu ing	creation sweep ature Ar Symbol C w Board Circuit C its, RC	- Multipl Analysis, nalysis, I Creation File Cre Creation, A Phase St	le Schematic AC sweep Monte Carlo eation - PCB Analysis and hift Oscillator,	15
Sim page Mod Prim Ana Ana Circ Edit Laye Add	ple Analog (e Project - M dule:2 hary Analysis lysis, Second lysis, Digital dule:3 uit Modificat or Netlist Cr out Design - ers and Sub ERENCE(S) R.Archamb	Circuits- Creation of Simple Dig Iultiple Schematic Folder Project s -Bias point Analysis, Trans dary Analysis – Parametric simulation- Footprint Creation - ion for PCB Design - PCB La eation - Quick Placement - A Creation of Simple Inverter Cir tractor, Amplifier Circuits - PCB	gital Circui -Design Pi ient Analy Analysis, Pad Desig yout Crea utomatic F rcuit, Recti Layout Designation	its - roce /sis, Tel gn - I tion Rout ifier sign	Bus essing. DC mpera PCB \$ - Ne ting- (Circu ing	creation sweep ature Ar Symbol C w Board Circuit C its, RC	- Multipl Analysis, nalysis, I Creation File Cre Creation, A Phase St	le Schematic AC sweep Monte Carlo eation - PCB Analysis and hift Oscillator,	15

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D	epartment	ELECTRICAL AND ELECTRON	VICS E	NG	NEER	ING	R 2019	Semest	
		Course News	Ho	urs/	Week	Credit	Total		
Co	ourse Code	Course Name	L	Т	Р	С	Hours	Maximum	Mark
19	EEZ03	INVERTER AND CONVERTER DESIGN	1	0	0	1	15	10	
Co	urse Objectiv	ve (s): The purpose of learning this	course	is to)			-	
	Understand	the concepts of converter and inver	ter.						
	Analyze the	converter and inverter designing.							H 1
Co	urse Outcom	es: At the end of this course, learne	ers will	be a	ble to:				
		concept of converter and inverter.							
	Apply the co	oncepts of converter and inverter for	desiar	ina.					÷
		Ind vollades driens ransformers i	asian (nscil	lator (pircuit to	r inverte	r-oscillator	
sta iC4 Mo Inv Mo Cor	age with powe 4093-Inverter dule:2 verter topology dule:3 nverter-types	ing voltage-Current-Transformer-Der er stage and transformer-Inverter using IC555 oscillator. y using half bridge topology, full brid of converter-buck, boost and b or, ripple factor, duty cycle-switching	circuit ge topo uck b	usir ology oost	ng IC ² y and I conv	1049-Sin ⊣-bridge verter- s	nple inve topology election	rter using	15
sta IC4 Mo Inv Mo Cor indu	age with powe 4093-Inverter dule:2 verter topology dule:3 nverter-types	er stage and transformer-Inverter using IC555 oscillator. y using half bridge topology, full brid of converter-buck, boost and b or, ripple factor, duty cycle-switching	circuit ge topo uck b	usir ology oost	ng IC ² y and I conv	1049-Sin ⊣-bridge verter- s	nple inve topology election	rter using	15
sta IC4 Mo Inv Mo Cor indu	age with powe 4093-Inverter dule:2 verter topology dule:3 nverter-types uctor, transist FERENCE(S)	er stage and transformer-Inverter using IC555 oscillator. y using half bridge topology, full brid of converter-buck, boost and b or, ripple factor, duty cycle-switching : d, Power Electronics Circuits, Device	circuit ge topo uck bo g regula	usir ology oost ator-	ng IC4 y and I conv losses	1049-Sin H-bridge verter- s a calculat	nple inve topology election tion.	rter using of diode,	
sta IC4 Mo Inv Mo Cor indu RE	age with powe 4093-Inverter dule:2 verter topology dule:3 nverter-types uctor, transist FERENCE(S) Rashid M.F Delhi,2003	er stage and transformer-Inverter using IC555 oscillator. y using half bridge topology, full brid of converter-buck, boost and b or, ripple factor, duty cycle-switching : d, Power Electronics Circuits, Device	circuit ge topo uck bo g regula es and	usir ology oost ator-	y and I conv losses	4049-Sin H-bridge rerter- s calculat	nple inve topology election tion. rson, Thii	rter using of diode, rd Edition, N	Jew

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Department	ELECTRICAL AND ELECTRON	ICS EN	IGIN	IEER	ING	R2019	Semester	
Course Code	Course Name	Hou	urs/V T	Veek P	Credit C	Total Hours	Maximum M	arks
19EEZ04	SOLAR PANEL DESIGN	1	0	0	1	15	100	
Understand Describe the Understand Course Outcor	ive (s): The purpose of learning this Solar cell technology. e various types of solar cells and des the various components in the solar nes: At the end of this course, learne e connections of solar cells in panel a	ign con power g ers will l	side gene be a	ratior eration ble to	n and dis):	tribution	systems.	
	the performance of various types of			0000	110 100.			
	ar system for different applications.	colur o	ono.					
factor - maximu Module II Types of Solar Diode – Class performance ar factors. Module III Classification: system. Design of Sola Selection of Cl	n – structure - I-V characteristics um power point – losses - cell efficier cells - Solar Modules - Blocking Di ification of solar cells – mono cry nalysis – series and parallel connec Stand alone PV system - Grid conne ar Home System (SHS) - Selection narge Controller - Selection of DC// itch - Selection of the wire size for so	ncy. iode - E ystalline tion - c ected P n of So AC Inve	By-p. s, po butpi V Sy lar F erter	ass [oly cl ut vol vstem >V m - Se	Diode - S rystalline Itage cale n - Hybric nodule - election o	Solar Arra , nano s culation - I solar P\ Selection	ay - Isolation solar cells – - mechanical / of Battery -	15
TEXT BOOK(S				010111	0.1111	The stress	1000	
1. Sukhatme 2010	.S.P, Nayak .J.K, "Solar Energy", Ta	ita McG	raw	Hill E	Educatior	n Private	Limited, New	Delł
REFERENCE(S						191		
Learning I	ngh Solanki., Solar Photovoltaic: "Fu	ndamer	ntals	, Tec	hnologie	s and Ap	plication", PHI	
John R.	V., L.G., 2000						and the second se	

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	ELECTRICAL AND ELECTRO					R 2019	Semester
Course Code	Course Name	Но	urs/	Week	Credit	Total	Maximum
		L	Т	P	С	Hours	Marks
19EEZ05	ELECTRICAL SYSTEMS IN AUTOMOBILE	1	0	0	1	15	100
Gain knowled Impart the kn Impart the kn Course Outcome Understand th Understand th Understand th Module-1 Storage, Distribut systems. Insulatio codes, cable conn diagram for 2, 3 a Module-2	 (s): The purpose of learning this could ge about electrical systems in autom owledge on battery system. owledge on battery charging system s: At the end of this course, learners he basic auto electrical systems. he layout of wiring and connections of he working of different electrical components on systems & Generation of electrical n and earth (negative and positive electors, wiring, fuse system, circuit brand 4 wheeler vehicles, Buses and Context of the system). 	obile. will be electronents energy earthin reakers	e able s use gy, l g) s s, Re	syster ed in a ₋ightir ysterr elays,	automob ng system , types Switche	iles m, 12 Vol of cables	t & 24 Volt used, color
battery & Alkaline Efficiency, Gravim	Automotive batteries. Principles, Cor battery. Designations & Rating of Ba etric test and efficiency. Battery faile	atteries ures. I	s. Pe	erform	ance tes	sts: Batter	y Capacity,
battery & Alkaline Efficiency, Gravim charging current, of Module-3 Need of Charging charging system regulator system:	battery. Designations & Rating of Ba	atteries ures. I D.C. dy Altern regula	s. Pe Rech ynan ators tor,	no, A s). Cl	ance tes g: Electri C dynam harging ensated	sts: Batter ronic circu no, flywhe system co voltage a	y Capacity, uits, battery el magneto ontrolling &
battery & Alkaline Efficiency, Gravim charging current, o Module-3 Need of Charging charging system regulator system: regulator, electron TEXT BOOK(S):	battery. Designations & Rating of Ba etric test and efficiency. Battery fail charging methodology & precautions. circuit, Types of charging system: D and Alternator (more emphasis on Relay/cut-out, voltage and current ic regulator, regulator characteristics.	D.C. dy Altern regula Drive	s. Pe Rech ynan ators tor, for (erform hargin no, Ar s). Cl comp Charg	ance tes g: Electric C dynam harging ensated ing syste	sts: Batter ronic circu no, flywhe system co voltage a em.	y Capacity, uits, battery el magneto ontrolling & and current
battery & Alkaline Efficiency, Gravim charging current, of Module-3 Need of Charging charging system regulator system: regulator, electron TEXT BOOK(S): 1. Tom Denton,	battery. Designations & Rating of Bateric test and efficiency. Battery faile charging methodology & precautions. circuit, Types of charging system: D and Alternator (more emphasis on Relay/cut-out, voltage and current	D.C. dy Altern regula Drive	s. Pe Rech ynan ators tor, for (erform hargin no, Ar s). Cl comp Charg	ance tes g: Electric C dynam harging ensated ing syste	sts: Batter ronic circu no, flywhe system co voltage a em.	y Capacity, uits, battery el magneto ontrolling & and current
battery & Alkaline Efficiency, Gravim charging current, of Module-3 Need of Charging charging system regulator system: regulator, electron TEXT BOOK(S): 1. Tom Denton, 2017	battery. Designations & Rating of Bateric test and efficiency. Battery faile charging methodology & precautions. circuit, Types of charging system: E and Alternator (more emphasis on Relay/cut-out, voltage and current ic regulator, regulator characteristics.	D.C. dy Altern regula Drive	s. Pe Rech ynan ators tor, for (no, An comp Charg	C dynam harging ensated ing syste	sts: Batter ronic circu no, flywhe system co voltage a em. ge,Publish	y Capacity, uits, battery el magneto ontrolling & and current
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battery & Alkaline Efficiency, Gravim charging current, of Module-3 Need of Charging charging system regulator system: regulator, electron TEXT BOOK(S): 1. Tom Denton, 2017 2. P. L. Kohli, "A 3. A. K. Babu, "A REFERENCE(S):	battery. Designations & Rating of Bateric test and efficiency. Battery faile charging methodology & precautions. circuit, Types of charging system: D and Alternator (more emphasis on Relay/cut-out, voltage and current ic regulator, regulator characteristics. "Automobile Electrical and Electron utomotive Electrical Equipments", Mo	Atteries ures. I D.C. dy Altern regula Drive nic Sy Graw	s. Pe Rech ynan ators tor, for (stem Hill, <u>na Pi</u>	erform nargin no, Au s). Cl comp Charg Charg 1st E ublish	ance tes g: Electric C dynam harging ensated ing syste Routledg dition, 20 ers, 1 st	sts: Batter ronic circu no, flywhe system co voltage a em. ge,Publish 017 Edition 20	y Capacity, uits, battery el magneto ontrolling & and current ers, 5 th Editio

Dep	partment	ELECTRICAL AND ELECTRON	IICS	ENC	GINE	RING	R2019	Semester
	ourse	Course Name	Ho		Neek	orean	Total	Maximum Marl
	Code		L	T	P	C 1	Hours 15	100
	EEZ06	EMBEDDED PROGRAMMING purpose of learning this course is to:	1	0	0	1	15	100
Moc Intro Exte Data diag PC, Moc ARM Bloc Reg Sim inter Moc Defi Kerr µC/0 Dev Proo	Develop an Relate and Describe the recognize the Design real dule I bouction to A ensions: Thue aflow Model- ram – ARI CPSR,SPSR dule II A based Emil k – Memory isters - UAR ple Assemble facing- Anale dule III nition of RTC nel – Non F OS –II RTOS ices for µC pramming in	ARM architecture and the pipeline stru- assembly level code for basic arithme distinguish between OS and RTOS in es: At the end of this course, learners a differences between the general cor- ne classification of embedded systems. time embedded systems using the cor- ARM – ARM Processor Core – Cor- mb, Jazzelle, AMBA - Memory Mode – ARM7 Architecture:ARM7TDMI – AI M7 internal structure – ARM7 op bedded Microcontroller – LPC 2148 I Mapping – General Purpose Input T: Features, Registers - I ² C Features by Language Programs for arithmeti- og to Digital Conversion- seven segme OS – Comparison with general OS – Se Preemptive Kernel – Preemptive Ke S : Introduction – Features of µC/OS C/OS–II–File Structure in µC/OS – a Implement Multitasking with two Stepper Motor and LED as counter ta	tic p their will I mput ncep mpar erat Bloc C op ent L Bloc C op ent L Goft a rnel -II - sep	rimit r functor to a a b to a a b to a a b to a a b rison on No TDN ing k Dia utput ing k Dia utput ing k Dia utput ing and H - S - Re - Re - Re - Re	ctiona ple to: syster RTO: of v euma Il feat states agram Unit: erating Displa Hard I Schedu equirer unctio e LEI	lity. n and th S. arious A n and H ures – A arious A n and fea LPC 2 ⁻¹ g Modes, - Embed y Interface RTOS – uler – S ments of ns of – D Blinkir	e embed RM fami Harvard - RM7 fun M Regis Atures – 148 Time - Analog Ided C I ce throug Task – M Scheduling µC/OS - Task. En g tasks	lies – ARM - ARM Core ctional block sters: GPR, Pin Connect er: Features, Interfacing: Programs in h I ² C lultitasking – g Algorithm. -II - Support mbedded C - Implement
	continuously		- 110	-	-			
1.	Dr. K.V.K.K.	Prasad, "Embedded / Real Time Syst ISBN: 9788177224610.	ems	: Co	ncept	s, Desigr	and Pro	gramming", Drea
	ERENCE(S)					-		
REF	LILLIOL(O,							
REF	Tammy No	: ergaard, "Embedded Systems Architeα n J. Labrosse, "Introduction to μC/OS	cture	", N€	ewnes	- 2nd Ed	lition, 14t	h December 2012

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Bln Chairman - BoS Dept. of EEE - ESEC

Department	ELECTRICAL AND ELECTRONIC	CS EN	GINE	ERIN	G	R2019	Semester	•
	Course Name	Ho	urs/\	Neek	Credit	Total	Maximun	n
Course Code	Course Name	L	Т	Р	С	Hours	Marks	107-02
19EEZ07	PLC AND ITS APPLICATION	1	0	0	1	15	100	
Gain knowl Impart the I Course Outcon	ive (s): The purpose of learning this co edge about basics of Programmable L knowledge on Programmable Logic Co knowledge on Programmable Logic Co nes: At the end of this course, learner the block diagram of programmable logic	ogic Controlle ontrolle ontrolle s will b	ontro r. r pro e abl	gramr	ming.			
 Understand Apply the k Applications 	the basics of programmable logic con nowledge of programming a Program	ntroller		Cont	roller to v	arious Ind	lustrial	
Module-I	Types of systemation (manufacturin	n ond	-		footuring		ntogoo of	
	Types of automation (manufacturing PLC Introduction – Block diagram o	Contraction of the local data						
	C scan – memory organization – inp							
	schematic and wiring diagram)			(
Module-II							1.5.5	
System -PLC T	ramming Devices – Comparison b Types (Fixed and Modular) – Input Ty List of various PLCs available.							1
ON delay and Instruction – UP	mming languages – ladder diagram - OFF delay Timer – Retentive Timer P Counter – Down Counter – UP/DO tic STAR-DELTA Starter	Instru	iction	1 - C	ascading	Timers -	- Counter	
TEXT BOOK(S)	•							_
1. Frank D.Pe	truzella, "Programmable logic controlle	ers", Ta	ta M	cGrav	v Hill, 5 th	edition, 2	016.	
2. 4 th edition,		rdware	and	Progr	amming,	Good hea	art- Willcox	
REFERENCE(S					S. M. T. T. B.	a the states search	and a state of the	-1
Kohin TE		allana	A 1	E and a		Dealers	a al. A un a l'	-
1. Kelvin T.E Dogwood V 2. S.C.Jonath	rickson, "Programmable Logic Contr Vally Press, LLC, 3 rd Edition, 2016.	ollers:	An I	Emph	asis on	Design a	nd Applicati	or

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Department	ELECTRICAL AND ELECTRONICS	EN	GINE	ERIN	IG	R 2019	Semester
Course Code	Course Name	Ho	urs/V	Veek	Credit	Total	Maximum
Course Code	Course Name	L	Т	Ρ	С	Hours	marks
19EEZ08	ENERGY AUDIT IN INDUSTRIES	1	0	0	1	15	100
 Familiarize Understand Learn the r 	ive (s): The purpose of learning this cour about forms of energy. I the concept of energy audit. nethods of energy audit. d report the outcome of energy audit.	se is	to				
UnderstandAcquire ski	nes: At the end of this course, learners w d of the energy management, auditing an lls to conduct an audit. le Energy audit report.				processe	es.	
Module-I	e Energy addit report.			Samt		1. 1	
Energy audit -	need, preliminary audit, detailed audit,	meth	odol	ogy a	ind appro	oach, Instr	ruments for
audit, monitoring	g energy and energy savings.		1				A STRATE A STRATE
Module-II							
Evaluation of	saving opportunities – determining the	e sa	aving	s in	INR, no	neconomi	ic factors, 1
	portunities, estimating cost of implement						
							1000
Module-III							
Case study - S	port, importance, effective organization, r	Ĝ.					
			onse	rvatio	n in prod	cess equip	oment like
	port, importance, effective organization, r Simple calculations of energy savings a		onse	rvatio	n in prod	cess equip	oment like
boilers, heat ex TEXT BOOK(S	port, importance, effective organization, r Simple calculations of energy savings an changer only	nd c					
boilers, heat ex TEXT BOOK(S 1. Craig B.Sn	port, importance, effective organization, r Simple calculations of energy savings an changer only): hith, Kelly E. Parmenter "Energy Manage	nd c	t Prir	nciples	s", Elsevi	er 2 ^{na} Ed	ition,2016
boilers, heat ex TEXT BOOK(S 1. Craig B.Sn	port, importance, effective organization, r Simple calculations of energy savings an changer only	nd c	t Prir	nciples	s", Elsevi	er 2 ^{na} Ed	ition,2016
boilers, heat ex TEXT BOOK(S 1. Craig B.Sn 2. Steve Doty REFERENCE(S	port, importance, effective organization, r Simple calculations of energy savings an changer only : nith, Kelly E. Parmenter "Energy Manage , Wayne C.Tuner, "Energy Management ;):	nd c ment Han	t Prir d bo	nciple: ok", F	s", Elsevi airmount	er 2 ^{nα} Ed Press, 8 ^π	ition,2016
boilers, heat ex TEXT BOOK(S 1. Craig B.Sn 2. Steve Doty REFERENCE(S 1. W B Murr	port, importance, effective organization, r Simple calculations of energy savings an changer only : hith, Kelly E. Parmenter "Energy Manage , Wayne C.Tuner, "Energy Management ;): hy and G. McKay, "Energy Management"	ment Han	t Prir d bo	ok", F	s", Elsevi airmount London.	er 2 ^{na} Ed Press, 8 ^{tt} 2007.	ition,2016 ⁿ Edition, 2012
boilers, heat ex TEXT BOOK(S 1. Craig B.Sn 2. Steve Doty REFERENCE(S 1. W.R.Murp 2. Barney L Fairmount	port, importance, effective organization, r Simple calculations of energy savings an changer only): hith, Kelly E. Parmenter "Energy Manage , Wayne C.Tuner, "Energy Management	ment Han , But	t Prir d boo tterw	nciples ok", F orths, y, " /	s", Elsevi airmount London, A Guide	er 2 ^{na} Ed Press, 8 ^{tt} 2007.	ition,2016 ⁿ Edition, 2012

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Department	ELECTRICAL AND ELECTRO	NICS E	ENG	NEEF	RING	R2019	Semester	
	Course Name	Ho	urs/\	Neek	Credit	Total	Maximum I	
Course Code	Course Name	L	Т	Р	С	Hours	Maximum	Warks
19EEZ09	SCADA AND DCS	1	0	0	1	15	100	
 Expose the Expose the Expose the Expose the Course Outco Understand Design a Apply the Module I Fundamentals HMI system 	On completion of the course the s e concept of Industrial automation e various communication protoco e comparison among various cor omes: On completion of the cour nd the basics of SCADA and DCS DCS and SCADA system for a p SCADA and DCS in various indu of industrial automation - nee n- Concept of SCADA syste	n bls of S trol me rse the S in ind rocess ustrial a d and	CAD stude stude lustri to m applic role	A. Is in A ent wi al auto eet a cations of au	Automatic II be able omation. set of spe s. utomation	e to ecifications. n, evolution	of automation	
Module II Location of Do – DCS comp SCADA system	DA packages - Application Deve CS in Plant - functions, advanta onents/ block diagram - Layout m and DCS –local control unit - o	lopmer ges an of DC	nt usi Id lim 2S -	ing SC nitation Contr	CADA sys ns - Com oller Det	stem. nparison of l ails - Differ	omparison o DCS with PLC ence betweer	f 1E
Module II Location of D – DCS comp SCADA system Module III Case studies DCS – Role o DCS / SCADA TEXT BOOK(1. Lukas, Mi	DA packages - Application Deve CS in Plant - functions, advanta onents/ block diagram - Layout m and DCS –local control unit - o of Process plants using SCADA f PLC in DCS and SCADA – com S): chael P., "Distributed Control Sys	lopmer ges an of DC operator & DCS nparisor	nt usi d lim CS - r inte S – A n – fi	ing SC nitation Contre rface Advance	CADA sys ns - Com oller Det – engine ced featu evices (Tr	stem. nparison of l ails - Differ ering interfa ires / option ransducers,	comparison of DCS with PLC ence between ices. s in SCADA & drives etc.,) in	f 15
Module II Location of D – DCS comp SCADA system Module III Case studies DCS – Role o DCS / SCADA TEXT BOOK(1. Lukas, Mi REFERENCE	DA packages - Application Deve CS in Plant - functions, advanta onents/ block diagram - Layout m and DCS –local control unit - o of Process plants using SCADA f PLC in DCS and SCADA – com S): chael P., "Distributed Control Sys (S):	lopmer ges an of DC operato & DCS nparison stems",	nt usi od lim S - r inte S - A n - fi , Van	ing SC nitation Contre rface Advand ield de	CADA systems - Corr roller Det – engine ced featu evices (Tr rand Rein	stem. nparison of l ails - Differ ering interfa ures / option ransducers, nfold Compa	Comparison of DCS with PLC ence between ces. s in SCADA & drives etc.,) in	f 15
Module II Location of D – DCS comp SCADA system Module III Case studies DCS – Role o DCS / SCADA TEXT BOOK(1. Lukas, Mi REFERENCE	DA packages - Application Deve CS in Plant - functions, advanta onents/ block diagram - Layout m and DCS –local control unit - o of Process plants using SCADA f PLC in DCS and SCADA – com S): chael P., "Distributed Control Sys (S) : e Popovic, Vijay P. Bhatkar, "Dis	lopmer ges an of DC operato & DCS nparison stems",	nt usi od lim S - r inte S - A n - fi , Van	ing SC nitation Contre rface Advand ield de	CADA systems - Corr roller Det – engine ced featu evices (Tr rand Rein	stem. nparison of l ails - Differ ering interfa ures / option ransducers, nfold Compa	Comparison of DCS with PLC ence between ces. s in SCADA & drives etc.,) in	f 15
Module II Location of Du- DCS comp SCADA system Module III Case studies DCS - Role of DCS / SCADA TEXT BOOK(1. Lukas, Mi REFERENCE 1. Press, 1 2. RS VIEV	DA packages - Application Deve CS in Plant - functions, advanta onents/ block diagram - Layout m and DCS –local control unit - o of Process plants using SCADA f PLC in DCS and SCADA – com S): chael P., "Distributed Control Sys (S) : e Popovic, Vijay P. Bhatkar, "Dis	lopmer ges an of DC operator & DCS nparisor stems", stributed	nt usi d lim S - r inte S - A n - fi Van d Co	ing SC nitation Contre rface Advance ield de n Nost	CADA sys ns - Corr - engine ced featu evices (Tr rand Rein er Control	stem. nparison of l ails - Differ ering interfa ures / option ransducers, nfold Compa	Comparison of DCS with PLC ence between ces. s in SCADA & drives etc.,) in	f 15

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Department	ELECTRICAL AND ELECTRONIC	CS E	NGI	NEER	ING	R 2019	Semester	
Course Code	Course Name	Hours/Week (Credit	Total	Maximum	Mork
		L	Т	Р	С	Hours	Maximum Ma	
19EEZ10	IOT FOR ELECTRICAL ENGINEERS	1	0	0	1	15	100	
Course Obj	ective (s): The purpose of learning this co	urse	is to				201 - B.S.	
UndersDesignUnders	tand the concept of remote Sensing and A tand the Basics of networking and Commu the Arduino programming for sensors and tand functions of smart meters.	nicat actu	ion F ators	5.				
Course Out	comes: At the end of this course, learners	s will	be a	ble to				
Design	ne Communication Protocols in wireless se IoT based Automation with Raspberry Pi. Irize the Functional specification of smart n		1		protoco	Ι.		
Module:1								
Introduction	to IoT-Sensing, Actuation, Basics of Ne	twork	king.	Com	municati	on Protoc	cols-Sensor	
	lachine-to-Machine Communications- Inter	oper	abilit	y in ic).			
Module:2	D. Italian Automation Internation of Cono		nd	Actuo	tore with	Arduino	Connected	15
Home and	Building Automation, Integration of Senson ng, Implementation of IoT with Raspberry	Dis a Pi	inu /	Actua		r Ardunio,	Connected	15
Module:3	ng, implementation of for with response						in the second	
Features ar	d functions of smart meters - Functional	l spe	cifica	ation -	- catego	ory of sma	art meters -	
	MI drivers and benefits - AMI protocol - I	Dema	and S	Side I	ntegratio	n: Peak l	oad, Outage	
	Quality management.		-			1		
REFERENC	Quality management. E(S):			Cur	lie	1		
REFERENC1.NPTE2."Smar	Quality management. E(S): L course "Introduction to Internet of Things t Grid Technology and Applications" by Ja	inaka	Eka	Suc anaya icatio	ke, Kiths	iri Liyana	ge, Jianzhon	
REFERENC 1. NPTE 2. "Smar Akihik 3.	Quality management. E(S): L course "Introduction to Internet of Things t Grid Technology and Applications" by Ja o Yokoyama, Nick Jenkins, John Wiley & S ng Started with Arduino" by Massimo Banzi	inaka Sons i, Ore	Eka Publ eilly F	anaya icatio Public	kė, Kiths n, 2012. ations, 2	011		ig Wi
REFERENC1.NPTE2."SmarAkihikAkihik3."Gettir4."Smar	Quality management. E(S): L course "Introduction to Internet of Things t Grid Technology and Applications" by Ja o Yokoyama, Nick Jenkins, John Wiley & S	inaka Sons i, Ore	Eka Publ eilly F	anaya icatio Public	kė, Kiths n, 2012. ations, 2	011		ig Wi

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Department	ELECTRICAL AND ELECTRONICS	S EN	GIN	EERIN	IG	R2019	Semester	
Course Code	Course Name				Credit		Maximum	Mark
		L	T	Р	С	Hours		
19EEZ11	LABVIEW AND ITS APPLICATIONS	1	0	0	1	15	100	
 Identify the Develop de Course outco Design cor 	he purpose of learning this course is to: various components of Lab VIEW in auto bugging technique for plotting arrays on omes: At the end of this course, learners notrol system technique for various applica ogramming for sequential and state prog	wave will b ations	eform be ab 3.	le to:	h and ch	arts.		-
Parts of VI, S helps Utilities data, coloring Module II Front Panel I register, Feed node - Using on waveform Module III Design techn Applications: switch- Coke I	nents - Virtual Instrumentation Applicati Starting VI - Block Diagram - Datafic - Correcting Broken VI's and Debuggin and cloning of objects. Design - Data types - Introduction to S back node - Case structure - Sequenc subVI's - Waveform chart and graph (S graph and charts - Simulate signal, Spec ique: Using Sequential Programming Developing modular applications- Ligh Machine simulator- Elevator Simulator an	ow a ng T Struct ed s cope ctral i - S nt m	tures tructu e, an meas State easu	Buildi iques - VVi ures (d swe urem prog reme	ng Sim - Unde Flat and eep cha ent - Tor ramming nt & au	ple VI - fined or I b Stacked rts) - plo ne measu g - state utomatic	Lab VIEW Jnexpected doop - Shift d), Formula tting arrays irement. e machine.	15
1. Jovitha Je	S): erome, "virtual instrumentation using Lab\	VIEW	/" , P	HILe	arning P	rivate Lin	nited, 2010.	
			調査	1	31	r		
				Cha	irman	Bos	100 B	

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Depart	nent	ELECTRICAL AND ELECTR	UNICO L	NGI	NEER	ING	R 2019	Semester	
Course Code	Code	Course Name	Ho	urs/\	Neek	Credit C	Total Hours	Maximum M	
	Code		L	Т	P				Marl
19EE	Z12	ROBOTICS	1	0	0	1	15	100	
Un Un An De	derstand the derstand the alysis Kine sign the ro	e (s): The purpose of learning thin the Basics of Robot anatomy the working of end effectors and of matics and transformation analy bot cell and applications of robot s: At the end of this course, lear	drive syst sis of rob t.	ems ot					
□ Un □ Ap	derstand F ply Robot o sign and a	Robot Systems and Robot Anato drive mechanisms for Mechanica nalysis different robot configurat	my al Transm						2
 Joint - robots, repeata Module Robot of stepper Roller (drives, Types. Module Block E Control 	 manipula Robots G bility. :2 drive mech motor, Me Chains, Mc Lead screet :3 Diagram of Indirect 	s, laws of robotics, Robot Definit tor – Wrist – End effectors – Ad eometry and workspace, Speci nanisms - Hydraulic and Pneu echanical Transmission method otion conversion - Rotary to R ws, Ball Bearing screws, Varia	ctuators - fications matic sys – Gear Rotary - able Spee	- Ser of F stem Tran Rota ed Ai	nsors Robots ns - E nsmiss ary to rrange	– Contro - Accur lectric D sion – Be Linear ement, R	ller, Class racy, reso rives - s elt Drive - – Rack obot end	sification of olution and ervomotor- – Cables – and pinion effectors -	15
		Robot control System, Motion Force control, Path Planning nts, Applications: Flexible Manu- nspection – Material transfers:	g: Point- Ifacturing	To-F Sys	Point tems	concept	 Motion Automatic 	n Through atic feeding	
lines, a operatio	utomatic i ons - Asser	Force control, Path Planning	g: Point- Ifacturing Machine	To-F Sys	Point tems ding	concept	 Motion Automatic 	n Through atic feeding	
lines, a operation TEXT E	utomatic in ons - Asser OOK(S):	Force control, Path Planning nts, Applications: Flexible Manu- nspection – Material transfers: nbly and inspection – Automatic	g: Point- Ifacturing Machine welding	To-F Sys loa Robo	Point stems ding ot.	concept and unic	 Motion Automation Automation Automation 	n Through atic feeding Processing	
lines, a operation TEXT E 1. De Lin	utomatic in ons - Asser OOK(S): b.S.R, "Ro hited, 2010	Force control, Path Planning nts, Applications: Flexible Manu- nspection – Material transfers: mbly and inspection – Automatic botics Technology and Flexible	g: Point- ifacturing Machine welding Automat	To-F Sys loa Robo ion",	Point stems ding ot. Tata	concept and unic McGraw	 Motion Automation Automation Automation 	n Through atic feeding Processing	mpar
lines, a operation TEXT E 1. De Lin 2. Mit	utomatic in ons - Asser OOK(S): b.S.R, "Ro hited, 2010 tal R K and	Force control, Path Planning nts, Applications: Flexible Manu nspection – Material transfers: mbly and inspection – Automatic botics Technology and Flexible	g: Point- Ifacturing Machine welding Automat	To-F Sys loa Robo ion",	Point stems ding ot. Tata w Hill,	concept and unic McGraw 2005.	– Motion - Automa ading - - Hill Pu	n Through atic feeding Processing ublishing Co	mpar
Ines, a operation TEXT B 1. De Lin 2. Mit 3. Bru Pla	utomatic in ons - Asser OOK(S): b.S.R, "Ro hited, 2010 tal R K and ino Siciliar nning and	Force control, Path Planning nts, Applications: Flexible Manu- nspection – Material transfers: mbly and inspection – Automatic botics Technology and Flexible	g: Point- Ifacturing Machine welding Automat	To-F Sys loa Robo ion", cGra Biuse	Point items ding ot. Tata w Hill,	concept and unic McGraw 2005.	– Motion - Automa ading - - Hill Pu	n Through atic feeding Processing ublishing Co	mpar
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