



VISION

The Department of Electronics & Communication Engineering shall strive to create engineering technocrats for addressing the global challenges in relevant areas to cater the ever-changing needs of society at National and International level.

MISSION

- 1. To ensure dissemination of knowledge through effective teaching and learning in Electronics and Communication Engineering.
- 2. To excel in Research and Development activities in emerging areas.
- 3. To promote industry-institute and institute-institute linkages for sustainable development of academic, research, training and placement activities.
- 4. To establish center of excellence in thrust areas to nurture the spirit of innovation and creativity among faculty and students.

P. K. Das

Dilip Kumar

J. S. Ubhi



Programme Educational Objectives (PEOs)

The Integrated Certificate and Diploma programme (DEC-CSME) shall produce skilled professionals who are:

- 1. Technically competent in maintenance, servicing and repairing of electronic equipment's.
- 2. Effective in communication and capable to work in a team.
- 3. Ethically and socially responsible for the development of country and community.
- 4. Able to demonstrate entrepreneurship skills and lifelong learning for successful career.
- 5. Able to adapt themselves with new technological challenges in relevant field.

Programme Outcomes (POs)

After successful completion of ICD (DEC-CSME) program, student will be able to:

- 1. Apply technical skill to troubleshoot, repair, service & maintenance of electronic equipment's.
- 2. Use knowledge of science and humanities for personality development.
- 3. Demonstrate basic electronics engineering principles and conduct related experiments including programming skills.
- 4. Identify and analyze well-defined electronic engineering problems.
- 5. Use appropriate tools and techniques to solve well-defined electronic engineering problems systematically.
- 6. Assist in the design and development of engineering solutions.
- 7. Demonstrate technical skills in utilizing modern electronic engineering tools.
- 8. Communicate effectively with the engineering community and the society at large.
- 9. Demonstrate awareness for societal, health, safety, legal and cultural issues and the consequent responsibilities for sustainable development.
- 10. Develop entrepreneurship skills.
- 11. Understand professional ethics, responsibilities, and norms of electronic engineering practices.
- 12. Function effectively as an individual or in teams with leadership qualities.



Semester-I								
S.	Code No.	Course Title	Ho	urs p	er	Hour	Credits	
No				week		S		
			L	Т	Р			
1.	BSMA101	Mathematics-I	3	1	0	4	4	
2.	BSPH103	Applied Physics-I	2	1	0	3	3	
3.	BSCY105	Applied Chemistry	2	1	0	3	3	
4.	HSMH101	Communication Skills in English	2	0	0	2	2	
5.	BSPH107	Applied Physics-I Lab	0	0	2	2	1	
6.	BSCY109	Applied Chemistry Lab	0	0	2	2	1	
7.	HSMH105	Communication Skills in English Lab	0	0	2	2	1	
8.	ESME101	Engineering Graphics	0	0	2	2	1	
9.	ESWS103	Engineering Workshop Practice	0	0	4	4	2	
10.	HSSP103	Sports and Yoga	0	0	2	2	1	
		Total	9	3	14	26	19	
11.	QPE C101	Computing and Peripherals	0	0	8	8	01	
		Technician						

Study Scheme of Integrated Certificate Diploma Programme (CSME)

Semester-II								
S.	Code No.	Course Title	H	ours p	per	Hour	Credits	
No				week		S		
			L	Т	Р			
1.	BSMA102	Mathematics-II	3	1	0	4	4	
2.	BSPH104	Applied Physics-II	2	1	0	3	3	
3.	ESCS102	Introduction to IT Systems	2	0	0	2	2	
4.	ESEE104	Fundamentals of Electrical	2	0	0	2	2	
		Engineering						
5.	ESEC108	Fundamentals of Electronics	2	0	0	2	2	
		Engineering						
6.	ESME106	Engineering Mechanics	2	1	0	3	3	
7.	BSPH106	Applied Physics-II Lab	0	0	2	2	1	
8.	ESCS110	Introduction to IT Systems Lab	0	0	2	2	1	
9.	ESEE112	Fundamentals of Electrical	0	0	2	2	1	
		Engineering Lab						
10.	ESEC114	Fundamentals of Electronics	0	0	2	2	1	
		Engineering Lab						
11.	ESME116	Engineering Mechanics Lab	0	0	2	2	1	
		Total	13	3	10	26	21	
12.	QPEC102	Electronic Workshop Practice	0	0	8	8	1	



13.	EAA 102	Fractional credit course/Extra	-	-	-	-	1
		Academic Activity					(S/US)

Summer-I								
S.	Code No.	Course Title	Hours per			Hour	Credits	
No			week			S		
			L	Т	Р			
1.	QPEC103	Qualification Pack (6 Weeks) in	0	0	2	24	03	
	-	PCB Design Technician			4			

Semester-III								
S.	Code No.	Course Title	Hour	·s per	week	Hou	Credits	
No					-	rs		
			L	Т	P			
1.	PCEC201	Analog Electronics	3	1	0	4	4	
2.	PCEC203	Digital Electronics	2	1	0	3	3	
3.	PCEC205	Consumer Electronics	2	0	0	2	2	
4.	PCEC207	Network Theory	3	1	0	4	4	
5.	PCEC209	Analog Communication	2	1	0	3	3	
		Systems						
6.	PCEC211	Analog Electronics Lab	0	0	2	2	1	
7.	PCEC213	Digital Electronics Lab	0	0	2	2	1	
8.	PCEC215	Analog Communication System	0	0	2	2	1	
		Lab						
9.	AUCH201	Environmental Science	2	0	0	2	0(S/US)	
		Total	14	14 4 6		24	20	
10.	QPEC201	Consumer Electronics	0	0	8	8	1	
		Appliances Technician						
11.	EAA 201	Fractional credit course/ Extra	-	-	-	-	1(S/US)	
		Academic Activity						

Semester-IV								
S.	Code No.	Course Title	Hours per			Hour	Credits	
No			week			S		
			L	Т	Р			
1.	PCEC202	Fundamental of Microprocessors	2	1	0	3	3	
2.	PCEC204	Electromagnetic Field and Antenna	2	1	0	3	3	
		Systems						



3.	PCEC206	Industrial Electronics		1	0	3	3
4.	PCEC208	Linear Integrated Circuits	2	1	0	2	2
5.	PEEC202	PE-I	3	1	0	4	4
6.	OEEC202	OE-I	3	0	0	3	3
7.	PCEC210	Industrial Electronics Lab		0	2	2	1
8.	AUMH2	Essence of Indian Knowledge and		0	0	2	0(S/US)
	02	Tradition					
		Total	16	5	2	23	20
9.	QPEC202	Trouble Shooting &	0	0	0	08	01
		Maintenance of Electronics Equipment's			8		
10	EAA-202	Fractional credit course/Extra Academic Activity		-	-	_	1 (S/US)

		Summer-II					
S.	Code No.	Course Title	Hours per			Hour	Credits
No			week			S	
			L	Т	Р		
1.	TPID20	Summer Internship–II with	0	0	2	24	03
	2	OJT(4-6 weeks)			4		

Semester-V									
S. No	Code No.	Course Title	urse Title Hours per Hour week s				Credit s		
			L	Т	Р				
1.	HSMH301	Entrepreneurship and Start-ups	3	1	0	4	4		
2.	PCEC301	Fundamentals of Microcontrollers	3	0	0	3	3		
3.	PCEC303	Modern Communication Systems	2	1	0	3	3		
4.	PEEC301	PE-II	3	1	0	4	4		
5.	OEEC301	OE-II	3	0	0	3	3		
6.	PCEC305	Modern Communication Systems Lab	0	0	2	2	1		
7.	PREC30	Minor Project	0	0	4	4	2		
	1								
		Total	14	3	6	23	20		
8.	QPEC30	Electronic Hardware Design Technician	0	0	8	8	01		



	Semester-VI								
S.	Code No.	Course Title	Hours per			Hour	Credit		
NO				week	1	S	S		
			L	Т	P				
1.	AUMH3	Indian Constitution	2	0	0	2	0		
	02								
2.	PCEC302	Introduction to Python Programming	3	0	0	3	3		
3.	PEEC302	PE-III	3	1	0	4	4		
4.	PEEC304	PE-IV	3	1	0	4	4		
5.	OEEC302	OE-III	3	0	0	3	3		
6.	PCEC304	Python Programming Lab	0	0	2	2	1		
7.	PREC302	Major Project	0	0	8	8	4		
8.	SEEC30	Seminar	1	0	0	1	1		
	2								
		Total	15	2	10	27	20		
9.	QPEC30	Mobile Phone Hardware Repair	0	0	8	8	01		
	2	Technician							

P. K. Das



	Professional Elective-I							
Sr.No	Sub. Code	Subject Name						
1	PEEC-202A	Audio Video System						
2	PEEC-202B	Electronic Equipment Maintenance						
3	PEEC-202C	Computer Programming & Application						
Professional Elective-II								
Sr.No	Sub. Code	Subject Name						
1	PEEC-301A	Wireless Communication						
2	PEEC-301B	Service and Maintenance of Computers						
3	PEEC-301C	Signals and Control System						
		Professional Elective-III						
Sr.No	Sub. Code	Subject Name						
1	PEEC-302A	Electronic Measurements and Instrumentation						
2	PEEC-302B	Computer Networks						
3	PEEC-302C	Fundamentals of Internet of Things						
	Professional Elective-IV							
Sr.No	Sub. Code	Subject Name						
1	PEEC-304A	Microwave and Radar Engineering						
2	PEEC-304B	Optical Electronics						
3	PEEC-304C	Programming of Arduino and Interfacing						

List of Open Electives

	Open Elective-I									
Sr.No	Sub. Code	Subject Name								
1	OEEC-202A	Microprocessor and Applications								
2	OEEC-202B	Digital Logic Design								
3	OEEC-202C	Electronic Measurements & Instrumentation								
		Open Elective-II								
Sr.No	Sub. Code	Subject Name								
1	OEEC-301A	Principle of Communication Engineering								
2	OEEC-301B	Introduction to Python Programming								
3	OEEC-301C	Wireless Communication								
		Open Elective-III								
Sr.No	Sub. Code	Subject Name								
1	OEEC-302A	Optical Electronics								
2	OEEC-302B	Programming of Arduino and Interfacing								
3	OEEC-302C	Internet of Things and Applications								



Course Code	Definitions
L	Lecture
Т	Tutorial
Р	Practical
HS	Humanities & Social Sciences Courses
BS	Basic Science Courses
ES	Engineering Science Courses
PC	Program Core Courses
PE	Program Elective Courses
OE	Open Elective Courses
AU	Audit Courses
SI	Summer Internship
PR	Project
SE	Seminar

XX	EE (Electrical engineering)
	IE (Instrumentation Engineering)
	EC (Electronics & Communication Engineering)
	CS (Computer Science & Engineering)
	CH (Chemical Engineering)
	ME (Mechanical Engineering)
	FT (Food Technology)
	PH (Physics)
	CY (Chemistry)
	MA (Mathematics)
	MH (Management & Humanities)
	SP (Sports)

PCXX- YZZ Y-stands for year code 1, 2 or 3 ZZ- odd for odd semester subject e.g. 101, 103, 201, 305 etc. ZZ-Even for even semester subject e.g. 102, 112, 202, 306 etc

Department of Electronics & Communication Engineering

P. K. Das



SUMMARY

Table 1: Work	Table 1: Working weeks, days and hours in a semester											
Semester Working Weeks / Working days/ Working Hours/ Hours/ seme												
	Semester Week Day											
Odd	Odd 15 5 8 600											
Even	15	5	8	600								

Table 2: Relation of credits and hours in a week										
Description	Credits	Hours/ week								
Theory/ Tutorial	1	1								
Laboratory (Practical)	1(2)	2(3/4)								
Qualification Pack	1	8								

Odd Semester		Even Semester				
Semester	Credit	Semester	Credit			
1	20	2	22	42		
3	21	4	21	42		
5	21	6	21	42		
				126		
		Summer-I	03	03		
		Summer-II	03	03		
				132		

Department of Electronics & Communication Engineering

P. K. Das

Fundamentals of Electronics EngineeringLCredits2002Sessional Marks50End Semester Examination Marks50The course intends to provide the basic concepts and characteristics of the electronics devices such as diode, BJT, FET, etc. Also aims to provide the understanding application of different electronics devices and simple circuits.CourseObjectives:Course intends to provide the basic concepts and characteristics of the electronics devices such as diode, BJT, FET, etc. Also aims to provide the understanding application of different electronics devices and simple circuits.CourseCourse intends to understand working of various semiconductor devices.3. Acquire knowledge about active and passive electronic circuits.Mapping of course outcomes with program outcomesWapping of course outcomes with program outcomesWapping of course outcomes with program outcomesVoltage and current sources.401 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO1 PO1 PO1 PO12CO3 3 3 3 1 1 1 1 0 1 0 0 2 1CO4 3 3 3 2 1 3 0 1 0 0 0Outcomes:Unit-IVoltage and current sources.VulteIOutcomesPO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1 PO1	ESEC-108												
$\begin{tabular}{ c c c c c c } \hline l c c c c c c c c c c c c c c c c c c c$				Fu	indame T	entals of	f Electr	onics E	nginee	ring D		Cradit	
Sessional Marks50Sessional Marks50End Semester Examination Marks50Course objectives:The course intends to provide the basic concepts and characteristics of the understanding application of different electronics devices and simple circuits.Course Outcomes:I. To acquire knowledge about semiconductor physics for intrinsic and extrinsic materials.Course Outcomes:I. To acquire knowledge about semiconductor physics for intrinsic and extrinsic materials.Course outcomes with program outcomesOther PO1 <td></td> <td></td> <td></td> <td></td> <td><u>L</u> 2</br></td> <td></td> <td></td> <td colspan="3"></td> <td colspan="3">2</td>					<u>L</u> 						2		
End Semester Examination Marks 50 End Semester Examination Marks 50 Course Objectives: The course intends to provide the basic concepts and characteristics of the electronics devices such as diode, BJT, FET, etc. Also aims to provide the understanding application of different electronics devices and simple circuits. Course Outcomes: 1. To acquire knowledge about semiconductor physics for intrinsic and extrinsic materials. 2. Able to understand working of various semiconductor devices. 3. Acquired knowledge about active and passive electronic circuits. Mapping of course outcomes with program outcomes Mapping of course outcomes with program outcomes PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO1 PO12 CO2 3 3 1 1 1 0 0 2 1 CO2 3 3 2 1 1 0			Sessio	nal Ma	rks			0		0		50	
Course The course intends to provide the basic concepts and characteristics of the electronics devices such as diode, BJT, FET, etc. Also aims to provide the understanding application of different electronics devices and simple circuits. Course Into acquire knowledge about semiconductor physics for intrinsic and extrinsic materials. 2. Able to understand working of various semiconductor devices. 3. Acquired knowledge about active and passive electronic circuits. Mapping of course outcomes with program outcomes PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1			End S	Semeste	r Exan	ninatior	Mark	5				<u> </u>	
Objectives: Introduction methods of a diode, BJT, FET, etc. Also aims to provide the understanding application of different electronics devices and simple circuits. Course Outcomes: 1. To acquire knowledge about semiconductor physics for intrinsic and extrinsic materials. 2. Able to understand working of various semiconductor devices. 3. Acquired knowledge about active and passive electronic circuits. Mapping of course outcomes with program outcomes PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO1 PO12 CO2 3 3 1 1 3 1 1 0 0 2 1 CO1 3 3 1 1 1 1 0 0 2 1 CO2 3 3 1 1 1 0 0 0 0 0 CO3 3 1 1 1 0 <t< td=""><td>Cours</td><td>e</td><td>The o</td><td>course</td><td>intends</td><td>to pro</td><td>vide th</td><td>e basic</td><td>concer</td><td>nts and</td><td>charact</td><td>teristics</td><td>of the</td></t<>	Cours	e	The o	course	intends	to pro	vide th	e basic	concer	nts and	charact	teristics	of the
Objective Inderstanding application of different electronics devices and simple circuits. Course Outcomes: 1. To acquire knowledge about semiconductor physics for intrinsic and extrinsic materials. 2. Able to understand working of various semiconductor devices. 3. Acquired knowledge about active and passive electronic components, voltage and current sources. 4. Able to understand the working principles of basic electronic circuits. Mapping of course outcomes with program outcomes PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO12 CO2 3 3 1 1 3 1 1 0 0 2 1 CO3 3 1 1 1 0	Objec	tives:	electro	onics d	evices	such as	diode.	BJT	FET. e	tc. Also	aims	to prov	vide the
Course Outcomes: 1. To acquire knowledge about semiconductor physics for intrinsic and extrinsic materials. 2. Able to understand working of various semiconductor devices. 3. Acquired knowledge about active and passive electronic components, voltage and current sources. 4. Able to understand the working principles of basic electronic circuits. Mapping of course outcomes with program outcomes PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO1 PO12 CO1 3 3 1 1 3 1 1 0 2 1 CO2 3 3 3 2 1 1 0 0 0 1 CO2 3 3 3 2 1 3 0 1 0 0 0 0 CO4 3 3 2 1 3 0 1 0	Objee		under	standing	applic	ation of	differe	nt electr	onics d	evices a	nd simp	le circu	its.
Outcomes:extrinsic materials.Image: component structure in the structure	Cours	e	1.	To ac	guire k	nowled	ge abo	ut semi	conduc	tor phy	sics for	r intrin	sic and
2. Able to understand working of various semiconductor devices. 3. Acquired knowledge about active and passive electronic components, voltage and current sources. 4. Able to understand the working principles of basic electronic circuits. Mapping of course outcomes with program outcomes Mapping of course outcomes with program outcomes Mapping of course outcomes with program outcomes OOI PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO1 PO12 CO1 3 3 1 1 1 0 0 2 1 CO2 3 3 1 1 1 0 0 0 0 0 CO3 3 3 1 1 0 1 0 <td< td=""><td>Outco</td><td>mes:</td><td></td><td>extrins</td><td>ic mate</td><td>rials.</td><td>0</td><td></td><td></td><td>1 2</td><td></td><td></td><td></td></td<>	Outco	mes:		extrins	ic mate	rials.	0			1 2			
3. Acquired knowledge about active and passive electronic components, voltage and current sources.4. Able to understand the working principles of basic electronic circuits.Mapping of course outcomes with program outcomesMapping of course outcomes with program outcomesPO1 PO1 PO1 PO1 PO1 PO1 PO1PO1 PO1 PO1 PO1 PO1 PO1 PO1COI 3 3 3 1 1 1 1 3 1 1 0 0 0 2 1COI 3 3 3 1 3 3 1 0 1 0 0 0 0 0Outlies 1 0 0 0 0 <t< td=""><td></td><td></td><td>2.</td><td>Able to</td><td>o unders</td><td>stand wo</td><td>orking c</td><td>of variou</td><td>ıs semic</td><td>conducto</td><td>or devic</td><td>es.</td><td></td></t<>			2.	Able to	o unders	stand wo	orking c	of variou	ıs semic	conducto	or devic	es.	
$\begin{tabular}{ c c c c c c c } \hline Voltage and current sources. \hline $$ Voltage and current sources with program outcomes $$ Vilce $$ Voltage and $$ Correst outcomes with program outcomes $$ Vilce $$ Voltage $$ PO9$ PO1 PO1 PO1 PO1 $$ PO1 $$$			3.	Acquir	ed kno	wledge	about	active	and pa	assive e	lectroni	c comp	onents,
4. Able to understand the working principles of basic electronic circuits.Mapping of course outcomes with program outcomesPO1PO2PO3PO4PO5PO6PO7PO8PO9PO1PO1PO1PO12CO1331113110021CO2333111010021CO333131100000CO433213010000Unit-I0100000000CO4332130100 <td></td> <td></td> <td></td> <td>voltage</td> <td>e and cu</td> <td>rrent so</td> <td>urces.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>				voltage	e and cu	rrent so	urces.						
$\begin{tabular}{ c c c c c c } \hline PO1 & PO2 & PO3 & PO4 & PO5 & PO6 & PO7 & PO8 & PO9 & PO1 & PO1 & PO12 \\ \hline PO1 & PO2 & PO3 & PO4 & PO5 & PO6 & PO7 & PO8 & PO9 & PO1 & PO1 & PO12 \\ \hline CO1 & 3 & 3 & 1 & 1 & 1 & 3 & 1 & 1 & 0 & 0 & 2 & 1 \\ \hline CO2 & 3 & 3 & 3 & 3 & 3 & 2 & 1 & 1 & 0 & 0 & 0 & 0 \\ \hline CO3 & 3 & 3 & 1 & 3 & 1 & 1 & 0 & 1 & 0 & 0 & 0 & 0 \\ \hline CO4 & 3 & 3 & 3 & 2 & 1 & 3 & 0 & 1 & 0 & 0 & 0 & 0 \\ \hline CO4 & 3 & 3 & 3 & 2 & 1 & 3 & 0 & 1 & 0 & 0 & 0 & 0 \\ \hline CO4 & - & Unit-I & - & Unit-I & 0 & 0 & 0 & 0 & 0 \\ \hline CO4 & - & Unit-I & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & $			4.	Able to	o unders	stand the	e worki	ng princ	iples of	basic e	lectroni	c circuit	s.
$\begin{array}{ c c c c c c } \hline PO1 & PO2 & PO3 & PO4 & PO5 & PO6 & PO7 & PO8 & PO9 & PO1 & PO1 & PO12 \\ \hline 0 & 1 & 0 & 0 & 2 & 1 \\ \hline CO1 & 3 & 3 & 1 & 1 & 1 & 3 & 1 & 1 & 0 & 0 & 3 & 2 \\ \hline CO2 & 3 & 3 & 3 & 1 & 3 & 1 & 1 & 0 & 1 & 0 & 0 & 0 & 0 \\ \hline CO4 & 3 & 3 & 3 & 2 & 1 & 3 & 0 & 1 & 0 & 0 & 0 & 0 \\ \hline CO4 & 3 & 3 & 3 & 2 & 1 & 3 & 0 & 1 & 0 & 0 & 0 & 0 \\ \hline \hline$		1	N	Aappin	g of cou	irse out	tcomes	with pr	ogram	outcom	es	1	т
CO1331113110021CO2333332110032CO3331311010000CO4333213010000CO4333213010000CO4333213010000Unit-I10 hrs.Active and Passive Components: Introduction to active and passive components; fixed and variable resistances, their various types fixed and variable capacitors, their various types and important specifications and color codes.Voltage and current sources – concept of constant voltages and constant current sources, symbol and graphical representation, characteristics of ideal and practical sources.Voltage and current sources – concept of constant voltages and constant current sources, symbol and graphical representation, characteristics of ideal and practical sources.Introduction: Classification of materials into conductors, semi-conductors, and insulators, atomic structure of Germanium and Silicon semi-conductors; intrinsic and extrinsic semiconductors, mass action law, diffusion, and drift currents.14Mrs.Semiconductor Diodes: PN junction, basic principles of operation and VI characteristics of PN junction diode, static and dynamic resistance of		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO12
COI331113110021CO2333332110032CO3331311010000CO4333213010000CO4333213010000Unit-IActive and Passive Components: Introduction to active and passive components; fixed and variable resistances, their various types fixed and variable capacitors, their various types and important specifications and color codes.Voltage and current sources – concept of constant voltages and constant current sources, symbol and graphical representation, characteristics of ideal and practical sources.Unit-II10 hrs.Introduction: Classification of materials into conductors, semi-conductors, and insulators, atomic structure of Germanium and Silicon semi-conductors; intrinsic and extrinsic semiconductors, mass action law, diffusion, and drift currents.Voltage Internet Diodes: PN junction, basic principles of operation and VI characteristics of PN junction diode, static and dynamic resistance of a diode. Use of a diode in rectifiers, half wave, full wave and bridge rectifier with shunt capacitor filter, series inductor filter, Zener diode and its applications, as a voltage regulator, light emitting diode (LED).	601										0	1	
CO2333332110032CO3331311010000CO4333213010000CO4333213010000Unit-I10 hrs.Active and Passive Components: Introduction to active and passive components; fixed and variable resistances, their various types fixed and variable capacitors, their various types and important specifications and color codes.Voltage and current sources – concept of constant voltages and constant current sources, symbol and graphical representation, characteristics of ideal and practical sources.Unit-II10 hrs.Introduction: Classification of materials into conductors, semi-conductors, and insulators, atomic structure of Germanium and Silicon semi-conductors; intrinsic and extrinsic semiconductors, mass action law, diffusion, and drift currents.Semiconductor Diodes: PN junction, basic principles of operation and VI characteristics of PN junction diode, static and dynamic resistance of a diode. Use of a diode in rectifiers, half wave, full wave and bridge rectifier with shunt capacitor filter, series inductor filter, Zener diode and its applications, as a voltage regulator, light emitting diode (LED).	COI	3	3	1	1	1	3	1	1	0	0	2	1
CO3 3 3 1 3 1 1 0 1 0 0 0 0 CO4 3 3 3 2 1 3 0 1 0 0 0 0 0 CO4 3 3 3 2 1 3 0 1 0 0 0 0 0 CO4 3 3 3 2 1 3 0 1 0 0 0 0 0 0 0 Contents: Introduction to active and passive components; fixed and variable resistances, their various types fixed and variable capacitors, their various types and important specifications and color codes. Voltage and current sources – concept of constant voltages and constant current sources, symbol and graphical representation, characteristics of ideal and practical sources. Introduction: Classification of materials into conductors, semi-conductors, and insulators, atomic structure of Germanium and Silicon semi-conductors; intrinsic and extrinsic semiconductors, mass action law, diffusion, and drift currents. 10 hrs. Semiconductor Diodes: PN junction, basic principles of operation and VI characteristics of PN junction diode, static and dynamic resistance of a diode. Use of a diode in rectifiers, half wave, full wave and	CO2	3	3	3	3	3	2	1	1	0	0	3	2
CO4 3 3 2 1 3 0 1 0 0 0 0 Unit-I 10 hrs. Active and Passive Components: Introduction to active and passive components; fixed and variable resistances, their various types fixed and variable capacitors, their various types and important specifications and color codes. Voltage and current sources – concept of constant voltages and constant current sources, symbol and graphical representation, characteristics of ideal and practical sources. Voltage and current sources – concept of conductors, semi-conductors, and insulators, atomic structure of Germanium and Silicon semi-conductors; intrinsic and extrinsic semiconductors, mass action law, diffusion, and drift currents. 10 hrs. Introductor Diodes: PN junction, basic principles of operation and VI characteristics of PN junction diode, static and dynamic resistance of a diode. Use of a diode in rectifiers, half wave, full wave and bridge rectifier with shunt capacitor filter, series inductor filter, Zener diode and its applications, as a voltage regulator, light emitting diode (LED).	CO3	3	3	1	3	1	1	0	1	0	0	0	0
Unit-I10 hrs.Active and Passive Components: Introduction to active and passive components; fixed and variable resistances, their various types fixed and variable capacitors, their various types and important specifications and color codes.Voltage and current sources – concept of constant voltages and constant current sources, symbol and graphical representation, characteristics of ideal and practical sources.Unit-II10 hrs.Introduction: Classification of materials into conductors, semi-conductors, and insulators, atomic structure of Germanium and Silicon semi-conductors; intrinsic and extrinsic semiconductors, mass action law, diffusion, and drift currents.Lunit-III14 hrs.Semiconductor Diodes: PN junction, basic principles of operation and VI characteristics of PN junction diode, static and dynamic resistance of a diode. Use of a diode in rectifiers, half wave, full wave and bridge rectifier with shunt capacitor filter, series inductor filter, Zener diode and its applications, as a voltage regulator, light emitting diode (LED).	CO4	3	3	3	2	1	3	0	1	0	0	0	0
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important specifications and color codes. Voltage and current sources – concept of constant voltages and constant current sources, symbol and graphical representation, characteristics of ideal and practical sources. Unit-II 10 hrs. Introduction: Classification of materials into conductors, semi-conductors, and insulators, atomic structure of Germanium and Silicon semi-conductors; intrinsic and extrinsic semiconductors, mass action law, diffusion, and drift currents. Unit-III 14 Mrs. Semiconductor Diodes: PN junction, basic principles of operation and VI characteristics of PN junction diode, static and dynamic resistance of a diode. Use of a diode in rectifiers, half wave, full wave and bridge rectifier with shunt capacitor filter, series inductor filter, Zener diode and its applications, as a voltage regulator, light emitting diode (LED).	variab	le resist	ances,	their va	rious ty	ypes fix	ked and	variabl	le capao	citors, the	heir var	ious ty _l	pes and
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symbol and graphical representation, characteristics of ideal and practical sources. Unit-II Io hrs. Introduction: Classification of materials into conductors, semi-conductors, and insulators, atomic structure of Germanium and Silicon semi-conductors; intrinsic and extrinsic semiconductors, mass action law, diffusion, and drift currents. Image:	Voltag	ge and c	urrent	sources	s - conc	ept of c	onstant	voltage	s and co	onstant o	current s	sources,	
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action law, diffusion, and drift currents. 14 <u>Unit-III</u> 14 hrs. 14 Semiconductor Diodes: PN junction, basic principles of operation and VI characteristics of PN junction diode, static and dynamic resistance of a diode. Use of a diode in rectifiers, half wave, full wave and bridge rectifier with shunt capacitor filter, series inductor filter, Zener diode and its applications, as a voltage regulator, light emitting diode (LED).	structu	re of Ge	ermaniu	m and S	Silicon s	semi-co	nductor	s: intrin	sic and	extrinsi	e semico	onductor	rs. mass
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wave and bridge rectifier with shunt capacitor filter, series inductor filter, Zener diode and its applications, as a voltage regulator, light emitting diode (LED).	junctio	on diode	, static a	and dvn	amic re	sistance	of a die	ode. Use	of a di	ode in re	ectifiers	, half wa	ave, full
applications, as a voltage regulator, light emitting diode (LED).	wave	and brid	lge rect	ifier wi	th shur	t capac	itor filt	er, serie	es induc	ctor filte	er, Zene	r diode	and its
	applica	ations, a	s a volt	age regi	ulator, li	ight emi	itting di	ode (LE	ED).		-		



Study Scheme for Integrated Certificate and Diploma (DEC-CSME) Programme

	<u>Unit-IV</u> 14									
Transistors: Introduction of BJT	Transistors: Introduction of BJT, working of PNP and NPN transistor, input and output characteristics									
of transistor configurations, amplit	fying action of a transistor, comparis	son of diffe	rent configurations, JFET							
and MOSFET, their characteristics	s and applications.									
RECOMMENDED BOOKS										
Title	Author	Publishe	r							
1. Basic Electronics and Linear	N N Bhargava and Kulshreshta	McGraw	Hill							
Circuits										
2. Electronics Devices and	Millman and Halkias	McGraw	Hill							
Circuits										

Department of Electronics & Communication Engineering

P. K. Das

Fundamentals of Left for the Left forms LabLTPCredits0021Sessional Marks50End Semester Examination Marks50CourseObjectives:To reinforce learning through hands-on experience by examining the electrical characteristics of various semiconductor devices, such as diodes, BJTs and FETs. To provide the student with the capability to measure and record the experimental data, analyze the results of various semiconductor devices.CourseOutcomes:1.To understand the functioning of various electronic instruments like CRO, signal generator and multimeter.2.To understand the characteristics of semiconductor devices and verify their responses.3.To construct various electronic circuits on the bread board and analyses their output.Wapping of course outcomes with program outcomesVolt PO2PO3PO4PO5PO6PO7PO8PO9PO1PO1PO1CO2 33322013210Co2 33To calculate the value of various passive electronic components.2To understand the function of different passive electronic components.1CourseMapping of course outcomes with program outcomesCO2 <th colsp<="" th=""><th colspan="10">ESEC-114 Fundamentals of Fleatronics Engineering Lab</th></th>	<th colspan="10">ESEC-114 Fundamentals of Fleatronics Engineering Lab</th>	ESEC-114 Fundamentals of Fleatronics Engineering Lab											
Image: Construct various semiconductor devices, such as diodes, BJTs and FETs. To provide the student with the capability to measure and record the experimental data, analyze the results of various semiconductor devices, such as diodes, BJTs and FETs. To provide the student with the capability to measure and record the experimental data, analyze the results of various semiconductor devices. Course Outcomes: 1. To understand the functioning of various electronic instruments like CRO, signal generator and multimeter. 2. To understand the characteristics of semiconductor devices and verify their responses. 3. To construct various electronic circuits on the bread board and analyses their output. Mapping of course outcomes with program outcomes PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO1 PO1 CO1 3 0 3 3 2 2 0 1 3 2 1 0 CO2 3 3 3 2 2 0 1 3 2 1 2 CO3 3 3 0 3 2 2 0 1 3 2 1 2 CO2 3 3 3 3 <t< th=""><th></th><th><u>r unc</u></th><th></th><th>ais of <u>e</u>. F</th><th>lectron</th><th></th><th>neerinş</th><th>z Lad</th><th>Cre</th><th>dits</th><th></th></t<>		<u>r unc</u>		ais of <u>e</u> . F	lectron		neerinş	z Lad	Cre	dits			
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End Semester Examination Marks 50 Course Objectives: To reinforce learning through hands-on experience by examining the electrical characteristics of various semiconductor devices, such as diodes, BJTs and FETs. To provide the student with the capability to measure and record the experimental data, analyze the results of various semiconductor devices. Course Outcomes: 1. To understand the functioning of various electronic instruments like CRO, signal generator and multimeter. 2. To understand the characteristics of semiconductor devices and verify their responses. 3. To construct various electronic circuits on the bread board and analyses their output. Mapping of course outcomes with program outcomes PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO1 PO1 CO2 3 3 3 2 2 0 1 3 2 1 2 CO3 3 3 2 2 0 1 3 2 1 0 CO2 3 3 0 3 2 2 0 1 3 2 1 0 CO3 3 3 2 2 0 1 3	Ses	sional Mar	·ks	·					50	50			
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Analog Electronics												
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Cours	This subject intends to teach operating principles and application of electronic											
Objec	ctives:	circuit	ts and o	levices	like dif	fferent	types of	f ampli	fiers, a	nd oscil	lators a	nd their
		applic	ations.									
Cours	se	1. Un	derstar	nd the c	oncept	and app	plication	ns of B.	JT and	FET.		
Outco	ome:	2. Un	derstar	nd the c	oncept	of amp	lificatio	on, oper	ating p	oint, D	C load l	ine, and
		am	plifier.									
		3. Un	derstar	nding tl	he conc	ept of	multist	age am	plifiers	and va	arious o	coupling
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		4. Kn	lowing	the con	ncept of	feedba	ck circu	uits, osc	illators	s, and tu	ined am	plifiers.
	DOI	M	apping	g of cou	Irse out	tcomes	with p	rogran	1 outco	mes	DO1	DO10
	POI	PO2	PO	PO4	P05	PO6	PO7	PO8	PO9	POI		POI2
CO1	1	3	3	3	1	2	1	1	2	<u> </u>	1	1
$\frac{CO1}{CO2}$	2	3	3	1	1	1	3	2	3	3	1	1
CO2	2	3	3	3	3	3	3	1	1	1	2	2
CO4	1	3	3	3	3	2	3	1	1	2	3	1
				Un	it-I		-					12 hrs.
BJT equati line, s self-bi	c haract ons of l tability ias for F	eristics BJT, rel factor, BJT, bia	and l ationsl biasing	Biasing nip amo g techni pensatio	: Princ ong α, β ques – on, ther	iple of , and γ. fixed b nal run	transis need ias, coll away.	tor as s for bias lector to	witch ing, op base l	and am erating pias, vo	plifier, point, l ltage di	Current DC load vider or
				Uni	t-II							12hrs.
Single	e stage	amplif	iers: G	raphica	l demo	nstratio	on of Si	ingle st	age am	plifier,	phase 1	eversal,
DC &	AC eq	uivalent	t circui	t, Load	line, A	nalysis.	Classi	fication	of am	olifier, (Concep	t of gain
and ba	andwidt	h, Tran	sistor a	mplifie	er circu	it as tw	o-port	network	, hybri	d paran	neter m	odel for
transis	stor amp	olifier.		1			1		•	1		
FET :	amplifi	er: JFE	ET and	its typ	es, cha	racteris	tics of	JFET,	small s	signal n	nodel c	of JFET,
biasin	g for JF	ET, JFI	ET as a	n ampl	ifier							
				<u>Unit</u>	t-III							12hrs.
Multi	stage a	mplifie	rs: Cha	aracteri	stics of	Cascad	led Am	plifier,	Gain in	Decibe	els, Sele	ection of
an Ar	nplifier	Config	guration	n for C	Cascade	Conne	ction,	Method	ls of C	oupling	g in Mu	ıltistage
Ampli	ifiers, 1	RC Co	upled	Ampli	fiers, T	ransfor	mer C	Coupled	Ampl	ifier, I	Direct (Coupled
Ampli	ifiers, C	Compari	son of	Differe	nt Coup	oling Te	echniqu	les.				_
Feedb	oack A	mplifie	r: Feed	dback p	orincipl	e, posit	tive, ne	egative	feedba	ck, and	their t	features,
advan	tages of	fnegativ	ve feed	back, to	opologie	es of fee	edback-	voltag	e series	, voltag	e shunt	, current
series,	, and cu	rrent sh	unt									
				Unit	t-IV							12hrs.

Oscillator: Introduction and types of an oscillator, Barkhausen Criterion, RC oscillators – RC phase shift and Wein bridge, LC oscillator- Hartley and Colpitts, Crystal oscillator. **Power and tuned amplifier:** Introduction to large signal amplifier, Difference Between Voltage Amplifier and Power Amplifier, Power Amplifiers, Power Amplifier types, Comparison of Amplifier Classes, Class-A, Class-B, Class-C, and Class-D Power Amplifier, Concept of tuned amplifier.

RECOMMENDED BOOKS									
Title	Author	Publisher							
1. Principle of Electronics	V K Mehta, Rohit	S Chand							
	Mehta								
2. Electronic Principles	A.P. Malvino	Tata McGraw Hill							
3. Electronic Devices and Circuits	S. Salivahanan , N.	Tata McGraw Hill							
	Sereshkumar								

Department of Electronics & Communication Engineering

P. K. Das



					P	CEC-2	03					
		r		_	Digita	al Elect	ronics	1				
				L			T		P		Cr	edits
		. .	1.8.7	2			1		0			3
		Sessio	nal Ma	rks								50
		End S	emester	r Exam	ination	Marks					;	50
		This c	ourse w	ill provi	de the 11	ntroduct	tion of th	ne basic	princip	les, char	acterist	ics and
C		operations of a digital system. Next focus is to give the detail description about									1 about	
Cours	e	Boolea	an algeb	ra and t	he vario	ous meth	nods of I	Boolean	functio	n reduct	tion, des	signing
Objec	tives:	ofcom	binatio	nal circu	uits by u	ising log	gic gates	, design	and ana	alyses of	asynch	ronous
		and sy	nchron	ous seq	uential	Circuits	s using	flip flo	ps and	at last	to und	erstand
		princip	ole of op	peration	of shift	resistor	s and D	/A an A	/D conv	verters.		
		1. Lea	rn to ap	ply Boo	lean lav	ws/K-M	ap-meth	od metł	nod to re	educe a	given B	oolean
		functio	on.									
Cours	е	2. Able	e to desi	gn & re	alize con	mbinatio	onal logi	ic circui	ts using	logic ga	tes for	various
Outco	mes:	pract	tical apr	olication	IS.		e		C	0 0		
		3. Abl	e to den	nonstrat	e the op	eration	of flip-f	lops. co	unters.	and shift	t registe	ers.
		4 . Abl	e to und	erstand	various	A/D an	d D/A c	onverte	rs.		0	
		N	Aappin	g of cou	rse out	comes v	with pro	ogram (outcome	es		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1
	101	102	100	101	100	100	107	100	107	0	1	2
CO1	3	3	3	1	2	1	1	1	1	0	2	2
CO2	3	3	2	1	1	1	2	1	1	0	3	2
CO3	3	3	3	3	2	2	2	1	1	0	3	2
CO4	3	3	3	1	3	2	2	1	1	0	3	2
					Unit-l	Γ						10
T ()		D '	1:00	1 .		-	1 1	<u>a' 1</u>	1.		1 4 1	hrs.
Introd	uction:	Basic (different	ce betw	een ana	log and	digital	Signals,	, applica	ations ar	id Adva	intages
OI Dig Review	nai Sigi v of nu	mber s	jital System•	Decima	1 Rinar	applicati v Octa	ioii. Land he	evadeci	mal nur	nher svo	tem ar	d their
inter-c	onversi	ons Sig	ystem. oned a	nd uns	ioned	number	Rinar	v oper	ations-	addition	Subtr	action
Multip	lication	and di	vision: l	Excess 3	B code. (Grav co	de. and	ASCII o	code.	<i>i</i> uunnon,		action,
1		,)		Unit-I	Ī)					12 hrs.
Logic	gates: I	Definitio	ons, sym	bols, an	d truth t	table of	NOT, O	R, ANE), NANI	D, NOR	, XOR,	XNOR
gates,	De-Mor	gan's th	eorems	, realiza	tion of b	basic ga	tes using	g univer	sal gate	s; realiza	ation of	simple
Boolea	an equat	ions usi	ng univ	ersal ga	tes, intr	oduction	n to k-m	ap (up t	to 4 vari	ables).		
Comb	ination	al Circ	uits: C	ombina	tional c	circuit d	lesign,	adders,	subtrac	ctor, co	de conv	verters,
multip	lexers, o	lemultip	plexer, e	encoders	s and de	coders.						



<u>Unit-III</u>			16 hrs.								
Sequential Circuits: Introduction, Logic dia	gram, truth table, timing	g diagram and	operation of								
following latches and flip flops, NOR latch, N.	following latches and flip flops, NOR latch, NAND latch, RS, T, D, and JK, Master / Slave JK flip										
flops. Operation using waveforms and truth tables of RS, T, D, and Master/Slave JK flip flops.											
Counters: Introduction to Asynchronous and Synchronous counters, Binary counters, Divide by N											
ripple counters, Up/down counter, Ring counter	er with timing diagram.	-	-								
Shift Resistors: Introduction, Serial in parallel	out, serial in serial out, p	oarallel in seria	l out, parallel								
in parallel out.	-		-								
Unit-IV 10 hrs.											
A/D and D/A converters: Binary Weighted D	A/D and D/A converters: Binary Weighted D/A converter, R/2R ladder D/A converter, Stair step										
Ramp A/D converter, Dual Slope A/D convert	er, Successive Approxim	nation A/D Con	nverter.								
RECOMM	ENDED BOOKS										
Title	Author	Publish	ner								
1. Fundamentals of Digital Electronics	A. Anand Kumar	PHI 2 nd Editi	on								
2. Digital Electronics	R P Jain	McGraw Hi 4 th Edition	ll Education								
3. Digital Logic Designs	Morris Mano	PHI 5 th Edition	on								
4. Digital Systems: Principles and Applications	R J Tocci	PHI 10 th Edit	ion								

P. K. Das

Dilip Kumar

J. S. Ubhi



	PCEC-205												
Consumer Electronics													
]	Ĺ			<u>T P</u>			(Credits		
			,	2			0 0			2			
		Session	1al Mar	·ks						50			
		End Se	emester	Exami	nation I	Marks					50		
Cours	e	The co	urse ain	n is to ir	ntroduce	studen	ts about	workin	g princi	ple of va	arious ty	pes of	
Objec	tives:	microp	hones a	nd loud	speakers	s. Furthe	er this su	ıbject w	ill intro	duce the	e studen	ts with	
		workin	g princi	iples of	audio a	and vide	eo recor	ding sy	stems.	An intro	oduction	about	
		satellite	e and c	able TV	⁷ is give	en. At 1	last wor	king pr	inciple,	block a	liagram	, main	
	features of consumer electronics gadgets/goods/devices have been presented.												
Cours	e	1.	Acquir	ed know	ledge of	f variou	s types	of micro	ophones	and lou	dspeake	ers.	
Outco	me:	2.	Learn v	various s	stages of	f Public	Addres	s systen	ns.		-		
		3.	Acquir	ed knov	wledge	of wo	rking r	orinciple	e of va	arious a	applicati	ion of	
			electron	nics.	U		0 1	1					
		4.	Unders	tand me	rits and	demerit	ts of vari	ious Dis	play TV	/'s like I	LCD, LE	ED and	
HD- TV's.													
	Mapping of course outcomes with program outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	
	_	_		_						0	1	2	
CO1	3	3	3	0	0	0	0	0	0	0	0	0	
CO2	0	3	3	0	0	0	0	0	0	0	0	0	
CO3	0	3	3	3	0	0	0	0	0	0	0	0	
CO4	3	3	3	0	0	0	0	0	0	0	0	0	
				Un	it-I						1	12 hrs.	
Audio	System	n: Micro	ophone,	Constr	uction, v	working	g, princi	ples, an	d appli	cation o	f micro	phone:	
carbon	, movir	ng coil.	velocity	, crystal	l, conde	nser typ	be, cord	less mic	rophon	e, louds	peakers,	direct	
radiati	ng, hori	n loaded	, woofe	r, tweete	er, mid-1	range, n	nulti-spe	eaker sy	stem, ba	affles, ar	nd enclo	sures.	
				Uni	<u>t-II</u>							12hrs.	
Sound	Recor	der: S	ound R	ecordin	g on ma	agnetic	tape, its	s princi	ples, bl	ock diag	gram an	d tape	
transpo	ort mee	hanism.	Digital	sound	recordir	ng on ta	ape and	disc. C	D syste	em and	DVD F	ormat.	
CD/D	VD nlav	vers and	record	ers Hi_	Fi syste	m nre-	amplifie	ere ami	lifiers	and equ	alizers	Stereo	
CD/D	v D pia.	yers and		cis, 111-	11 Syste	m, pre-	ampiin	.15, amp		ana equ	alizers,	Stereo	
ampin	iers.												
				Unit	t-III						1	2 hrs.	
Satellite TV and Cable TV: Principles of satellite TV system, Frequency allocation of S, C and													
KV band, up-link, and down-link frequencies. Block diagram and working principle of TVRO													
receive	receiver (TV receiving only).												
Cable	TV: I	Block D	iagram	and Prin	nciples	of work	king of (Cable T	'V and	DTH, ca	able TV	using	

Cable TV: Block Diagram and Principles of working of Cable TV and DTH, cable TV using Internet.



TMH, New Delhi India

R. G. Gupta

2. Audio Video Systems

	12 hrs.										
Application: Basic block diagram, working principles and application of Digital watch /clock,											
Calculator, Washing machine, Microwave ovens, Mobile handset, Digital camera, DTH, Electronic											
ignition system for automobil	es.										
	RECOMMEN	DED BOOKS									
Title	Author	Pu	blisher								
1. Audio Visual Systems	Saniav Attri	BPB Pul	olishers New Delhi								

Department of Electronics & Communication Engineering

P. K. Das

]	PCEC-20)7					
Network Theory												
				[]		Т			Р		Cred	its
			ĺ	3		1			0		4	
		Session	al Mark	KS							50	
		End Se	mester l	Examina	ation M	arks					50	
Course)	The sul	oject ain	ns to pr	ovide tl	he studer	nt with a	an under	rstanding	g to ana	alyze any	/ given
Object	ives:	network	x with th	e help of	f fundar	nental teo	chniques	such as	Kirchof	f's laws	, mesh ar	nd node
		analysis	s, netwo	rk theor	ems, et	c. Also,	aims to	provide	the neo	cessary	backgrou	und for
		underst	anding v	arious ci	ircuits a	nd netwo	orks.					
Course	•	1. Un	derstand	ing of th	e basic	concept of	of netwo	rk analy	sis.			
Outcor	nes:	2. An	alyze the	e circuit u	using K	irchhoff's	s laws, no	ode anal	ysis, mes	sh analy	sis, and n	etwork
		the	orems.			•	1 .	• • • •		· •		
		3. Ab	le to ana	lyze reso	onant ci	reuits and	1 magnet	ically co	oupled ci	rcuits.	<u> </u>	1
		4. Ab.	le to use	Laplace	transfo	rmation 1	to solve v	various c	errcuits a	ind use of	of test sig	inals.
	5. Understand filters and attenuators.											
	DO1	DOJ			urse ou	DOC	DO7	gram ou	DO0	DO10	DO11	DO12
<u>CO1</u>	2	PO2	1	<u>P04</u>	PU5	<u>PU0</u>	PU/	1 1	PU9			P012
CO1	<u> </u>	2	1	2	3	2	0	1	1	0	1	2
C02	<u></u> 1	2	<u> </u>	2	2	2	0	1	2	0	1	2
C04	3	3	2	3	2	2	0	1	1	0	0	2
CO5	0			0			•	-	-	U	•	
000]	Unit-I					I		12 hrs.
Introd	uction:	Resisto	or. Capa	citor. Ir	nductor.	Series a	and Para	allel Cor	nection	. star-d	elta conv	version.
Voltage	e and cu	rrent sou	rces. rel	ation be	tween c	urrent. vo	oltage, po	ower. an	d energy	v of DC	sources.	Source
transfor	rmation	formatio	on of bra	inch, noc	le, and	loop.				,		~~~~
		,		Ū,	Jnit-II	I					14 h	rs.
Netwo	rk Anal	vsis: Kir	choff's C	Current I	Law (KC	CL), Kirc	hhoff's V	/oltage I	Law (KV	L), mes	sh analysi	s, node
analysi	s for so	lving net	work pr	oblems.	Superp	osition tl	neorem,	Theveni	n's theo	rem, No	orton's th	leorem,
and ma	ximum	power tra	ansfer th	eorem fo	or the so	olution of	network	s with E	DC excita	ation an	d AC exc	itation.
				U	nit-III							12 hrs.
Resona	nce an	d Magne	etically	Coupled	l Circui	its: Intro	oduction	to reson	ance, Se	eries res	onance,]	Parallel
resonar	nce, Cor	ncept of s	elf-indu	ctance a	nd mutu	al induct	ance, co	upling c	oefficier	nt, magr	netically o	coupled
circuits, Series and parallel magnetically coupled circuits, Dot convention.												
Unit-IV 10 hrs.												
Standard Test Signals: Unit step, ramp, impulse, gate and shifted functions and their Laplace transforms,												
Filters	and At	tenuato	rs: Intro	oduction	to low	pass, hig	gh pass,	band pa	ss, and l	band eli	mination	filters,
prototy	pe LC a	nd RC fi	lters, bas	sic conce	ept of th	e attenua	tor and i	ts types.				

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RECOMMENDED BOOKS										
Title	Author	Publisher								
1. Fundamentals of Electric Circuits	Charles K. Alexander and	Tata McGraw Hill								
	Matthew N.O. Sadiku									
2. Network Analysis	Van Valkenburg	Prentice Hall of India								
3. Networks and Systems	D. Roy Choudhary	New Age International								
4. Circuit and Networks: Analysis and Synthesis	A. Sudhakar and S. Palli	Tata McGraw Hill								

P. K. Das

PCEC-209									
Analog Communication									
L T P Credits									
Sessional Marks 50									
End Semester Examination Marks50	End Semester Examination Marks50								
<u>Course</u> The focus of the course is on understanding the importance and theories of anal	The focus of the course is on understanding the importance and theories of analog								
Objectives: communication systems. The students will understand the various anal	og								
communication techniques, AM, FM generation, detection, transmission a	ind								
reception methods, analog pulse modulation techniques.									
Course 1. To gain knowledge about the fundamental concepts of various analog									
Outcome: communication systems.									
2. To study the methods of generation and detection of AM and FM									
3. Acquire knowledge about AM and FM transmission and reception.									
4. To study various pulse communication schemes.									
Mapping of course outcomes with program outcomes									
PO1 PO PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO1 PO)1								
	2								
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	2								
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	2								
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	<u>^</u>								
Unit I 12 h	2 186								
Introduction: Communication information Message and Signals Electromagnetic Spectru	<u>.1 5.</u> im								
Classification of signals Periodic and non-neriodic signals. Analog and digital signals Determining	stic								
and random signals, the elements of a communication system. Modulation, Definition, Types	of								
modulation, Need for modulation.									
<u>Unit-II</u> 14 h	rs.								
Amplitude/Linear Modulation: Definition, Expression of AM wave, modulation index, frequen	cy,								
spectrum, bandwidth, power contents of sidebands and carrier. DSB-SC, DSB-FC, SSB-SC, the	eir								
comparison and areas of applications, Basic principle of AM generation, Generation of DSB a	ind								
SSB signals, AM diode detection, envelope detector.									
Unit-III 12 h	rs.								
Angle/Exponential Modulation: Modulation index, frequency deviation, frequency spectrum a	ind								
bandwidth of FM wave, Power contents in FM, Phase modulation. Basic principle of FM generative	on,								
Varactor diode modulator, FM detection, basic principle of slope detection, balanced slope detection	Varactor diode modulator, FM detection, basic principle of slope detection, balanced slope detector								
Unit-IV IU nrs. Dadia Transmittan and Dassivan Diselt diagram of AM and EM transmittan Working minoi	m 1a								
with block diagram of AM and FM receiver (Superheterodyne).									
Pulse Modulation: Sampling process, Sampling theorem, Basic idea about PAM, PWM and PPM									
THINE WITHHIN THE ANTICLE AND THE AND THE AND THE ADD THE AD	7 N/I								
and typical applications. Reconstruction of message.	M								



Title	Author	Publisher
1. Electronic communication	Kennedy	Tata McGraw Hill
systems		
2. Electronic Communications	Wayne Tomasi	Pearson Education
System: Fundamentals Through		
Advanced		
3. Principles of communication	Taub and Schilling	Tata McGraw Hill
systems		
4. Communication system	Sanjay Sharma	Katson Books
(Analog and Digital)		
5. Communication System	Simon Haykin and	Wiley Publisher
	Michaek Mohar	-

P. K. Das

	PCEC-211													
Analog Electronics Lab														
	_		L			<u> </u>			•		Credi	ts		
	_		0			0		2	1		1			
	_	Sessiona	l Marks		50									
		End Sen	nester E	xaminat	ion Ma	rks					50			
Cours	e	The obj	ective of	f this lab	is to g	ive stude	nts hand	s-on pra	ctice in	obtainin	ining parameters of			
Object	tives:	differen	t amplif	iers, find	ling the	ir frequei	ncy resp	onse; de	signing	& analyz	zing osci	illators,		
	and also study the characteristics of JFET. With this knowledge, students will be able									able to				
		do mini	-projects	with the	e help o	f amplifie	ers and C	Dscillator	rs.					
Cours	e	1.	Understa	and the b	asic cha	racteristi	cs of BJ	T in diff	erent con	nfigurati	ons.			
Outco	mes:	nes: 2. Design amplifier circuits using BJTs in different configurations and determine												
	frequency response.													
		3.	Analyse	and desi	gn feed	back amp	olifiers a	nd oscill	ators.					
			Mappi	ng of co	urse ou	tcomes v	vith pro	gram ou	tcomes					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
CO1	1	3	3	1	2	3	1	1	1	2	2	2		
CO2	1	2	3	3	3	3	1	1	2	2	1	1		
CO3	1	3	3	2	3	3	1	2	2	1	2	1		
	 List of Experiments: 1. Working of transistor as a switch, 2. Working of transistor as an amplifier. 													
		3.]	Determi	ne the in	put and	output cl	naracteri	stics of t	he CB tr	ansistor	configu	ration.		
			Determi	ne the in	put and	output ch	naracteri	stics of C	JE trans	istor con	figuratio	on.		
		5.	Determi	the drain	and tran	ster char	acteristi	cs of JFE	51. 1	c	·	. C 1		
		0. 0	Construct	valta aa	nt types	ol blash	ig circui	is and ar	iaryze th	le waver	orm usin	ig fixed		
			Study th	voltage	atogo C	ulas. E omnlifi	or & fin	d the goi	n					
			Study m	ultistage	$R_{-}C_{-}c$	unled ar	ei & III nnlifier	x to det	II. ermine	frequenc	w resnot	ise and		
		0. 1	oain	unistage		supreu ar	iipiinei			nequeile	y respon			
		9	50111. To deter	mine the	frequer	ncy of os	cillation	s of the F	Hartlev a	nd Coln	itts oscil	lator		
		10 1	Frequence	v respon	ise of a	BIT amr	lifier wi	th and w	vithout fe	edback	amnlifie	r		
		10.1	requein	-, 105poi	u	201 unip			iniout N					

P. K. Das

	PCEC-213												
		1]	Digital	Electro	nics Lal)					
			Ι	- 			Т		Р		Cr	edits	
			()			0		2			1	
		Session	al Mar	ks								50	
		End Se	emester	Exami	nation I	Marks					4	50	
Cours	e	To mak	e studer	nts fami	liar with	differe	nt types	of desig	ns as se	quentia	l logic c	ircuits,	
Objec	tives:	combin	ombinational logic circuits, trouble shooting of various digital systems & study of										
		various	arious digital systems. Knowledge of basic electronics & digital techniques is										
	useful in understanding theory and practical of the subject.												
Cours	e	1.To an	nalyses	and des	sign dig	ital cor	nbinatio	nal circ	uits lik	e decod	lers, en	coders,	
Outco	mes:	multi	plexers,	and de	-multip	lexers a	s well a	s arithn	netic cii	cuits (h	half add	er, full	
		adder	and mu	(ltiplier)								,	
		2. To a	nalvses	and d	esign s	equenti	al digit	al circu	its like	flip-fl	ons. re	gisters.	
		cour	nters.	una a	esign s	• • • • • • • • • • • • • • • • • • • •	ar argra		105 11110	- mp m	ops, 10	5100010,	
		3 Unde	rstand f	he imno	ortance a	and nee	d for ve	rificatio	n testii	ng of di	oital loc	ric and	
		desi	on for t	estabilit	v			inicatio	in, testin				
		N	Apping	g of cou	rse out	comes v	vith pro	ogram o	utcome	es			
	PO	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	
	1	102	105	104	105	100	107	100	10)	0	1	2	
CO1	2	3	3	3	2	1	0	1	3	2	1	2	
CO1	2	3	2	3	2	1	2	1	2	2	1	2	
	2	3	3	3	2				3	2	1	2	
CO3	2	3	3	3	2	3	0		3	2		2	



Li	ist of Experiments:
1.	. Verification and interpretation of truth tables for AND, OR, NOT NAND, NOR
	and Exclusive OR (EXOR) and Exclusive NOR (EXNOR) gates.
2.	. Realization of logic functions with the help of NAND or NOR gates.
3.	. To design a half adder using XOR and NAND gates and verification of its operation.
4.	. Construction of a full adder circuit using XOR and NAND gates and verify its operation.
5.	. To design a NOR Gate Latch and verification of its operation.
6.	. Verification of truth table for positive edge triggered, negative edge triggered,
	level triggered IC flip-flops (At least one IC each of D latch, D flip-flop, JK flip- flops)
7.	. Verification of truth table for encoder and decoder ICs. Mux and Demux.
8.	. To design a 4 bit SISO, SIPO, PISO, PIPO shift registers using JK/D flip flops and verification of their operation.
9.	. To design a 4 bit ring counter and verify its operation.
10	0. Asynchronous Counter ICs
	Use of IC 7490 or equivalent TTL (a) divide by 2 (b) divide by 10 Counter

P. K. Das

Dilip Kumar

J. S. Ubhi

	PCEC-215													
Analog Communication Lab														
			Ι				T P				Cr	edits		
			()			0 2					1		
		Session	nal Mar	ks								50		
		End Se	emester	Exami	nation N	Aarks						50		
Cours	e	This la	ıb aims	to prov	ide basi	c pract	ical kno	wledge	about o	different	AM a	nd FM		
Objec	tives:	es: modulation techniques by observing the output waveforms on CRO.												
Course 1. Calibrate modulated as well as demodulated waveforms on CF									RO.					
Outcomes: 2. Generate DSB-SC, SSB and FM signals.														
	3. Analyse super heterodyne AM receiver and measurement of										its para	meters		
	like sensitivity and selectivity.													
		Ν	Mapping of course outcomes with program outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1		
										0	1	2		
CO1	3	3	3	3	3	2	0	1	3	2	1	3		
CO2	3	3	3 3 3 2 2 1 3 2						1	3				
CO3	3	3	3	3	3	2	0	1	3	2	1	3		
		List of	Experi	ments:										
		1.	To obse	erve am	plitude r	nodulat	tion and	its wav	eform o	n CRO.	C			
		2.	To obta	un Amp	litude m	odulate	ed Envel	lop and	determi	ne depth	n of			
		2	modula	t10n.	1 1		1	114	C A N 4	• 1				
		3.	To obse	erve env		lector I	or demo	dulation	1 OI AM	signal.				
		4.	Genera	tion of I	JSB-SC	signai	using ba	alanced	modula	tor.				
		5. 6	Genera To obse	uon or s	single si	ne Danu	i signai.	ita way	oform o	n CDO				
		0. 7	To ouse	eroto o F	fuency I SM Sign	nouulai	non and	depth o	f modul	lation				
		7. 8	To stud	ly super	heterod	$\Delta ne \Delta N$	ficasure A receiva	er and n	neasurei	nent of i	receive	r		
		0.	narame	ters viz	sensitix	vity and	selectiv	vity	licasuici					
		9	To obse	erve the	wavefo	rm of d	emodul	ated FM	signal	with the	heln of	ratio		
).	detector	r	wave10		Cinoquia		Signal			14110		
		10.	To obse	erve the	wavefor	rm of d	emodula	ated FM	signal	with the	help of	Phase		
		101	locked-	loop de	tector.	4			8		r 51			

	PCEC-202											
	Fundamentals of Microprocessor L T P											nadita
				և Դ			1 1		<u> </u>			
		Sessio	nal Mar	<u>2</u> •ks			1		50			
		End Se	emester	Exami	nation	Marks						50
Cour	se	The o	biective	of th	e cours	se is t	o expos	se the	studen	ts to tł	ne evol	lution of
Obje	ctives	micron	rocesso	rs. the a	architect	ure and	instruc	tion set	of typi	cal 8-bi	t micro	processor
:		8085	It also	deals	with	Assemb	lv Land	onage l	Program	ming a	nd inn	ut-output
		technic	mes Ne	ext focus	s is to ir	troduce	the arc	hitectur	e nrogi	ammino	and ir	terfacing
		of 805	l microe	controlle	ers.			11100000	•, prog.	E	,, unu n	
Cour	'SP	1. Un	derstand	the eve	olution o	of micro	comput	ers				
Outc	omes:	2. Un	derstand	the	architec	ture of	the 8	3085 m	icropro	cessor	and its	various
		anr	applications.									
		 Applications. Apply programming techniques in designing simple assembly language programs 										
		5. Apply programming techniques in designing simple assembly language programs for solving simple problems by using instruction sets of microprocessor and										
		microcontroller										
	4 Use the addressing modes and timing diagram for executing program efficiently											
4. Use the addressing modes and timing diagram for executing program efficiently.												
	PO1	PO2	PO3	PO4		PO6	PO7		PO9	PO1	PO1	PO12
	101	102	105	104	105	100	107	100	107	0	1	1012
CO	3	3	3	1	2	2	1	1	0	0	2	2
1												
CO	3	3	2	1	1	2	2	1	0	0	3	2
2												
CO	3	3	3	3	2	2	2	1	0	0	3	2
3 CO	3	3	3	2	3	2	2	1	0	0	3	1
4	5	5	5	2	5	2	2	1	U	U	5	1
-					Unit-	[1		1			14 hrs.
Intro	duction	n: Typica	al organ	ization	of a mic	rocomp	outer sys	stem and	d functi	ons of it	s variou	ıs blocks,
Micro	oproces	sor, its e	volutior	n, functi	on, and	its appli	ications.					
Intro	duction	1 to 8-bi	it Micro	oproces	sor Are	chitectu	re: Cor	icept of	Bus, b	us orgar	nization	of 8085,
functi	ional bl	ock diag	ram of	8085, fi	unctions	of each	i block o	of 8085	archite	cture, pr	n detail	s of 8085
and re	elated s	ignais.			Unit I	т						Q hra
Mem	ories a	nd I/O I	nterfaci	ing: Me	mory or	<u>1</u> oanizati	ion con	cent of 1	nemory	mannin	σ narti	tioning of
total 1	total memory space, address decoding, concept of I/O, mapped I/O and memory mapping, partitioning of											
Conce	ept of R	AM, RO	OM, PR	OM, EP	ROM a	nd EEP	ROM.		-	5		
	-											

Unit-III 12hrs										
Programming using 8085 Microprocessor: 8085: 8085 programming model, brief ideas of										
machine and assembly languages, machines and mnemonic codes, basic idea of instruction format										
and addressing modes, basic concept of instruct	ion set for data transfer gi	roup, arithme	tic group, logic							
group, stack, subroutine, I/O and machine control group, writing assembly language programs.										
Unit-IV	Unit-IV 14hrs									
Introduction to 8086 microprocessor: Register organization of 8086, Architecture, signal										
description of 8086, 8086 microprocessor prog	gramming, 8086 Instruct	ion Set, Add	ressing modes,							
Assembly Language Programming with Intel 80	086 microprocessor									
RECOMMENDED BOOKS										
Title	Author	Publish	ier							
1. Microprocessor Architecture- Programming	Ramesh S Gaonkar	5th Edition,	Penram							
& Applications with 8085/8080A		Internationa	ll Publishing							
2. Introduction of Microprocessors & Ram B 4th Edition, Dhanpat Rai										
Microcomputers		Publisher (H) Ltd.							
		Ì								

P. K. Das



PCEC-204													
Electromagnetic Field and Antenna Systems													
				L		,	Γ	F)	Credits			
			2 1 0							3			
		Sessie	onal Ma	rks						50			
		End S	End Semester Examination Marks50										
Cours	e	The objective of this course is to impart fundamental concepts in the area of								area of			
Objec	tives:	electr	omagne	tic field	and wa	ve prop	agation.	Variou	s param	eters re	lated to	a field	
		like p	otential	, flux, c	harge d	ensity, f	field into	ensity a	nd ener	gy dens	ity is co	overed.	
		Next	focus	is to g	ive the	brief	descript	tion ab	out Ma	xwell's	equation	on for	
		electr	omagne	tic field	and the	ir propa	gation.	Basic id	lea aboi	it transn	nission	ines is	
		also c	overed.			ii prope	8						
Cours	e	1.	Under	stand fu	Indamen	tal term	s related	to elec	tromagi	netic fiel	d and ar	itenna.	
Outco	mes:	2.	Apply	Maxwe	ell's equ	ations fo	or electr	omagne	tic wav	e propag	gation.		
		3.	Under	stand fu	indamer	ntal term	ns relate	d to trar	nsmissio	on lines.			
		4.	<u>U</u> nder	stand fu	ındamer	ntals of v	wave tra	insmissi	on in di	ifferent	nedia.		
		N	/lapping	g of cou	rse out	comes v	vith pro	gram o	outcome	es			
	PO1	PO	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	
		2								0	1	2	
CO1	3	3	2	3	2	2	1	1	0	0	0	2	
CO2	3	3	2	1	2	2	2	1	0	2	0	1	
CO3	3	1	1	0	2	1	1	1	0	3	2	2	
CO4	3	3	2	2	2	2	2	1	1	1	2	2	
				Un	it-I]	l4 hrs.	
Introd	uction t	o Vect	or Anal	ysis: Int	troductio	on to ve	ctors, ad	ldition,	subtract	tion and	multipl	ication	
of ve	ctors, d	lifferen	t co-or	dinate	systems	s, carte	esian, c	cylindrio	cal and	l spher	ical sy	'stems,	
transfo	rmation	betwee	en diffe	rent co-	ordinate	e system	ns, line i	integral	, surfac	e integra	al and v	volume	
integra	1.					-		-		-			
Time	Varying	Fields	s: Farad	ay's lav	<i>v</i> , movi	ng conc	luctor in	n a chai	nging m	nagnetic	field, S	Stoke's	
theorem	n, Maxv	vell equ	uation f	rom Far	aday's l	law, dis	placeme	ent curre	ent, Ma	xwell's	equation	n from	
ampere	es law, N	/laxwel	l equation	on for fr	ee space	е.	•				1		
				<u>Un</u> i	t-II							12hrs.	
Wave	Transm	nission	: Maxw	ell equa	ations, p	lane wa	aves, EN	M wave	in a h	omogen	eous m	edium,	
unifor	n plane	wave	equation	n for a	conduc	ting me	edium, s	sinusoid	al time	variatio	ons, ref	lection	
coeffic	coefficient, wave equations for waves in space, plane waves at interfaces, group velocity, phase												

coefficient, wave equations for waves in space, plane waves at interfaces, givelocity, power, and energy relations, pointing vector, reflection of wave.

Department of Electronics & Communication Engineering



Unit-III 12 hrs										
Transmission Lines: Introduction, basic principles, termination lines with load, voltage and										
current distribution, characterist	current distribution, characteristic impedance, propagation constant attenuation constant, phase									
constant, reflection coefficient,	VSWR, open and short-circuit	ed transm	nission lines and their							
impedances, stub matching, type	s of high frequency transmission	lines.								
	<u>Unit-IV</u>		14 hrs.							
Basic Antenna Parameters: Int	Basic Antenna Parameters: Introduction, radiation mechanism, radiation patterns, antenna beam									
area, antenna beam width, radia	ation intensity, gain, directive g	ain, powe	r gain, directivity (D),							
antenna bandwidth, effective ape	rture and height, antenna impeda	nce, radia	tion resistance, front to							
back ratio, radiation power densi	ty, isotropic radiators, near field	and far fie	ld concept.							
Antenna Arrays: Introduction	, linear uniform array isotropic	sources,	principles of pattern							
multiplication, broadside arrays,	end fire arrays.									
	RECOMMENDED BOOKS									
Title	Author	Pul	blisher							
1. Electromagnetic Engineering	Hayt	McGraw	' Hill							
2. Electromagnetic	Karus	McGraw	' Hill							
3. Electromagnetic Fields and K.D. Prasad Satya Prakashan										
Waves	Waves Structure Fields and Structure									
4. Principles of	Matthew N. O. Sadiku	Oxford I	Publication							
Electromagnetics										

	PCEC-206											
		1		-	Indust	rial Ele	ctronics	5		[~	
							<u>T</u>			Credits		
		C •	1.1.7	2			1	()	3		
		Sessi	onal Ma	arks	• .•						50	
		End	Semeste	er Exan	ination	Marks					50	
Cours	e	The c	objective	e of this	s course	e is to p	provide	in-deptl	1 know	ledge of	f the ba	sics of
Objec	tives:	variou	is powe	er semi	conduct	or devi	ces, ana	alyses a	nd des	ign of	various	power
		conve	erter cir	cuits us	ing pov	ver sem	iconduc	tor dev	ices and	d their a	application	ions in
~		comm	nercial a	nd indu	strial ar	eas.						
Cours	e	I. Ac	quire kr	nowledg	e about	fundam	iental co	oncepts	and tec	hniques	used in	power
Outco	mes:	electr	onics.		• •	1	1.1	1				•. •
		2. An	alyses	various	single]	phase a	nd three	e phase	power	converte	er circu	its and
		under	stand in	eir appi	ications	1 tuarrh 1.	aboote	orrige al.	aatuania	a aircuit	ta.	
		5. De	stor ohi	lity to 1	underste	nd the	esnoot p			s circuit	lS.	ial and
		indust	trial apr	lication		ind the	use of j	power c	onvente		minere	iai allu
		Indus	Aannin		.s. Irse out	comes s	with nro	orem o	utcom	26		
	PO1		PO3	PO4	PO5	PO6	PO7	PO8		PO1	PO1	PO1
	101	2	105	104	103	100	107	100	107		1	2
CO1	1	3	3	2	3	1	1	2	2	1	1	1
CO2	2	3	3	3	1	3	1	2	2	1	3	2
CO3	3	3	1	3	2	3	3	3	1	1	1	1
CO4	1	3	2	3	1	3	2	1	2	2	1	1
				Un	it-I						-	12 hrs.
Power	· Device	es: Sy	mbols,	specific	cations,	and t	esting of	of SCR	ks, DIA	ACS, T	RIACS,	UJT,
Charao	cteristics	of the	above d	evices.								
Introd	luction t	to Thyı	ristors:	Thyrist	or rating	gs, thyri	stor con	struction	n, princ	iple of c	operation	n of an
SCR, v	working	of SCR	using t	ransisto	r analog	gy. Turn	on metl	nods-DO	C gate, A	AC gate	and Pul	se gate
trigger	ring and l	R-C trig	gger circ	cuits. Tu	ırn off n	nethods-	natural	and for	ced turr	n off met	hods. th	iyristor
protec	tion, Cire	cuit for	over vo	ltage ar	nd over	current]	protectio	on.				
				Uni	t-II							12hrs.
Phase	Control	lled Re	ctifiers	: Explar	nation of	f the wo	orking of	f single-	-phase ι	incontro	lled hal	f wave
and fu	ll wave 1	rectifier	r (resisti	ve and i	inductiv	e loads)	with th	e help c	of wave	forms, 1	Explana	tion of
workii	ng of cor	ntrolled	rectifie	r using	SCR (re	esistive	and indu	uctive lo	ads) wi	ith help	of wave	e forms
and ap	propriat	e mathe	ematical	l expres	sion (no	o deriva	tions): t	hree-ph	ase con	trolled 1	half way	ve, full
wave a	and bridg	ge rectif	fier, Prin	nciple of	f dual co	onverter	s & thei	ir applic	ations.			
				Uni	t-III							12 hrs.
Chop	pers: Int	roducti	on, type	es of cho	oppers,	step-up	and step	o-down	choppe	rs. volta	ge and	current
comm	utated ty	pe chor	oper.		/		1		11		-	

Cycloconverters: Introduction and principle of operation of converter, up and down Cycloconverters.

Inverters: Principle of operation of basic inverters circuit, basic series and parallel commutated inverters.

<u>Unit-IV</u>	12 hrs.							
Thyristor Applications: Advantages of electronic control of devices, basics of DC motor speed								
control, speed control of DC and small AC motors using thyristor technolog	y, principal of							
operation and working of the following switching circuits using SCRs: Auto	omatic battery charger,							
Voltage regulator, Time delay relay circuit, Emergency, light, Burglar alarm	n circuit, Light							
operated alarm, AC phase control circuit using TRIAC and its application	s : Illumination							
control, Fan speed control, Temperature control.								
RECOMMENDED BOOKS								
Title Author Pub	olisher							

Title	Author	Publisher
1. Industrial Electronics and	S K Bhattacharya and S	Tata McGraw Hill
Control	Chatterji	
2. Power electronics	P S Bimbhra	Khanna Publishers, New Delhi
3. Power electronic	M Rama Murthi	New age

Department of Electronics & Communication Engineering

P. K. Das

PCEC-208													
	Linear Integrated Circuits												
		L					<u>T</u>		2	Credits			
		G •	114	2			l	()	3			
	Sessional Marks										50		
6			semeste	er Exan	ination	Marks) 	· • • 1	•1•	1 .	50		
Cours	e	Lear	ning o	p-amp	and 1	ts chai	acteristi	cs. At	oility t	o desig	gn diff	erent	
Objec	tives:	coni	iguratio	ns of o	p-amp	circuits	and de	sign iin	ear and	1 non-111	near op	-amp	
Cours	0	appi	Acqui	$\frac{1}{red kno}$	wledge	of fund	amental	charact	yses of eristics	$\frac{555 \text{ mm}}{\text{of on-ar}}$	nns		
Outco	mes.	1.	To an	alvze or	v ieuge	vith one	l withou	t using	faadhac	bi op-ai k and	nps.		
Outco	iiies.	2.	dotorm	aiyze of	v nogoti	with and	hooly off	a using	norform		for		
			detern	nine nov	w negati	ve leed	Dack ell	ects the	periori	nance o	l op-		
		2	amps.		•		6		1 1:	C			
		3.	I O lea	irn the I	inear ap	plicatio	ns of op	~ 555	u ampii	mers.			
		<u> </u>	Jannin		arious a	ppiicati	vith pro	<u>g 555 ti</u>	mers.	26			
	PO1		PO3	PO4	PO5	PO6	PO7	PO8	PO9	-3 PO1	PO1	PO1	
	101	2	105	104	105	100	107	100	107	0	1	2	
CO1	2	3	3	3	2	1	0	1	2	0	2	3	
CO2	3	3	3	3	2	1	0	1	1	0	0	3	
CO3	2	2	3	3	1	1	0	1	1	1	2	3	
CO4	3	3	3	3	3	1	0	1	0	0	0	3	
				Un	it-I							14 hrs.	
Intro	luction:	Basic	Op-amp	and its	s schem	atic syı	nbol, B	lock dia	agram o	of a typi	cal Op-	Amp,	
integra	ated circ	uits and	d their t	ypes, IO	C packag	ge type	s, 741 p	in confi	iguratio	n, chara	cteristic	s and	
perfor	mance pa	aramete	ers of O	p-Amp,	equival	ent circ	uit of ar	n Ideal a	ind prac	tical Op	o-Amp a	ind its	
voltag	e transfe	r curve		· · 1.	т	.1.	4 1	r , c			1 (
Practi	cal Op-4	Amp: I	nput off	set volta	ige, Inpi	ut bias c	urrent, I	input of	iset curi	rent, tota	al outpu	t offset	
Therm	e, al drift N	Variatio	on of on	amn na	rameter	s with s	innly vo	ltage ar	d temp	erature	Noise (
slew r	ate.	v arrativ	JII OI OP	ump pu	rameter	5 WILLI 5	appiy ve	nuge ui	la temp	crature,	(0130, 0	<i>/////////////////////////////////////</i>	
510 11 1				Uni	t-II							14 hrs.	
Opera	tional a	mplifi	er appl	ication	s: Op-a	mp as	inverting	g ampli	fier, no	n-inver	ting am	plifier,	
Differ	ential an	plifier	, voltag	e follov	ver, con	nparator	, adder,	subtrac	ctor, int	egrator,	differen	ntiator,	
zero ci	rossing d	letector	, level c	letector,	square	wave g	enerator	, voltag	e to cur	rent con	verter, o	current	
Negat	ive feed	back	in on-a	mns. I	Block d	iagram	renrece	ntation	of fee	dback (configur	ations	
Voltac	lve leeu	t Volte	n up-a	tage Ci	irrent_ci	irrent (Jurrent_	voltage	topolog	uback v	Johngui	ations,	
Unit-III 10 hre													
Volta	ge regula	ator IC	s: Conc	ept of r	egulatio	n, princ	ipal of s	eries an	d shunt	regulate	or, three		
termin	als volta	ge regu	lator IC	s (posit	ive, and	negativ	ve) and t	heir app	olication	ıs (78XX	K and 79	AXX).	

<u>Unit-IV</u>	10 hrs.									
Specialized IC applications: 555 timer IC and its pin configuration, Block diagram, application of										
555 as Monostable and Astable Multivibrator	r.									
RECOMMENDED BOOKS										
Title	Author	Publisher								
1. Op Amps & Linear Integrated circuits	Ramakant Gayakwad	Pearson Education								
2. Operational Amplifiers and linear	R.F. Coughlin & F.F.	Prentice Hall								
integrated circuits	Driscol									
3. Design with Operational Amplifiers and	S. Franco	Tata Mc-Graw Hill								
Analog Integrated Circuits										

P. K. Das

PCEC-210													
		Industrial Electronics Lab											
				T		P	Credits						
			1.5.6	0			0		2	1			
		Sessi	onal Ma	arks	•	24					50		
~		End	Semeste	er Exan	ination	Marks					50		
Cours	e	The ob	jective i	s to anal	lyses V-	l charac	teristics	various	power	semicon	ductor o	levices	
Objec	tives:	like SC	CR, DIA	C and I	RIAC a	and to st	udy var	100s bas	sic powe	er contro	ol circui	t using	
Cours	0	power	A nalva	$\frac{1}{2}$ a the V	devices.	atomistic	a of you	ions inc	hustrial	alaatran	ia davia	a lika	
Outco	mes	1.	SCR F	MAC T	RIAC at	nd UIT	s or var	ious inc	lustrial	election		es like	
Outco	mes.	2.	Analys	e the w	vaveforn	ns of h	alf-wav	e and f	full-way	ve contr	olled re	ectifier.	
			relaxati	on osci	llator, cl	10pper of	circuit e	tc.				,	
		N	Aapping	g of cou	rse out	comes v	vith pro	ogram o	outcome	es			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	
										0	1	2	
CO1	1	1	3	3	1	3	1	2	2	1	1	2	
CO2	1	1	3	3	3	3	2	2	1	1	1	2	
		 List of Experiments: To test and draw the characteristics of SCR and find it's latching and holding currents. To test and draw the characteristics of DIAC and find its break over voltages. To test and draw the characteristics of TRIAC and find it's latching and holding currents. To test and draw the characteristics of UJT and find its intrinsic standoff ratio. To draw the different waveforms of half-wave controlled rectifier and find its average. To draw the different waveforms of full wave mid-point controlled rectifier and find its average. To study the different waveforms of relaxation oscillator using UJT and find its time-period. To trigger the SCR using relaxation oscillator. To draw the different waveforms of half wave voltage controller and find its average. 										iolding rages. iolding fratio. find its ier and trolled find its find its cessary	


12. To draw the different waveforms of voltage commutated and current commuted
Chopper circuits and find their duty cycle.
13. To draw the different waveforms of Series and Parallel Inverter circuits.

P. K. Das



					PE	CEC-20	2A						
		1		-	Audio	Video S	Systems				~		
							1				<u>Credits</u>	6	
		Sagai	analMa	<u>3</u>			1		J		4		
		Sessi End	Somosto	irks r Fvor	ination	Marke	,				50		
Course		The	histiya		hing thi	a gubiog) tiata ai	we stud	anta an	in donth		adaa af	
Object	e tivos:	vario	us electr	onic au	dio and	video 1	recordin	α and r	davback	svstem	i Kilowie s. Furth	euge of	
Object		subie	et will	introduc	the s	students	with v	g and p vorking	princir	les. ma	in feat	ires of	
		consu	imer ele	ctronics	gadget	s/goods	/devices	like PA	A Syster	ns, CD	systems	s VCR.	
		LCD,	Plasma	, LED a	nd HD-	TV whi	ch in-tu	rn will o	levelop	in them	capabil	ities of	
		assem	nbling, f	ault diag	gnosis a	nd recti	fication	in a sys	stematic	way.	-		
Cours	e	1.	1. Acquired knowledge of various types of microphones and loudspeakers.										
Outco	me:	2. Learn various stages of Public Address systems.											
3. Acquired knowledge of working principle of magnetic tape recording and													
optical recording, Video recording and various VCR formats.													
4. Understand various Display TV's like LCD, LED and HD- TV's.													
	DO1			$\frac{2}{2}$ OI COU	rse out	Comes v	PO7	pgram (PO1	DO1	
	101	2	105	104	105	100	107	100	109	0	1	2	
CO1	3	3	3	0	0	0	0	0	0	0	0	0	
CO2	0	3	3	0	0	0	0	0	0	0	0	0	
CO3	0	3	3	3	0	0	0	0	0	0	0	0	
CO4	3	3	3	0	0	0	0	0	0	0	0	0	
		XX 7 1		Uni	<u>it-I</u>	· · ·	1	11	· ·			8 hrs.	
Micro	phones:	Work	king prir	iciple of	conder	nser mic	rophone	e, collar	microp	hone, T	ypes of		
microp	phones.							2					
Louds	peakers	: piezo	electric	moving	coil Ho	orn type	speaker	, woofe	r, tweet	er, mid-	range sp	peaker,	
Crosso	over netw	vork.											
<u> </u>			Ŧ	Uni	<u>t-II</u>	•			.1 .			8hrs	
Public	addres	s systei	n: Type	of amp	lifier, H	orn unit	i, echo u	nıt, mıx	er-their	working	g princi	ple and	
CD/D	VD reco	rder/n	laver• F	lock di	aoram a	nd its ex	nlanati	on evn	anation	of vario	ous cont	rols	
audio	recording	and n	lavback	· heade	stereo r	recordin	o tane a	meed o	ional hi	or vario		1010,	
audio I		g and p	layback	, neaus, Unit			g, tape s	speed, s		ising.		8 hrs	
Video	<u>CD nlar</u>	ver/rec	order: 1	<u>UIII</u> Principle	$\frac{-111}{-5} \text{ of } vic$	leo reco	rding or	maane	tic tane	s video	tane rec	o ms.	
mediu	m. video	casset	te forma	t: video	cassette	e specifi	ication	magil	ne tapes	s, viuco	ape rec	Jorunig	
Ampli	fiers: H	i-Fi sys	stem, pre	e-amplif	iers, am	plifiers	and equ	alizers,	Stereo	amplifie	ers.		
		J	I	ł	,	•	I)		1			



Study Scheme for Integrated Certificate and Diploma (DEC-CSME) Programme

	<u>Unit-IV</u>	8 hrs.							
Television: Introduction to LCD, Plasma, LED, and High Definition Television.									
Sound Recorder: Sound Recording on magnetic tape, its principles, block diagram and tape									
transport mechanism, Digital sound recording on tape and Disc.									
RECOMMENDED BOOKS									
Title	Author	Publisher							
1. Audio Visual Systems	Sanjay Attri.	BPB Publishers New Delhi.							
2. Audio Video Systems	R. G. Gupta	TMH, New Delhi India							

Department of Electronics & Communication Engineering

P. K. Das

					PF	EEC-20	2B						
		1		Electr	onic Eq	uipmen	t Maint	enance	D		C JP4-		
				L 2			<u> </u> 1		P				
		Sagaio	mal Ma	3 when			1		0	50			
		Sessio End 6	Som osta	rks • Evomi	nation	Manlıa					50		
C			benneste				1 1	1 '11	· · ·	• (1 1			
Cours	e	I his c	course w	in this	le the sti	idents t	o develo	p skills	to maini	ain the	basic ele	ectronic	
Object	lives:	circui	try used	in this	equipme	ent, whi	ich are e	thom to	a in inc fulfil th	ustry ar	na in co	nsumer	
		goous the ad	vance m	ns. 11115		will also	they w	ill face i	n the inc	le Dasie	prerequi		
Cours													
Outco	me.	1 To understand the concept of troubleshooting											
Outco	inc.	2 Identify and test various active and passive components											
	2. To understand the troubleshooting procedures												
		 4 Diagnose faults in electronics equipment's 											
	4. Diagnose faults in electromes equipment s.												
	DO1	DO1	Mappin		Irse out	comes v	with pro	gram o	utcomes		DO1	DO1	
	POI	POZ	POS	PO4	P05	PO6	PO/	PU8	P09	POI		PO1	
<u>CO1</u>	2	2	2	0	0	0	0	0	0	U	1	2	
COI	3	3	3	U	U	U	U	U	U	U	U	U	
CO2	0	3	3	0	0	0	0	0	0	0	0	0	
CO3	0	3	3	3	0	0	0	0	0	0	0	0	
CO4	3	3	3	0	0	0	0	0	0	0	0	0	
				Un	it-I							12 hrs.	
Funda	mental 7	Frouble	eshootin	ig Proce	edures I	nside a	n Electr	onic Ea	uipmen	t - Read	ing Dray	wings	
And D	iagrams -	– Block	Diagra	m. Circu	it Diagr	am. Wi	ring Dia	oram: D	is-assem	blv and	re-asser	nbly	
of equi	pment, E	Equipme	ent Failu	ires and	causes s	uch as r	boor desi	ign, prod	duction of	deficienc	cies, care	eless	
storage	and tran	isport, i	napprop	riate op	erating c	onditio	ns, Natu	re of fau	lts, Faul	t locatio	n proce	dure,	
Fault f	inding ai	ds – Sei	rvice and	d mainte	enance n	nanuals	and inst	ruction 1	nanuals,	Test an	d Measu	uring	
instrun	nents, spe	ecial too	ols Trou	bleshoot	ting tech	niques,	approac	hing co	mponent	s for tes	ts, Grou	nd- ing	
system	s in Ele	ctronic	Equipm	nent, Te	mperatu	re sensi	itive Inte	ermitten	t proble	ms Cor	rective a	actions,	
Situati	ons wher	e repair	s should	l not be	attempte	ed.							
				<u>Uni</u>	t-II							12 hrs	
Passiv	e Compo	onents	and The	eir Testi	ng Pass	ive Cor	nponent	s- Resis	tors, \overline{Ca}	pacitors	, Inducto	ors	
Failure	es in fixed	d resisto	ors, testi	ng of res	sistors, v	variable	resistors	, variab	le resisto	ors as po	tentiom	eters,	
failure	s in poter	ntiomet	ers, testi	ng of po	otentiom	eters, se	ervicing	potentio	meters,	LDRs a1	nd Therr	nistor	
Types	of capaci	tors and	d their p	erforma	nce, Fail	lures in	capacito	rs, testii	ng of cap	pacitors	and		
precau	tions the	rein, va	riable ca	pacitor	types, T	esting o	f inducto	ors and i	nductan	ce meas	urement		

Unit-III 12 hrs.										
Testing of Semiconductor Devices - Types of semiconductor devices, Causes of failure in										
Semiconductor Devices, Types of failure Test procedures for Diodes, special types of Diodes, Bipolar										
Junction Transistors, Field Effect Transistors, Thyristors Operational Amplifiers, Fault diagnosis in										
op-amp circuits.										
Unit-IV 12 hrs.										
Logic IC families, Packages in Digital ICs, IC identification, IC pin-outs, Handling ICs, Digital										
troubleshooting methods – typical faults, testing digital ICs with pulse generators Logic clip, Logic										
Probe, Logic Pulser, Logic Current Tracer, Logic Comparator Special consideration for fault diagnosis										
in digital circuits Handling precautions for ICs sensitive to static electricity Testing flip-flops, counters,										
registers, multiplexers and de-multiplexers, encoders and decoders; Tri-state logic.										
RECOMMENDED BOOKS										
Title Author Publisher										
1. Modern Electronic Equipment: Khandpur Tata McGraw Hill Edition										
Troubleshooting, Repair and Maintenance 2006										
2. Electronic Instruments and Systems: R. G. Gupta Tata McGraw Hill Edition										
Principles, Maintenance and Troubleshooting 2001										
3. Student Reference Manual for Electronic David L Terrell Butterworth-Heinemann										
Instrumentation Laboratories										
4. Electronic Testing and Fault DiagnosisG. C. Loveday, A.Wheeler PublishingH										

P. K. Das

Dilip Kumar

J. S. Ubhi

					PF	EEC-20	2C							
		1	С	ompute	er Prog	rammin	ng & Ap	plicatio	n					
				L			Т	I			Credits			
		~		3			1	()		4			
		Sessie	onal Ma	<u>irks</u>	• •					50				
		End S	Semeste	r Exam	ination	Marks	i				50			
Cours	e	This c	ourse is	useful a	as it dev	elops th	e ability	to write	e compu	ter prog	rams, co	mpare		
Objec	tives:	value	s, and	perform	alterna	ative of	peration	s based	on the	e comp	arison 1	results.		
		Stude	nts will	also lea	arn how	to ider	tify the	proper	structu	re of loo	ops, the	use of		
Course		arrays	s, and th	e use of	pointer	s and iu	inctions.							
Cours	e	• able to write compile and debug programs in C language												
Outco	able to write, compile, and debug programs in C language.													
	3. Understand the structure and usage of different looping and branching													
	statements.													
	4. To understand array, pointer, and functions.													
		Ν	Mapping of course outcomes with program outcomes											
	PO1	PO	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1		
		2								0	1	2		
CO1	1	3	3	3	1	2	1	1	2	3	1	1		
CO2	2	3	3	1	1	1	3	2	3	3	1	1		
CO3	2	3	3	3	3	3	3	1	1	1	2	2		
CO4	1	3	3	3	3	2	3	1	1	2	3	1		
D	D	1	4 D	<u>Un</u>	<u>it-l</u>	,	1 D	•	1	1	1 0 0	12 hrs.		
Progr	am Dev	elopme	ent: Pro	gram de	evelopm	ent cyc	le, Prog	rammin	g langu	age leve	els & fe	atures.		
Proper	ties & C		cation o	of Algor	unm, II	lowchar	t symbo	ois, imp	ortance	& adva	intage o	I HOW		
Intro	luction	to C· -	Histor	v of C	feature	s of C	structur	e of C	nrogra	n Prog	ram eve	ention		
proces	s. Comp	ile. link	$\frac{11300}{8}$	y or c, a progra	m. Writ	ting sim	nle C n	rograms	program	II, 110g		cution		
proces	<u>, comp</u>	<u>110, 1111</u>		<u>u progre</u> Uni	t-II			ograms				12hrs.		
Varia	bles, Co	nstants	& Data	a types:	C chara	cter set.	Tokens	s Consta	nts, Ke	words,	identifi	ers and		
Variat	oles, Data	a types	and stor	age, Da	ta type	Qualifie	rs, Decl	aration	of Varia	ables, as	signing	values		
to var	iables, c	leclarin	ig varia	bles as	consta	nts, De	claring	variable	es as v	olatile	- Overf	low &		
underf	low of d	ata.												
Opera	tors an	d expi	ressions	: Ope	rators i	n C, A	rithmeti	ic, Logi	ical, As	ssignme	nt, Rela	itional,		
Incren	nent and	d Deci	rement,	Condit	ional,	Bitwise	, Opera	ator pro	ecedenc	e and	Associ	ativity.		
Arithn	netic C e	xpressi	ons, Eva	aluation	of expr	essions.								
.	<u> </u>			Unit	<u>-III</u>		1 .	1		• • •	0	<u>12hrs.</u>		
Decisi	on Cont	trol Str	ucture:	Introdu	$\frac{1}{1}$	b Branc	h contro	ol staten	nents, S	imple 1	t statem	ent, 11-		
else st	atement,	else-lf	stateme	nt, neste	ed 11-els	e, Switc	n staten	nent – g	o staten	nent.	loor fo	n 100m		
brook	Control	SITUCE	ure: Int	roauctic	011 10 100	oping sta	atements	s, while	ioop, d	o-while	100p, 10	r 100p,		
Uleak	and cont	mue sta	uement.	Uni	LIV							12hrs		
					<u>-1 1</u>							141113.		

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Array: Introduction to array and its types, declaration, initialization of array, accessing elements of an array, adding, deleting, sorting, and searching of array

Functions and Pointers: Built-in functions, Math functions, Console I/O functions, Standard I/O functions, Character Oriented functions, Concept of pointer and pointer variable, initialization of pointer, call by reference.

RECOMMENDED BOOKS											
Title	Author	Publisher									
1. Let us C	Y. P. Kanetkar	BPB Publications									
2. Programming with C	E. Balagurusamy	Tata McGraw Hill									
3. Programming in C	Reema Theraja	Oxford University Press									

Department of Electronics & Communication Engineering

P. K. Das



	TPID-202												
			F	our W	eeks Su	ımmer	Interns	hip Tr	aining				
				L		Т			Р		Crec	lits	
				0		0			24		3		
Cours	se	To pr	ovide h	ands-or	n exper	ience ir	n variou	s dom	ains suc	ch as har	dware, s	oftware,	
Objec	ctives:	maint	enance,	and tes	ting in	Industr	y / Trai	ning Co	entre's/	Corporat	te Offices	s so that	
		they b	they become aware of the practical application of theoretical concepts studied in the										
		classr	ooms a	nd to	expose	studen	ts to th	e 'real	' worki	ng envii	onment	and get	
		acqua	acquainted with the organization structure, business operations and administrative										
		functions.											
Cours	se	1. Generate a report based on the experiences and projects carried out with the											
Outco	omes:	ability to apply knowledge of Mathematics, Science, and Engineering											
			Funda	mentals	5.								
		2.	Demo	nstrate	compe	tency in	n releva	ant eng	ineering	g fields	through	problem	
			identi	fication	, formu	lation, a	and solu	tion.		-		-	
		3.	Effect	ively i	mpleme	ent ski	lls in o	commu	nication	n, in wi	riting an	d using	
			multir	nedia to	ools.						-	_	
		4.	Devel	op the a	ability t	o work	as an ir	ndividu	al and i	n group	with the	capacity	
			to be a	a leader	or man	ager as	well as	an effe	ctive te	am mem	ber.	1 0	
		5.	Maste	r the pr	ofessio	nal and	ethical 1	respons	sibilities	s of an en	gineer.		
	Mapping of course outcomes with program outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO1	3	2	2	2	2	2	2	3	3	3	1	3	
CO2	3	2	3	3	3	3	3	2	2	3	1	3	
CO3	3	3	2	3	2	2	2	2	1	3	1	3	
CO4	1	1	1	1	1	1	1	1	3	3	1	3	
CO5	3	2	3	3	3	3	3	2	2	3	1	3	

P. K. Das

					_	PCEC-	301					
				<u>Fun</u>	dament	als of M	<u>licrocol</u> T	ntroller	S D			hadita
				L 3			<u>1</u> 0		<u> </u>			
		Sessio	nal Mar	5 ·ks			U		U			50
		End S	emester	Exami	nation	Marks						50
Cour	se	This co	ourse nr	ovides t	he know	vledge a	bout mi	crocont	rollers	and emb	edded s	vstems
Obie	ctives	and en	on on one of the other other of the other ot	s on the	e basic w	vorking	of a mic	crocontr	oller sv	stem an	d its	ystems
:		progra	mming l	languag	e.							
Cour	se	1. Und	lerstand	Archite	cture of	Microc	ontrolle	r.				
Outc	omes:	2. Lean	rn progra	amming	g instruc	tions an	d addre	ssing m	odes.			
		3. Acq	uire pro	grammi	ng skills	s of mic	rocontro	oller.				
	4. Develop application programs using assembly and C Languages.											
Mapping of course outcomes with program outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO12
										0	1	
CO	3	3	3	1	2	2	1	1	0	0	2	2
	2	2		1	1		-	1	0	0		
	3	3	2	1	1	2	2	1	U	U	3	2
	2	2	2	2	2	2	2	1	0	0	2	
	3	3	5	5	2	2	2	1	U	U	3	2
$\frac{3}{CO}$	3	3	3	2	3	2	2	1	0	0	3	1
4	U	0	0	-	0		-	-	Ū	v	0	1
					Unit-	I		1				14 hrs.
8051	Microo	controll	er: 8051	Archit	ecture- I	Register	s, Pin d	iagram,	I/O por	ts funct	ions, Int	ernal
Memo	ory org	anizatio	n. Extern	nal Men	nory (R	OM & F	RAM) ir	nterfacir	ng.			
					<u>Unit-I</u>	Ι						8hrs.
8051	Instru	ction Se	t: Addre	essing N	Iodes, D	Data Tra	nsfer in	struction	ns, Aritl	hmetic i	nstructio	ons,
Logic	al instr	uctions,	Branch	instruct	ions, Bi	t manip	ulation	instruct	ions. Si	mple As	sembly	language
progr	am exa	mples (v	vithout l	oops) to	o use the	ese instr	uctions.					101
0051	Sto als		4 1		Unit-L	<u> </u> 		1 640 010	Sta ala	and Cash		12hrs.
8051	Slack,	I/O Por	ly longu	acing a	nu Prog	grammi somplos	on subr	of Slack	, Slack	and Sub	routine	orfooing
simpl	e swite	Assenio h and I I	Ty langu	age pro	to swite	h on/off	f I FD w	outile a vith resp	ect to s	witch st	ops. m atus	erfacting
simpi	c swite			5 ports	<u>Unit_</u>	IV		nii iesp			atus.	14hrs
8051	Timers	and Se	rial Por	• t: 8051	Timers	and Co	ounters –	- Operat	ion and	Assem	blv lang	uage
progr	amming	g to gene	erate a p	ulse usi	ng Mod	e-1 and	a squar	e wave	using N	Iode2 of	1 a port	pin. 8051
Serial	Comm	unicatio	on-Basi	cs of Se	rial Data	a Comn	nunicatio	on, RS2	32 stan	dard, 9 r	oin RS2	32
signal	ls, Simp	ole Seria	l Port pi	rogramr	ning in .	Assemb	ly and C	to tran	ismit a r	nessage	and to a	receive
data s	erially.		-							_		



8051 Interrupts and Interfacing Applications: 8051 Interrupts. 8051 Assembly language programming to generate an external interrupt using a switch, 8051 C programming to generate a square waveform on a port pin using a Timer interrupt. Interfacing 8051 to ADC-0804, DAC, LCD and Stepper motor and their 8051 Assembly language interfacing programming.

Recommended Books

Textbook:

- 1. "The 8051 Microcontroller and Embedded Systems using assembly and C", Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay; PHI, 2006 / Pearson, 2006.
- 2. "The 8051 Microcontroller", Kenneth J. Ayala, 3rd Edition, Thomson/Cengage Learning. **Reference Books:**
- 1. "The 8051 Microcontroller Based Embedded Systems", Manish K Patel, McGraw Hill, 2014, ISBN: 978-93-329-0125-4.
- 2. "Microcontrollers: Architecture, Programming, Interfacing and System Design", Raj Kamal, Pearson Education, 2005.

Modern Communication Systems L T P Credits 2 1 0 3 Sessional Marks 50 50 End Semester Examination Marks 50 Course The course aims at studying the concepts of digital communication with the introduction to various components of digital communication systems. The students will understand the procedures and modulation techniques involved in developing digital communication system and explore the utility of digital signals for extended applications.										
LTPCredits2103Sessional Marks50End Semester Examination Marks50CourseThe course aims at studying the concepts of digital communication with the introduction to various components of digital communication systems. The students will understand the procedures and modulation techniques involved in developing digital communication system and explore the utility of digital signals for extended applications.										
2103Sessional Marks50End Semester Examination Marks50CourseThe course aims at studying the concepts of digital communication with the introduction to various components of digital communication systems. The students will understand the procedures and modulation techniques involved in developing digital communication system and explore the utility of digital signals for extended applications.										
Sessional Marks50End Semester Examination Marks50CourseThe course aims at studying the concepts of digital communication with the introduction to various components of digital communication systems. The students will understand the procedures and modulation techniques involved in developing digital communication system and explore the utility of digital signals for extended applications.										
End Semester Examination Marks50CourseThe course aims at studying the concepts of digital communication with the introduction to various components of digital communication systems. The students will understand the procedures and modulation techniques involved in developing digital communication system and explore the utility of digital signals for extended applications.										
Course The course aims at studying the concepts of digital communication with the introduction to various components of digital communication systems. The students will understand the procedures and modulation techniques involved in developing digital communication system and explore the utility of digital signals for extended applications.										
Objectives: introduction to various components of digital communication systems. The students will understand the procedures and modulation techniques involved in developing digital communication system and explore the utility of digital signals for extended applications.										
students will understand the procedures and modulation techniques involved in developing digital communication system and explore the utility of digital signals for extended applications.										
developing digital communication system and explore the utility of digital signals for extended applications.										
for extended applications.										
Ior extended applications.										
Course 1. Gain knowledge about the fundamental concepts of digital communication										
comes: systems.										
2. Convert analog signal into digital signal and apply suitable line codes										
3. Acquire knowledge about digital modulations schemes.										
4. Able to understand the fundamentals of optical fiber communication system.										
Mapping of course outcomes with program outcomes										
PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO1 PO1 PO1										
CO1 2 2 2 3 2 0 1 0 0 0 2										
CO2 3 2 2 3 3 2 1 1 0 1 2										
CO3 1 2 1 2 1 1 0 1 1 1										
<u>CO4</u> 3 3 2 2 3 2 1 1 1 <u>2</u>										
Unit-I 12 hrs.										
Elements of Digital Communication: Block diagram of Digital Communication system, Digital										
representation of Analog signals, Advantages and Disadvantages of Digital Communication system										
Sampling Theorem: Sampling, Natural sampling, flat top sampling, Sampling Rate, Aliasing										
Unit-II 14 hrs.										
Pulse Modulation Techniques: Block diagram of PCM system, Quantization, Delta Modulation,										
continuously variable Slope Delta Modulator (CVSDM) or Adaptive Delta Modulation.										
Line Coding: Line Coding & its properties. NRZ & RZ types, signaling format for unipolar,										
Polar, bipolar (AMI) and Manchester coding.										
Concept of amount of information and entropy: Rate of information, Shannon Fano Source										
Coding, Huffman source coding										
<u>Unit-III</u> <u>12 nrs.</u>										
Numprexing Techniques: Fundamentals of time and frequency division multiplexing.										
Supertrum ASK Modulator Engineering (ASK), ASK										
Digital Carrier Demodulation Techniques: Coherent ASV Detector New scherert ASV										
Digital Carrier Demountation rechniques. Concretiin ASK Detector, Non-concretiin ASK Detector, Non-coherent FSK Detector, Coherent FSK Detector										



Study Scheme for Integrated Certificate and Diploma (DEC-CSME) Programme

Unit-	IV	10 hrs.									
Optical Fiber Communication: Ben	efits and disadvantages	of fiber optics, transmission									
windows, point to point communication link, transmission of light through optical fiber, numerica											
aperture (NA), types of fiber, attenuation in optical fibers, bending loses, absorption, scattering.											
REC	OMMENDED BOOKS										
Title	Title	Title									
1. Electronic Communication	s Wayne Tomasi	Pearson Education									
System: Fundamentals Throug	h										
Advanced											
2. Communication System	Simon Haykin and	Wiley Publisher									
	Michaek Mohar										
3. Fiber Optic Communication	Vivekanand Mishra	Wiley Publisher									
	and Sunita P. Ugale										

PCEC-305 Modern Communication Systems Lab													
			1	ivioaer.	n Comr	nunica T	tion Sy	stems I			Cred	ita	
			0			<u> </u>			2		1		
		5	Sessiona	J Mark	'S	U			2		50		
		Ĩ	End Sen	nester I	 Examin	ation N	larks				50		
Cours	se	This la	ab aims	to unde	rstand t	he build	ling blo	cks of o	digital d	communi	cation sy	stem.	
Objec	tives:												
Cours	se	1. Analyze the performance of a baseband and pass band digital communication											
Outco	mes:	system.											
		2. Understand and analyze the various data formats used in digital communication.											
		Mapping of course outcomes with program outcomes											
001	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
	3	3	3	3	3	2	0	1	3	2	1	3	
		3 3 3 2 2 1 3 2 1 3 List of Experiments: 1. Study of Sampling and reconstruction techniques. 2. Study of Pulse code modulation and demodulation. 3. Study of Delta modulation and demodulation. 4. Study of different data formats/line codes. 5. Study of data coding techniques. 6. Study of ASK modulation and demodulation. 7. Study of FSK modulation and demodulation. 8. Study of PSK modulation and demodulation. 9. Study of TDM PCM receiver and transmitter. 											

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					PI	EEC-30	1A						
				<u> </u>	/ireless	<u>Comm</u>	<u>unicatio</u> T	on –					
				L 2			<u> </u> 1		,		Credits		
		Secol	onal Ma	<u>J</u>			1	(,		<u>4</u> 50		
		End 9	Somosto	irks r Evom	ination	Marka	4				<u> </u>		
Course	10		of the e			t wiai Ka) anian af	<u>`</u>	avatar	. It ala		a daam	
Cours	se tivos:	Aim	of the c	be veric	to stud	ly the b	ling offo	central oto It d	systen	1. It also the dif) gives foront tr	a deep	
Objec	cuves:	modu	lation te	chnique	s used	for mol	nig ene	munica	tion Fi	ally it	introdu	pes of	
		CDM	A and C	SM tec	hniques	used for	or mobil	e comm	unicatio	n n	mnouu		
Cours	se	1.	Under	stand th	e basics	s terms	related t	o wirele	ess com	municat	ion syste	em.	
Outco	mes:	2.	Under	stand th	e basics	s of cell	ular con	nmunica	tion sys	stem.			
		3	3. Understand the modulation techniques used in mobile communication.										
			Mapping of course outcomes with program outcomes										
	PO1		PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	
	101	2	100	101	100	100	10/	100	107	0	1	2	
CO1	2	2	0	0	1	2	0	1	0	0	3	2	
CO2	1	2	3	3	1	2	0	1	1	2	2	2	
CO3	3	2	1	2	2	2	1	1	1	1	2	3	
				Uni	<u>it-I</u>							12hrs.	
Intro	duction	to Wire	eless Co	mmuni	cation S	Systems	s: Conce	ept of ce	llular c	ommuni	cation s	ystem,	
basics	of wirel	ess cell	ular sys	tem, mo	bile uni	it, base	station,	mobile s	switchir	ig cente	r, perfor	mance	
criteri	a, voice	qualit	y, servi	ce qual	ity, co	verage	and rec	quired g	grade o	f servic	e, co-c	hannel	
interfe	erence, f	requend	cy reuse	e, deter	mining	the fre	quency	reuse o	listance	, chann	el assig	gnment	
strateg	gies, nano	a-011 sti	rategies,	<u>, interiei</u>	rence, a	na syste	m capac	city.				12 h.m.	
Mahil	o Dodio	Dron	agation	UIII Untrad	<u>l-II</u>	to radio	NUNIO	nronad	tion f		o propo	12 IIrs.	
model	basic	nronaga	agailon m	echanisi	ns refl	ection	diffract	ion sea	utering	types	of smal	l_scale	
fading	, basic	effects	due to I	Connler	spread a	and dela	v spread	1011, 302 1.	ittering,	types	or sina	11-Seale	
Tuang	, 1441115	•11••••		Unit	t-III		ij spreu				-	12 hrs.	
Modu	lation T	echniq	ues: In	troducti	on to li	near mo	odulatio	n techni	ques, n	ninimun	n shift k	keying,	
gaussi	an minir	num sh	ift keyir	ng, sprea	d spect	rum mo	dulation	technic	jues.				
				<u>Unit</u>	t-IV						-	12 hrs.	
Adva	nced Tra	ed Transceiver Schemes: Cellular code division multiple access systems, GSM, IS-95,											
and in	and introduction to fourth and fifth generation wireless communication standards.												
	RECOMMENDED BOOKS												
Title						Author				Publis	sher		
1. Wir	eless con	nmunic	cations		T.S	S Rappa	port		Pear	rson Edu	ucation,	2003.	
2. Prir	nciples of	f Mobil	e Comn	nunicati	on Go	rdon L.	Stuber		Spri	nger Int	ernation	nal	
									Ltd.	, 2001.			

3. Wireless Communications	Andrea Goldsmith	Cambridge University Press, 2007
		11035, 2007

P. K. Das

PEEC-301B												
Service and Maintenance of Computers												
$\begin{array}{c c c c c c c c c c c c c c c c c c c $												
		Sessi	nal Ma	<u> </u>			1	L (,		<u>4</u> 50	
		End S	Semeste	er Exam	ination	Marks					<u> </u>	
Cours	e	This	course is	s useful	as it equ	ins nar	icinants	with he	sic kno	wledge	about ne	ersonal
Objec	c tives:	comp	uters	Partici	as it equ	vill also	learn	about	PC ha	dware	and so	ftware
Objec		maint	enance	of PC sy	vstems a	nd trou	bleshoot	ting of c	commor	n proble	ms.	neware,
Cours	e	1. (Gain bas	ic know	ledge a	bout pe	rsonal co	omputer	'S	- proore.		
Outco	mes:	2. I	Learn ab	out PC	hardwar	e and s	oftware	1				
		3 . T	Indersta	anding t	he archi	tecture	of comp	uter svs	tems			
		4. U	Jndersta	unding t	he funct	ions of	peripher	al devic	es in m	icrocom	nouter sy	vstems
		5. 1	Froubles	shooting	of con	nmon r	roblems	s in per	sonal c	ompute	rs and S	Simple
home-networking												
Mapping of course outcomes with program outcomes												
	PO1	PO	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1
	_	2		_			_			0	1	2
CO1	3	3	3	0	0	0	0	0	0	0	0	0
CO2	3	3	3	3	0	0	0	0	0	0	0	0
CO3	3	3	0	3	0	0	0	0	0	0	0	0
CO4	3	3	0	3	0	0	0	0	0	0	0	0
CO5	3	3	0	0	3	0	0	0	0	0	0	0
				Un	it-I						1	12 hrs.
Repai	r, Servi	cing an	id Mair	itenanc	e Conce	epts: I	Repair, S	Servicin	g and M	Mainten	ance Co	oncepts
Introd	uction to	servici	ng and i	mainten	ance coi	ncepts.	Meantir	ne betw	een fail	ure (NT	BF) me	antime
the re	pair ma	untenar	ice pol	ıcy, po	tential	problem	ns prev	entive	mainter	nance a	and cor	rective
mainte	enance.	Circui	t tracing	g techni	ques.	Concep	t of shi	elding	groundi	ng and	power	supply
Funde	ements a	na cons trouble	sideratic	ons of co	omputers	s and its	s periphe	\mathbf{OS} . For	ult loogt	ion Fou	lt findir	anida
Servic	e Manua		et and n	ig proce	a instru	ments	Special	tools fo	r troubl	eshootir	na Insta	lg alus,
of one	rating Sv	iis - 10 istem	st and n	icasuim	ig msuu	ments,	Special	10015 10	1 110001	cshooth	ig, msu	mation
	runng 5j	stem		Uni	t-II						1	2 Hrs.
Hardy	Hardware and Software Faults: Trouble shooting techniques. Different trouble shooting											
techni	techniques and methods, Functional area approach, Split half method, Divergent, convergent and											
feedba	ck path	circuits	, analys	is measu	ured tech	hniques				U	0	
Troub	Troubleshooting of computer components and Peripherals: Mother Board, FDD, HDD, CD											
ROM/	DBD, Pi	inters,	Modem	s, Moni	tors, SM	íPs.						



Study Scheme for Integrated Certificate and Diploma (DEC-CSME) Programme

Unit	·III		12 Hrs.							
Maintenance and repair of periphe	rals: Specification, Ma	intenance an	d Repair of CVTs and							
UPS, Sight preparation and design of	computer rooms. Testir	ng specificati	ons and installation of							
computer systems and peripherals.	-									
CD Drive and its troubleshooting: V	Vorking Principle and its	types. CD-R	OM drive: - CD drives							
mechanism installation of CD drive. D	rive technologies: - CD-	ROM: SCSI	CD-R, CD-RW, DVD-							
ROM. Working Principals, IDE control	oller card.									
Unit	-IV		12 Hrs.							
Modem: Fault Finding, Repairing, modem Circuit Diagram, Repairing MODEM.										
Network Components: Introduction	of Network Cable lik	e UTP, STI	P, Fiber Optics, Hub,							
Unmanageable Switch, Manageable Sv	witch, Router, Wi-Fi, Ac	cess Point, Po	CI Wireless Card, USB							
Wireless Device, Print Server, USB	Network Sharer, Back	cup Device.	Server Hardware etc.							
Installation and troubleshooting of Ro	uters.	1 ,								
REG	COMMENDED BOOK	S								
Title	Author	Publis	her							
1.Electronic test equipment	RS Khandpur	McGraw H	ill							
1 1	I									
2. Maintenance and Troubleshooting	SK Chauhan	SK Kataria	and Sons, New Delhi							
Guide										
3. Trouble shooting computer system	Robert C Benner									

Department of Electronics & Communication Engineering

	PEEC-301C											
				Si	gnals a	nd Con	trol Sys	stem		1		
			L			T		P			Credit	S
		~ •	3			1		0			4	
		Session	al Marl	KS .							50	
		End Se	mester	Examii	nation 1	Marks					50	
Course		This co	urse ain	ns to pr	ovide o	letailed	descript	tion of	continue	ous sign	als and s	systems,
<u>Objectiv</u>	ves	their pr	operties	, repres	entation	ns, and	method	s that a	re nece	ssary for	r the ana	alysis of
		continu	ous sigr	als and	l systen	ns. Kno	wledge	of time	e-domain	n and fr	equency	-domain
		represer	ntation	and an	alysis	using	Transfor	ms, La	place-tr	ansform	, to un	derstand
~	Course1. Identify and classify different types of signals and systems that are commonly used											
Course 1. Identify and classify different types of signals and systems that are commonly used in engineering.												
Outcomes in engineering. 2. Apply transform techniques to analyse continuous-time signals and systems												
 2. Apply transform techniques to analyse continuous-time signals and systems. 3. Understand basics of control system theory and its role in engineering design 												
 3. Understand basics of control system theory and its role in engineering design. 4 Analyze time domain behavior of systems 												
4. Analyze time domain behavior of systems. Manning of Course Outcomes with Program Outcomes												
Mapping of Course Outcomes with Program Outcomes PO1 PO2 PO3 PO4 PO6 PO7 PO8 PO9 PO10 PO11 PO12												
PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12												
CO1	3	3 2 2 1 1 1 1 0 0 2										2
CO2	3	2	2	2	3	1	1	1	1	0	0	2
CO3	3	2	2	2	3	1	1	1	1	0	0	2
CO4	3	3	2	2	2	1	1	1	1	0	0	2
					Unit-I							12 hrs
Introdu	ction	to sign	als and	l syste	ms: De	efinition	of sig	nals an	d syste	ms, eler	nentary	signals,
classific	ation o	f signals	s and sy	stems, j	properti	es of sy	stems.					
LTI sys	tems: (Continu	ous-time	e and D	iscrete-	time L7	ΓI systen	ns, their	propert	ties.		
				<u> </u>	Jnit-II							12hrs
Fourier	transf	f orm : C	ontinuo	us-time	Fourier	r transfo	orm of p	eriodic	and ape	riodic si	gnals, pi	operties
of conti	nuous-	time Fo	ourier tr	ansforn	n, discr	ete-tim	e Fourie	er trans	form of	è periodi	c and a	periodic
signals, convolution.												
				U	J nit-III							12 hrs
Laplace transform (LT): One-sided Laplace transform (LT) of common signals, important theorems,												
and properties of LT, Inverse LT, region of convergence (ROC).												
Introduction to control system: Introduction, open loop control system, closed loop control system												
with block diagrams and illustrative examples, formulation of equations for linear electrical systems,												
signal flow graphs, block diagram simplification for linear systems.												
~				1.0	Unit-IV				~			12 hrs
System	respon	ise: Tim	e domai	n and fi	requenc	y doma	in respon	nse of th	ne first a	nd secon	d order	systems.
time domain specifications, steady state error and coefficients, type and order of system with P, PI,												
PD and PID controller, relation between time and frequency response for second order systems.												



RECOM	MENDED BOOKS	
Title	Author	Publisher
1. Signals and Systems	T. Rawat	Oxford University Press, (2010)
2. Modern Control Systems Engineering,	Nagrath I J and Gopal M	New age international, 3rd Edition, 2014.
3. Linear Control System	B S Manke	Khanna Publishers, 12th edition

P. K. Das

						Pl Min	REC-3)1 joat						
				L			<u>T</u>		Р		Credit	5		
				0			0		4		2			
Cours	se	To gu	ide the	studen	ts in suc	ch a wa	ay so th	at they	carry out	a work on	a topic as	s a		
Objec	<u>tives</u>	foreru	nner to	the ful	ll-fledge	ed proj	ect wor	k to be	taken suł	osequently	in IV sen	nester.		
Cours	<u>se</u>	Upon	comple	etion of	f the cou	irse, th	ne stude	nts will	be able t	0				
Outco	omes	 Se ga so Co Fo Fo Fo Fo Fo 	 Select a suitable project making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities. Collect and disseminate information related to selected project. Form a team and distribute the work among themselves. Communicate technical and general information by means of oral as well as written presentation skills with professionalism. Mapping of Course Outcomes with program outcomes 											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
CO1	3	3	3	3	3	3	1	2	2	2	3	2		
CO2	1	3	2	2	3	0	0	3	3	2	2	0		
CO3	2	1	0	2	3	3	0	1	3	3	2	3		
CO4	1	1	2	3	2	0	0	3	3	3	2	0		

	PEEC-302A											
			Elect	ronic M	leasure	ments a	nd Inst	rument	ations			
]				Т])		Credits	
			ĺ	3			1	()		4	
		Session	1al Mar	·ks							50	
		End Se	emester	Exami	nation I	Marks					50	
Cours	se	Aim of	f the cou	urse is t	o study	the bas	ics of u	nit, dim	ensions	and sta	ndards.	It also
Objec	ctives:	gives d	leep insi	ght into	the PM	IMC ins	strument	t and br	idges. It	discuss	es the C	CRO in
		detail.	Finally,	it intro	luces sig	gnal ger	nerator a	ind anal	yzer.			
Cours	se	1. Able	e to unde	erstand	the vario	ous type	es of erro	ors intro	duced i	n measu	rements	3.
Outco	Itcomes: 2. Able to understand the PMMC instruments and bridge theory.											
		3. Able to understand the CRO, signal generators and analysers.										
		N	Apping	g of cou	rse out	comes v	with pro	ogram o	utcome	es		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1
<u> </u>	1	•	•	1	-	•	0	1	0	0		2
	1	2	0	1	2	2	0		0	0	0	2
<u>CO2</u>	0	3	2	1	2	2	2		0	0	0	2
<u>CO3</u>	0	3	2		2	2	0	1	0	0		2
TT •4	1.	•	1 4 1		<u>It-I</u>		1		C	CI 1	· 1	<u>12 nrs.</u>
Unit,	aimens	ions, an	a stand	ards: 5			ons and	metric j	orenxes	. SI elec	trical ui	11ts, SI
lempe	rature s	cales, di	mensior	i, and si	landards	s. Measi	urement	Errors:	Gross	error, sy	Slemalic Scort f	error,
Measu	ile erro	or and	mbinati	on basi	accuration of sta	cy, pre	onalysis	resolut	ion and	i signii	Icant 1	igures,
Wiedst			moman	UII, Uasi Uni	<u>t II</u>	uisticai	anary 515				1	12 hrs
PMM	C instru	ment a	alvanon	eter D	<u>(-11</u> C amme	eter D(^r voltme	otor cor	ies ohm	meter	AC ele	ctronic
voltm	eter di	oital vo	alvanon	systen	e annin 19 dioi	tal mu	lti_mete	r digit	al freq	uency 1	neter s	vstem
Wheat	tstone b	ridge lo	w resist	ance me	asureme	ents los	v resista	nce me	asuring	instrume	ents AC	bridge
theory	, canaci	tance br	idges. I	nductan	ce bridg	es. O m	eter.		sams	inisti unit		onage
	,			Uni	t-III	, x					1	12 hrs.
CRO:	CRT.	wave fo	orm disi	plav. tii	ne base	. dual	trace os	cillosco	pe. me	asureme	nt of v	oltage.
freque	encv. an	d phase	bv CRO	oscillo	oscope p	robes.	oscillosc	cope spe	cificatio	ons and	perform	ance.
I	, C	1	5	Uni	t-IV)					1	12 hrs.
Signa	l genera	ator and	l analvz	er: Sig	nal gene	rator: S	ine wav	e. non-s	sinusoid	al signa	l. and fu	inction
genera	venerators. Spectrum analyzer and distortion.											
	RECOMMENDED BOOKS											
Tit	le			Α	uthor				Put	olisher		
1. Ele	ctronic]	Instrume	ntation	Dav	id A. B	ell		2	nd Ed.,	PHI, Ne	w Delh	i
and M	leasuren	nents						2	008.			
2. Ele	ctronic]	Measure	ments	Oliv	ver and (Cage		Т	MH, 20	009.		
and In	strumer	ntation										
3. Me	asureme	surement and Alan S. Morris Elsevier (Butterworth										
Instru	mentatio	on Princi	iples					H	leinman	ın), 2008	3	

PEEC-302B													
		1			C	ompu	ter Ne	etworks					
				L			T			P		Cre	dits
				3			1			0		4	}
		Sessi	ional I	Marks	6							5	0
		End	Seme	ster E	xamiı	nation	Mark	(S				5	0
<u>e</u>		Aim	of the	course	e is to	study	the bas	sics of c	omputer	r netwo	rks, trans	mission	media and
tives		netw	ork top	pologi	es. En	nphasi	s will b	be laid o	on cover	ing the	basic lay	ers used	in TCP/IP
		mode	el.									-	
<u>e</u>			Under	stand	the ba	sics of	TCP/	IP mod	els and o	lifferen	t types of	t networ	′k.
mes		2.	Identii	ty the	1ssues	and c	halleng	ges in th	he archit	ecture of	of a comp	puter net	work.
		3.	Realiz	e prot	ocols :	at diff	erent la	ayers of	t a netwo	rk hier	archy.		
		4.	Gain e	xperti	$\frac{\text{se in s}}{2}$	some s	pecific	c areas	of netwo	orking.			
	DO1			ng of (Jours	e Out	comes	with p	rogram	outcon	nes	DCO1	DCO1
	PO2	PU3	PO4	1	PO6	PO/	PU8 1	PO9	POIU		2	2	PS02
<u> </u>	3	3	2	1	1	0	1		0	1	2	2	2
3	2	3	3	2	<u> </u>	<u> </u>	1	0	0	2	2	1	2
$\begin{array}{c c c c c c c c c c c c c c c c c c c $											2	1	2
CO4 3 3 3 0 1 1 1 2 0 2 3 2 2 Unit I													121
Unit-I 12hrs													
luction	lo col	mput	er net	WOLK	s: Das			h atrua	etworks,		and evon	ution of	computer
isotion	of con		netw(ork w	JOIOGY I ANI	γ, απι ΜΑΝ			I intorn	ot intr	iks allu	ovtrono	t OSI and
D mode		npute	on of (OIKS-	LAN, A TCI	IVIAT D/ID	, ran	N, WAI	N. IIIterii	let, mus	anet and	extrane	i, OSI and
moue	15, 0011	iparis		JSI al	Unit_	II. II							12 hrs
al lave	r. Data	ands	ionals	digit	al and	analo	tranci	mission	bandw	idth util	ization t	ransmis	sion media
zitching	r. Data	and s	ngnais	, uigit	ai anu	anaiog	5 (1 4115)	111551011	, bandw	iun un	lization, t	1411511115	sion mouta
itterinig	.				Unit-1	Π							14 hrs
ink lav	er and	netw	ork la	ver· I	ntrodu	ction	to data	link lay	ver erro	r detecti	ion and c	orrection	n data link
l. medi	um acco	ess co	ntrol.	ethern	et. and	l other	netwo	orks. net	work la	ver prot	ocols, un	icast an	d multicast
<u>.</u>			,					,		/ r			
					Unit-l	IV							10 hrs
port la	iver an	nd ap	plicati	ion la	ver: F	roces	s to pr	ocess d	lelivery:	TCP a	nd UDP	, applic	ation layer
ols, FT	Р, НТТ	Р.	L				1		5			, 11	5
					RECO	OMM	ENDE	D BOO	OKS				
	Title					A	Author	•			Pub	olisher	
Data (Commu	inicat	ion an	d		B.A.	Forou	Izan		4th	Ed., Tata	u McGra	w-Hill.
Netwo	orking										-		
Comp	uter Ne	etworl	ks			A.S	[anenb	aum		4th	Ed., Pear	son Edu	ication.
3. Data and ComputerW. Stallings8th Ed., Prentice-Hall													
Comn	nunicat	ion											
	e tives e mes PO1 0 3 1 3 luction rks, int ication P mode cal laye vitching ink lay l, medi g. port la ols, FT Data 0 Netwo Comp Data a Comm	e mes PO1 PO2 0 3 3 2 1 3 3 3 luction to co rks, introducti ication of com P models, com cal layer: Data vitching. ink layer and l, medium acc g. port layer and lata Commu Networking Computer Nata Data and Con Communicat	End Model e 1. mes 2. 3. 3. PO1 PO2 PO3 0 3 3 3 2 3 1 3 3 3 3 3 added Mathematical and setwitching. Ead layer: Data and netw and netw ink layer and netw and setwitching. ink layer and netw and setwitching. port layer and and compute and setwitching. Data Communicat networking Computer Networf Data and Compute Data and Compute Communication	End Semestives End Semestives e Aim of the network top model. e 1. Under 1. Under 2. Identif 3. Realiz 4. Gain e mess 2. Identif 3. Realiz 4. Gain e PO1 PO2 PO3 PO4 0 3 3 2 3 2 3 3 2 3 2 3 3 3 Iuction to computer networks, introduction to networe fast, introduction fast, fast, introduction fast, fast, introduction fast, fast, introduction fast, fas	L 3 Sessional Marks End Semester E e Aim of the course tives network topologi model. 1. Understand e 1. Understand mes 2. Identify the 3. Realize prot 4. Gain experti Mapping of O 0 3 2 1 Mapping of O 0 3 2 1 3 2 3 3 2 1 Mapping of O 0 3 3 2 1 Mapping of O 0 3 3 2 1 Mapping of O 0 3 3 2 0 3 2 3 3 2 0 3 3 3 3 0 0 Int layer computer networks 1 1 1 1 Bata and signals, digita 2 2 2 2 Ink layer and network layer: In l, medium access control, ethern go. 2 2 2 Ink layer and application and ols, FT	CLSessional MarksEnd Semester ExamineeAim of the course is to network topologies. En model.e1. Understand the ba 2. Identify the issues 3. Realize protocols 4. Gain expertise in a 3 Realize protocols 4. Gain expertise in a Section and the protocols 4. 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CO3. Python programming and interfacing for Raspberry Pi.												
CO4. Design IoT applications in different domains												
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Introduction to Python Prog language: Introduction to Python programming, Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi.

R	ECOMMENDED BOOKS	
Title	Author	Publisher
1. "Internet of Things: A Hands-on Approach"	Arshdeep Bahga and Vijay Madisetti	Universities Press
2. "Programming Arduino" Getting started with sketches	Simon Monk	McGraw-Hill

Department of Electronics & Communication Engineering

P. K. Das

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~		Enc	1 Seme	ster E		tion IV	larks						50
Cours Objec	<u>se</u> etives	diff Imp syst syst	tamilia erent lement em. To ems.	rize the design ation a study	e design techn approac the de	ologies h of c	ept of o s used optoeled nd eval	for for tronic uation	design s device of mo	of of op ces in r	es and optoelect nodern toelect	circuits tronics comm conics in	by using devices. unication ntegrated
<u>Cours</u> Outco	 Ability to utilized optoelectronics devices in high speed optic communication systems. Ability to analyze, model and implement advanced techniques in optoelectronics fabrication. 												
			Mapp	ing of	Course	Outco	omes w	vith pr	ogram	outcon	nes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13
CO1	Μ	Μ	S	S	S	Ν	Μ	Μ	Ν	Μ	S	Ν	Μ
CO2	S	S	S	S	S	Μ	Ν	S	Μ	Μ	S	Ν	Μ
CO3	S	S	Μ	Μ	S	Ν	W	S	Μ	Μ	S	Ν	Μ
					Un	it-I							8 hrs
Eleme diffrac generi elemen semico	ents of etion, 1 c optic ntal a onducto	light ight so al syste nd cou ors.	and source, recently and source, recently and the source of the source o	olid-sta eview d funda d sem	ate phy of quan umental nicondu	ysics: ntum r buildi ctor, o	Wave nechan ng bloc electroi	natur ical co cks, bas nic pr	e of li oncept, sics of opertie	ight, po review semicon es and	larizatio of soli nductor optica	on, inte id state optoele 1 proc	rference, physics, ectronics, esses in
Ontio		and Em				<u>11-11</u>	inting	- 1	tion of	'un dintin		lation i	14 1115
optica optica pumpi stabili	al sour l feedb ng thro zation.	ces Em ack, th eshold	resholc conditi	and abs l condi ions, la	sorption tions-la aser mo	of rad aser los odes, c	lation, sses, lii lasses	absorp ne shaj of lase	tion of pe fund er, sing	radiatio ction, po gle mod	n, popu opulatione operatione operatione operatione operatione operatione operation op	n inver ation, f	nversion, sion and requency
					Uni	t-III							14 hrs
 Photo detectors: Principle of optical detection, detector performance parameters, thermal detectors, photon devices, solar cell. Display devices: Luminescence, photoluminescence, cathode luminescence, cathode ray tube, electro luminescence, injection luminescence and light emitting diodes, plasma displays, display 													
bright	ness, L	CD, nu	meric c	lisplay	s.								



Unit-IV		12 hrs								
Optoelectronic integrated circuits: Introduc	tion, hybrid and monolith	ic integration, application of								
optoelectronic integrated circuits, integrated transmitters and receivers.										
RECOMMENDED BOOKs										
Title	Author	Publisher								
1. Semiconductor Optoelectronic Devices	Pallab Bhattacharya	Pearson Education Inc								
2. Photonics - Optical Electronics in Modern Communications	A. Yariv and P. Yeh,	Oxford University Press								
3. Opto Electronics – As Introduction to materials and devices	Jasprit Singh	McGraw-Hill International								
4. Opto Electronics – An Introduction	J. Wilson and J. Haukes	Prentice Hall, 1995								

P. K. Das

PEEC-302C Programming of Arduino and Interfacing															
				Progr	ammi	ng of A	Arduii T	10 and	Interfac	ing	Credita				
				<u>L</u> 2			1 1		r 0						
			Sossio	J nol M	arlze		I		U		<u>4</u> 50				
			End S	amost	ar Eva	minat	ion M	arks			<u> </u>				
Соци	•60		Aim (of the		is to	unde	ai no retand	the com	nonents o	$\frac{30}{f an \Lambda r}$	duino i e			
Ohie	<u>sc</u> ctives:		hardw	are an	d soft	vare c	ompor	istanu ients a	nd under	stand the	hasic co	ncents of			
		-	nroora	ane an	o Ardu	ino ID	E E	ients a	ind under	stand the					
Cour	'se		CO1:	Unders	stand t	he basi	$\frac{2}{c}$ conc	ents of	f program	ming					
Outc	omes:		CO2:	Learn 1	how to	protot	vne ci	rcuits v	with a bre	adboard.					
	<u> </u>		CO3:	Progra	m basi	c Ardu	ino ex	amples	S.						
			CO4:	Prototy	pe cir	cuits a	nd con	nect th	em to the	Arduino.					
Mapping of course outcomes with program outcomes															
	PO	PO	PO	PO	PO	PO	PO	PO							
	1	2	3	4	5	6	7	8	PO9	PO10	PO11	PO12			
<u>CO1</u>	3	3	2	2	3	3	2	1	1	1	1	1			
<u>CO2</u>	3	3	3	2	3	2	2	2	1	1	1	1			
<u>CO3</u>	3	3	3	3	2	1	1	2	1	1	1	2			
CO4	3	3	3		3	1	2	3	1						
Unit-I 12 hrs															
Intro archit	duction duction	on of Dev	Arduii ice and	no: Ov platfo	verviev rm fea	v, Boai tures	rd des	cription	n, Installa ligital and	ation, Pin Lanalog p	configur orts Farr	ation and			
with	Arduir	, Dev	erfacing	Board	l. Intro	duction	n to A	rduino	platform	a unulog p	0103, 1 011	innarizing			
			2	U	nit-II				<u> </u>			12 hrs			
Prog	gramm	ning]	Basics:	Ardui	ino da	ta typ	es, Va	ariables	s and co	onstants, C	operators	, Control			
State	ments,	Loop	s, Arra	ys, Poi	nter, S	tring, f	unctio	ns.)	1	,			
Ardu	lino F	uncti	ons: P	ins Co	onfigur	red as	INPU	T, Pu	ll-up Re	sistors, Pi	ns Confi	igured as			
OUT	PUT,	pinM	ode() l	Functio	on, dig	gitalWi	rite()	Functio	on, analo	gRead() f	function,	Arduino			
Intern	upts	-	0												
Ardu	t <mark>ino</mark> Ti	ime: I	ncorpo	rating A	Arduin	o time	, delay	/ () fun	ction, de	layMicrose	econds ()	function,			
millis	s () fun	ction,	micros	s() func	ction.					•					
				Un	nit-III							12 hrs			
Ardu	ino Di	isplay	s: Wor	king w	ith Ser	rial Mo	nitor,	Line gi	raph via s	erial moni	tor, Inter	facing a			
8 bit	LCD to	o Ard	uino, Fi	ixed or	ne line	static 1	nessag	ge disp	lay, Runn	ing messa	ge displa	y, Using			
the L	CD Li	brary	of Ardı	ino.					_						
Ardu	lino So	ensor	s: Ardı	11no –	Humi	dity Se	ensor,	Arduir	no – Tem	perature S	Sensor, A	Arduino –			
Wate	Water Detector / Sensor, Arduno – PIR Sensor, Arduno – Ultrasonic Sensor, Arduno –														
Connecting Switch (Magnetic relay switches)															
Unit-IV 12 hrs															
GIVII	Giving Input to the Controller: Using serial input, Controlling LEDs with keys, Keys as toggle														
SWIIC	n, mie	riacin	g a piez	LO BUZ	zer, Us	sing a t	Juzzer	as an a	uarm uni	l.					

Arduino Communications: Parallel Communication, Serial Communication Modules, Types of Serial Communications, Arduino UART, GSM/GPRS Arduino Interfacing.

RECOMMENDED BOOKS

- 1. Arduino Projects For Engineers ,BPB Publications ,Neerparaj Rai
- 2. Beginning C for Arduino, Apress, Jack purdum

Department of Electronics & Communication Engineering

P. K. Das

Dilip Kumar

J. S. Ubhi



	PREC-302														
					Ν	Aajor P	Project								
			L			Т			Р		Cree	lits			
			0			0			8		4				
Cours	e	Projec	et Wor	k aims	at deve	eloping	innovat	tive ski	lls in t	he stude	nts where	by they			
Objec	tives:	apply	in tota	ality the	knowl	edge ar	nd skills	s gained	d throug	gh the co	ourse wor	k in the			
		soluti	on of p	articula	r probl	em or b	y under	taking	a proje	ct. In add	dition, the	e project			
		work	is inter	nded to	place s	students	s for pro	ject or	iented p	oractical	training i	n actual			
		work	situatio	on for th	e stipu	lated pe	eriod wi	th a vie	w to:						
		1.	Deve	lop und	lerstand	ling of s	subject	based k	nowled	lge given	in the cl	assroom			
		in the context of its application at workplaces and first-hand experience and confidence amongst the students to enable them to use and apply													
			confidence amongst the students to enable them to use and apply												
		polytechnic/institute-based knowledge and skills to solve practical													
		problems related to the world of work.													
		2.	Deve	lop abi	lities li	ke inter	rpersona	al skills	s, comn	nunicatio	on skills,	positive			
		2	attıtu	des, and	d values	s etc.	1.		0 0 1 1	1 ·	1 • 1	1.			
		3.	Deve	lop und	erstand	ling reg	arding r	hature c	of fieldv	vork in w	vhich stuc	lents are			
C		1	going	g to play	$\frac{1}{1}$ their r	role afte	r compl	leting th	$\frac{1}{1}$ to $\frac{1}{1}$	ses of stu	$\frac{1}{4}$	· 1 1			
Cours	e	1.	Refit	ie and c	complet	te the se		project	making	g use or	the techn	ical and			
Outco	mes:	2	Worl	r with th	knowle	age wn	ich mee	ets the e	h a image	i oulcom	ie.	mainst			
		<u> </u>	W OFI	x with the	regulta	ern tool	is requir	inulator	d time	lementati	ion of the	project.			
		5. 1	Acm	eve the	hlom	solving	m me si	ipulated	u time.	n proio	not mana	acmont			
		4.	docu	mentati	on inte	solvili	g, sysu		nication	n, proje sekille		.gement,			
		יו	Manni	ng of co	urse o	utcome	s with	nrngra	m outc	omes					
	DO1							DOGIA		DO10	DO11	DO12			
	PUI	PO2		rU4	P05	r00	ru/	PUð	r09	POIU	PUII	PUIZ			
CO1	2	2	3	2	2	2	1	2	2	2	2	2			
CO^{2}	<u> </u>	3	2	2	3	<u> </u>	1	2	2	2	2				
CO2	3	3	3	3	3	2	3	3	3	3	3	0			
CO4	2	1	0	2	3	3	0	1	3	3	2	3			



	SEEC-302													
						Se	minar							
				L			Т		Р		Credi	ts		
				0			0		2		1			
Cours Objec	<u>se</u> :tives	To can multio	rry out a lisciplin	a presen nary co	ntation mpone	in one one of the second secon	of the s	peciali	zations c	of the prog	gram with	substantial		
<u>Cours</u> Outco	se omes	1. An we 2. Id m 3. De an 4. Id de in	n ability ork con entify a anagem evelop a d integ entify a clivery fluencin	y to wr npleted and ap nent stra audiend rating c and cri in pu ng a spo	and im ply app ategies ce-cant ethical tically blic an <u>eaker's</u>	prove j propria to their ered pre and leg evalua nd pro	persona te well cacade esentat al visu te the fession <u>ility.</u>	ents and ality de l-rehear mic stu ions mo al aids. quality al dis	t give or evelopme rsed not idies. eeting co of clair course,	al present ent and co e-taking oncrete pr ns, expla and unc	ommunications rel ommunication interactive ofessional unation, su lerstand ti	ated to the tion skills. and time objectives pport, and he factors		
	DO1	DOA	Mapp							DO10	DO11	DO10		
	POI	PO2	PO3	PO4	P05	PO6	PO7	PO8	PO9	POIO	POII	PO12		
CO1	2	2	3	3	3	0	0	2	2	3	2	2		
CO2	0	0	0	1	0	0	0	2	1	3	3	0		
CO3	2	1	0	1	1	0	0	2	3	3	1	3		
CO4	0	0	0	0	3	3	0	2	3	3	2	2		

P. K. Das

OEEC-202A													
	Microprocessor and Applications L T P												
									<u>P</u>		C	redits	
		Sagio	al Mar	<u>3</u> 			0		U			<u> </u>	
		Session End Se	iai Mar	TKS Evomi	nation	Marks						50	
Cour		The e	hightiga	Examine of the				a tha	atudan	ta ta ti		Jution of	
Obio	se	ine o	bjective	ol in	e cours		o expo	se the	studen			lution of	
00je	cuves	microp	rocesso	rs, the a		ure and	instruc	tion set		cal 8-b1	$t m_1 cro_1^2$	processor	
•		8085.	It also) deals	with A	Assemb	ly Lang	guage I	rogram	iming a	ind inp	ut-output	
		technic	ues. Ne	ext focu	s 1s to 1r	ntroduce	the arc	hitectur	e, progi	amming	g, and 1r	iterfacing	
		of 805	micro	controll	ers.								
Cour	se	1. Un	derstand	the eve	olution o	of micro	comput	ers.					
Outco	omes:	2. Un	derstand	the	architect	ture of	the 8	085 m	icropro	cessor	and its	various	
		applications.											
		3. Ap	3. Apply programming techniques in designing simple assembly language programs										
		for	for solving simple problems by using instruction sets of microprocessor and										
		mie	microcontroller.										
	4. Use the addressing modes and timing diagram for executing program efficiently.												
Mapping of course outcomes with program outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO12	
										0	1		
CO	3	3	3	1	2	2	1	1	0	0	2	2	
1													
CO	3	3	2	1	1	2	2	1	0	0	3	2	
2									0				
CO	3	3	3	3	2	2	2	1	0	0	3	2	
<u> </u>	2	2	2	2	2	2	2	1	0	0	2	1	
	5	3	3	2	3	2	2	1	U	U	3	1	
-					Unit-]	ſ						14 hrs.	
Intro	duction	n: Typic	al organ	ization	of a mic	crocom	outer sys	stem and	d functi	ons of it	s variou	is blocks.	
Micro	proces	sor, its e	volution	n, functi	on, and	its appli	cations.					,	
Intro	duction	1 to 8-b	it Micro	oproces	sor Arc	chitectu	re: Cor	ncept of	Bus, b	us orgai	nization	of 8085,	
functi	ional bl	ock diag	ram of	8085, fi	unctions	of each	block o	of 8085	archite	cture, pi	n detail	s of 8085	
and re	elated s	ignals.											
					<u>Unit-I</u>	I						8hrs.	
Mem	ories a	nd I/O I	nterfaci	ing: Me	mory or	ganizati	ion, con	cept of 1	nemory	mappin	ig, parti	tioning of	
total 1	memory	/ space, a			ig, conce	ept of I/	U, mapp	ped I/O	and me	mory ma	apped I/	U. Basic	
Conce	ept of R	ANI, KU	JIVI, PK	UNI, EF	KUN a	na eep	KUIVI.						

Unit-III 12hrs										
	0005	• • • • •	121115.							
Programming using 8085 Microprocessor:	8085: 8085 programm	ning model,	brief ideas of							
machine and assembly languages, machines and mnemonic codes, basic idea of instruction format										
and addressing modes, basic concept of instruction set for data transfer group, arithmetic group, logic										
group, stack, subroutine, I/O and machine control group, writing assembly language programs.										
Unit-IV 14hrs.										
Introduction to 8086 microprocessor: Register organization of 8086, Architecture, signal										
description of 8086, 8086 microprocessor programming, 8086 Instruction Set, Addressing modes,										
Assembly Language Programming with Intel 80	086 microprocessor									
RECOMM	ENDED BOOKS									
Title	Author	Publish	ier							
1. Microprocessor Architecture- Programming	Ramesh S Gaonkar	5th Edition,	Penram							
& Applications with 8085/8080A		Internationa	ll Publishing							
			-							
2. Introduction of Microprocessors & Ram B 4th Edition, Dhanpat Rai										
Microcomputers		Publisher (H) Ltd.							
		Ì								

P. K. Das

OEEC-202B														
					Di	gital L	ogic De	sign		r				
				L			T		<u>P</u>			Credits		
		~		3			0		0			3		
		Sess	sional N	Aarks	•							<u>50</u>		
		End	Semes	ster Ex	aminat	ion Ma	arks					50		
Cours	<u>se</u>	This	course	e provi	des a m	odern	introduc	ction to	o logic	design	and the	basic	building	
<u>Objec</u>	<u>etives</u>	bloc	ks used	d 1n d1	gital sy	stem.	The cou	irse de	als wit	h seque	ential c	ircuits,	random	
C			$\frac{1}{1}$	nories,	and mo	dern lo	gic devi	$\frac{1}{1}$	$\frac{ch}{1}$ as fight	eld prog	gramma	ble log	ic gates.	
Cours	<u>se</u>	1. A	n abilii	ty to a	nalyze a	and des	sign coi	mbinat	ional sy	/stems	compos	sed of s	standard	
Outco	omes		omoina n abilit	tional i	nodules	s, such a sata kny	as mulu	plexer:	s and de	mehron	0115. 010	1 async	hronous	
		2. A	in autio	iy io u al svste	ms	ale Kii	Jwieuge		inple sy	nemon	ous and	i async	monous	
		3 A	n abilit	v to an	alvze an	d desio	n simnl	e syste	ms com	mosed	of progr	ammah	le logic	
		5. 11	ich as F	Y to an ROMs 1	PLDs F	PGAs	and CP	LDs		iposeu (n progr	ammao	ie iogie,	
Mapping of Course Outcomes with Program Outcomes														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	
CO1	S	S	S	W	Μ	Ν	Ν	Ν	Ν	Ν	Μ	Ν	S	
CO2	S	S	Μ	W	W	Ν	Μ	Ν	Ν	Ν	S	Ν	Ν	
CO3	S	S	S	S	Μ	Ν	Μ	Ν	Ν	Ν	S N S			
-					Un	it-I						12	hrs	
Desig	n of co	mbinati	onal cir	cuits a	nd impl	ementa	ation us	ing mu	ltiplexe	ers, dec	oders, F	ROM, P	LA and	
PAL.													_	
~ *					Uni	<u>t-II</u>						12	hrs	
Synch	ronou	s seque	ntial ci	ircuits	: The fi	nite sta	ate mac	hine, c	design o	of singl	e multi	mode a	and ring	
counte	ers, Me	aly state	diagra	m, Mo	ore state	diagra	m, state	transit	tion tab.	les, stat	e reduct	tion tecl	nniques,	
state a	ssignm	ents, sy	ntnesis	of seq		circuits	•			I		12 h.u.a		
ACM				lun ata	<u>) - </u>	ACM	le a unter a	CM to	1 1	1-1-1	CACM.		~	
ASNI Progr	modul	es: Ine	e dovie	nm sta	te m/c, i	ASIVI C n to CI	narts, A DI De an	A EDC	Δs	iking of		nodule	5.	
TTUgi	amma	oic logi			Unit-IV		LDS al	uno	A 3			12 hrs		
Asvno	hrono	us seau	ential	circuit	s: Race	s. haza	rds. as	vnchro	nous, s	tate dia	grams.	primiti	ve flow	
tables.	state r	eduction	ns and 1	row me	rging. d	lesign (of asvnc	hronou	us state.	une and	, grains,	Printer		
	,				RECO	MME	NDED	BOOK	KS					
	TitleAuthorPublisher													
1. An	Engine	ering A	pproacl	h to Di	gital	Fl	etcher V	Willian	n, I	3 rd Ind	ian repi	rint, PH	I,	
Des	sign	0			0				,	(1994)		,	-	
2. Dig	ital De	sign				М	lorris M	lano M		3 rd Edi	tion, Pe	earson		
	Education (2002).													

OEEC-202C												
		r	Elect	ronic M	leasure	ments a	and Inst	rument	ations			
							Т	I			Credits	
				3			0	()		3	
		Session	nal Mar	·ks							50	
		End Se	emester	Exami	nation 1	Marks					50	
Cours	se	Aim of	f the cou	urse is t	o study	the bas	ics of u	nit, dim	ensions	and sta	ndards.	It also
Objec	tives:	gives d	leep insi	ght into	the PM	IMC ins	strumen	t and bri	dges. It	discuss	es the C	CRO in
~		detail.	Finally,	it intro	luces sig	gnal ger	nerator a	ind analy	yzer.			
Cours	se	1. Able to understand the various types of errors introduced in measurements.										
Outco	omes:	2. Able to understand the CDO gignal generators and enalyzers										
		3. Able	to unde	erstand	the CRC), signa	genera	tors and	analyse	ers.		
	DO1			$\frac{g \text{ of } cou}{DO4}$	rse out	comes v	Nith pro	bgram o			DO1	DO1
	PUI	POZ	PUS	PU4	P05	PUO	PU/	PUð	PU9			PO1
C01	1	2	0	1	2	2	0	1	0	0	1	2
$\frac{cor}{cor}$	1	2	2	 1	2	2	2	1	0	0	0	2
CO2	0	3	2	1	2	2		1	0	0	1	2
	U	5	4	 Un	it_I	4	U	I	U	U		12 hrs
Unit.	Unit dimensions and standards: Scientific notations and metric prefixes SL electrical units SL											
tempe	rature s	cales. di	mension	n. and st	andards	s. Measi	irement	Errors:	Gross e	error. sv	stematic	error.
absolu	ite erro	or and	relative	error.	accura	cv. pre	cision.	resolut	ion and	d signif	icant f	igures.
Measu	irement	error co	mbinati	on, basi	cs of sta	atistical	analysis	5.		0		6)
				Uni	t-II		•				1	12 hrs.
PMM	C instru	ıment, g	alvanon	neter, D	C amme	eter, DO	C voltme	eter, ser	ies ohm	meter.	AC ele	ctronic
voltm	eter, di	gital vo	oltmeter	systen	ns, digi	ital mu	lti-mete	r, digit	al freq	uency 1	neter s	ystem,
Wheat	tstone b	ridge, lo	w resist	ance me	asurem	ents, lov	v resista	nce mea	suring	instrume	ents.AC	bridge
theory	, capaci	itance br	idges, Iı	nductan	ce bridg	ges, Q m	eter.					
				Uni	t-III						-	12 hrs.
CRO:	CRT,	wave for	orm disj	play, tii	ne base	e, dual	trace os	cillosco	pe, me	asureme	nt of v	oltage,
freque	ency, an	d phase	by CRO	, oscillo	oscope p	probes, o	oscillosc	ope spe	cificatio	ons and	perform	ance.
				Uni	<u>t-IV</u>						-	12 hrs.
Signa	l genera	ator and	l analyz	er: Sig	nal gene	erator: S	ine wav	e, non-s	inusoid	al signa	l, and fu	inction
genera	ators. S	pectrum	analyze	er and d	stortion	l.	<u> </u>	TIC				
				RE	COMN	IENDE	D BOO	OKS	р 1			
	le	r 4	<i></i>			11				DIISher	D 11	•
I. Ele	ctronic	Instrume	entation	Dav	'1d A. B	ell		2	nd Ed.,	PHI, Ne	w Delh	1
and \mathbb{N}	easurer	nents	ma austra	01:-		Case		2	008. MIL 20	000		
2. Ele	ctronic	vieasure	ments		er and	Cage			win, 20	109.		
$\frac{110}{3}$ M _{\odot}		nauon		A 10	n S. Ma	rric			leavior	(Buttows	vorth	
J. Ivie	montati	n Dring	inles	Ala	II 5 . IVIO	1115			isevier	(Dutterv)		
msuu	montati		ipies						Ciminal	ш <i>)</i> , 2000)	
OEEC-301A Principle of Communication Engineering												
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			FI	<u>Incipie</u> L		munica	<u>шон ен</u> Т	Igineeri	ng >		Credits	
				3			0)		3	
		Sessio	onal Ma	irks			0		,		50	
		End S	Semeste	er Exam	ination	Marks	;				50	
Cours Objec	e tives:	The f	focus of nunicat	the cou ion syst	rse is on tems and	unders d digita	tanding l comm	the imp nunicatio	ortance	and the m. The	ories of studen	analog ts will
		techr	rstand t niques.	he vario	ous anal	og com	municat	tion tech	iniques	and pul	se mod	ulation
Cours Outco	<u>e</u> me:	1. To co 2. To 3. A	o gain k ommuni o study cauire k	nowledge cation synthesis the mether the mether nowled	ge about ystems. nods of g	the fun generati	damenta on and o	al conce detection	pts of v n of AN	arious a 1 and FN recepti	nalog M	
	4. Gain knowledge about the fundamental concepts of digital communication systems.											
	Mapping of course outcomes with program outcomes											
	PO1	PO	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1
		2								0	1	2
CO1	3	2	1	1	2	2	2	1	0	0	2	2
CO2	3	3	3	3	2	2	2	1	0	0	2	2
CO3	3	3	1	1	2	2	2	1	0	0	0	2
CO4	3	3	3	3	2	2	2	1	0	0	0	2
				Un	it-I						-	12 hrs.
Introd	luction:	Comm	nunicatio	on, info	rmation	, Messa	age and	Signals	s, Elect	romagne	etic Spe	ectrum,
Classi	fication	of sig	gnals, F	Periodic	and n	on-peri	odic si	gnals, 1	Analog	and d	igital s	ignals,
Deterr	ninistic	and ra	indom	signals,	the ele	ements	of a c	commun	ication	system	, Modu	ilation,
Defini	tion, Ty	pes of n	nodulati	on, Nee	ed for mo	odulatic	on.					
				Uni	t-II						-	14 hrs.
Ampli	itude/Li	near N	Aodula	tion:	Definiti	on, Ex	pression	of Al	M wav	e, mod	ulation	index,
freque	ncy, spe	ctrum, ł	bandwic	lth, pow	er conte	nts of si	debands	s and car	rier. DS	SB-SC, I	DSB-FC), SSB-
SC, th	eir comp	parison	and are	as of ap	plicatio	ns, Bas	ic princi	iple of A	AM gen	eration,	Genera	tion of
DSB a	DSB and SSB signals, AM diode detection, envelope detector.											
				Uni	t-III							12 hrs.
Angle, bandw genera slope o	Angle/Exponential Modulation: Modulation index, frequency deviation, frequency spectrum and bandwidth of FM wave, Power contents in FM, Phase modulation. Basic principle of FM generation, Varactor diode modulator, FM detection, basic principle of slope detection, balanced slope detector											

Unit-IV	7	10 hrs.								
Elements of Digital Communication: E	Block diagram of Digital	Communication system, Digital								
representation of Analog signals, Advanta	iges and Disadvantages o	of Digital Communication system								
Sampling Theorem and Pulse code mo	dulation: Sampling, Nat	ural sampling, flat top sampling,								
Sampling Rate, Aliasing, Pulse code mod	lulation.									
RECOMMENDED BOOKS										
Title	Author	Publisher								
1. Electronic communication	Kennedy	Tata McGraw Hill								
systems										
2. Electronic Communications	Wayne Tomasi	Pearson Education								
System: Fundamentals Through										
Advanced										
3. Principles of communication	Taub and Schilling	Tata McGraw Hill								
systems										
4. Communication system (Analog	Sanjay Sharma	Katson Books								
and Digital)										
5. Communication System	Simon Haykin and	Wiley Publisher								
	Michaek Mohar									

P. K. Das

Dilip Kumar

J. S. Ubhi

	OCEC-301B													
		1		Introc	luction	to Pyth	on Prog T	<u>grammi</u>	ng			1.4		
				L 2					<u> </u>		C	redits		
		Carrier		<u>)</u> .l.a			U		U			3 50		
		Session End S		KS Even		Maulia						50		
~		Ena So	emester	Exam	ination .	Marks				0.5.1		20		
Cour	se	The ob	jective o	of the c_1	ourse 1s	to expo	se the st	tudents 1	to basic	s of Pyth	10n			
Obje	ctives	Progra	mming,	and alg	orithmi	c proble	m solvi	ng. The	student	s will ga	ain hand	s-on		
:		experie	ence to s	olve pr	oblems	using Py	ython co	ondition	als and	loops. P	ython fi	inctions		
		and use	e functio	on calls	to solve	problei	ns. 10 i	ise Pyth	on data	structur	es - lists	s, tuples,		
Course	~ ~ ~		aries to	represe	nt comp	nex data	l. 			-1-1				
Cour	se	1. Dev	elop alg			ons lo si	mple co	mpulali	onal pro	oblems.				
Oute	omes:	$\begin{array}{c} 2 \mathbf{Dev} \\ 3 \mathbf{W}_{min} \end{array}$	elop and	a Dutha	n nrogra	e Pythol	i progra	uns.	and loop	ning for	colving			
		5. WIII	e simple	e rytho	n progra	uns usin	ig condi	tionals a	and loop	Jing Ioi	sorving			
		4 Rem	resent co	mnour	nd data u	ising Py	than lie	ts tunle	s dictic	naries e	te			
		4. Rep.	Manni				with n	rogram						
	DO1	DOA	Mappi				b with p				DO1	DO10		
	POI	PO2	PO3	PO4	P05	PO6	PO7	PO8	PO9		1 POI	POIZ		
CO	3	3	3	1	2	2	1	1	0	0	2	2		
1		0	Ũ	-	-	-	-	-	Ū	Ŭ		-		
CO	3	3	2	1	1	2	2	1	0	0	3	2		
2			_	-	-	_	_	-	Ū	Ŭ		_		
CO	3	3	3	3	2	2	2	1	0	0	3	2		
3														
CO	3	3	3	2	3	2	2	1	0	0	3	1		
4														
					<u>Unit-</u>	Ι						14 hrs.		
Data	Types,	Expres	sions, S	tateme	nts: Pyt	hon inte	rpreter	and inte	ractive	mode, d	ebuggin	ıg; values		
and ty	ypes: in	t, float, l	ooolean,	string,	and list	; variabl	les, expi	ressions	, statem	ents, tup	ole assig	nment,		
prece	dence o	of operate	ors, com	nments;	Illustrat	tive prog	grams: e	exchange	e the va	lues of t	wo vari	ables,		
circul	ate the	values o	f n varia	ables, d	istance b	between	two po	ints.						
					<u>Unit-I</u>	I						8hrs.		
Cont	rol Flo	w, Func	tions, St	trings:	Conditi	onals: B	oolean	values a	nd oper	ators, co	ondition	al (if),		
altern	ative (i	f-else), c	hained	conditio	onal (if-o	elif-else); Iterati	ion: stat	e, while	e, for, br	eak, con	tinue,		
pass;	Fruitfu	l functio	ns: retur	n value	s, paran	neters, le	ocal and	l global	scope, t	function	compos	sition,		
recurs	sion; St	rings: sti	ring slice	es, imm	nutability	y, string	functio	ns and r	nethods	s, string	module	; Lists as		
array	S.										- [
.	a -			.	<u>Unit-I</u>	<u>II</u>		1.				12hrs.		
Lists	, Tuple	s, Dictio	naries:	Lists: 1	ist opera	ations, li	st slices	s, list me	ethods,	list loop	, mutabi	lity,		
aliasi	aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries:													



operations and methods; advanced list processing - list comprehension; Illustrative prog	grams:
simple sorting, histogram, Students marks statement, Retail bill preparation.	
<u>Unit-IV</u>	14hrs.
Files and Miscellaneous: Files: File Objects, File Built-in Function [open()], File	ilt-in
Methods, File Built-in Attributes, Standard Files, Regular Expressions.	
RECOMMENDED BOOKS	
Text book:	
1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.	
Reference Books:	
1. Think Python, Allen Downey, Green Tea Press.	
2. Introduction to Python, Kenneth A. Lambert, Cengage.	
2 Duthon Drogroupming A Modern Annagoch Vergi Kymme Dogroon 4 Looming D	Druth an

3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson. 4. Learning Python, Mark Lutz, O'Reilly.

Department of Electronics & Communication Engineering

P. K. Das

OEEC-301C													
				<u> </u>	Ireless	Comm	unicatio	on T)		Cuadita		
				L 3			<u>1</u> 0	1					
		Sessi	nal Ma	J arks			U	L (,	50			
		End S	Semeste	r Exam	ination	Marks	3				<u> </u>		
Cours	se	Aim	of the c	ourse is	to stud	ly the h	asics of	cellula	· systen	n It also	o gives	a deen	
Objec	c tives:	insigh	nt in to t	he vario	ous type	es of fad	ling effe	ects. It d	iscusses	the dif	ferent ty	mes of	
o »jet		modu	lation te	echnique	es used	for mol	oile com	munica	tion. Fi	nally, it	introdu	ces the	
CDMA and GSM techniques used for mobile communication.													
Cours	se	1.	Under	stand th	e basics	s terms	related t	o wirele	ss com	municat	ion syste	em.	
Outco	omes:	2.	Under	stand th	e basics	s of cell	ular con	nmunica	tion sys	stem.			
3. Understand the modulation techniques used in mobile communic										nunicatio	on.		
Mapping of course outcomes with program outcomes													
	PO1	PO	PO PO3 PO4 PO5 PO6 PO7 PO8 PO9								PO1	PO1	
		2								0	1	2	
CO1	2	2	0	0	1	2	0	1	0	0	3	2	
CO2	1	2	3	3	1	2	0	1	1	2	2	2	
CO3	3	2	1	2	1	1	2	3					
<u>Unit-I</u> 12hrs.													
Intro		to Wire	eless Co	mmuni	cation S	System	s: Conce	ept of ce	llular c	ommuni	cation s	ystem,	
basics	of wirel	ess cell	ular sys	tem, mo	bile uni	it, base	station,	mobile s	switchir	ig center	r, perfor	mance	
interfe	a, voice	quant	y, servi	ce qual	mining	the fre	and rec	relise (distance	chann	e, co-c	mannel	
strated	vies hand	1-off st	rategies	interfe	rence a	nd syste	m cana	reuse v	instance	, chann	ci assig	sinnent	
Brace	5105, mark	4 011 50	lute gies,	Uni	t-II	na syst	in capa	oncy.			1	12 hrs.	
Mobi	le Radio	Prop	agation	: Introd	uction	to radio	o wave	propaga	tion, fi	ee spac	e propa	gation	
model	, basic	propaga	ation m	echanis	ns, refl	lection,	diffract	ion, sca	ttering,	types	of smal	l-scale	
fading	, fading	effects	due to I	Doppler	spread a	and dela	ay spread	d.	Ċ.	• 1			
				<u>Unit</u>	:-III						1	12 hrs.	
Modu	lation T	`echniq	ues: In	troducti	on to li	near mo	odulatio	n techni	ques, n	ninimun	n shift k	xeying,	
gaussi	an minin	num sh	ift keyir	ng, sprea	id spect	rum mo	dulatior	technic	ues.				
	1.00		<u> </u>	Uni	<u>t-IV</u>	1 1.	•••	1.1.1				<u>12 hrs.</u>	
Adva	nced Tra	ansceiv	er Sche	emes: C	ellular ($\operatorname{code}_{\cdot} \operatorname{dr}_{1}$	vision n	ultiple	access s	systems,	, GSM,	IS-95,	
and in	and introduction to fourth and fifth generation wireless communication standards.												
				RE	COMN	1ENDE	D BOO	OKS					
Title	1	<u> </u>				Author	,			Publis	sher	2002	
1. W11	eless con	nmunic	cations		T.S	s Kappa	port		Pear	rson Edu	ication,	2003.	
2. Prir	nciples of	f Mobil	e Comn	nunicati	on Go	rdon L.	Stuber		Spri	nger Int	ernatior	nal	
Ltd., 2001.													

3. Wireless Communications	Andrea Goldsmith	Cambridge University Press, 2007
		11035, 2007

	OEEC-302A Optical Electronics												
				T	(optical	Electr T	onics		Р		Cr	odits
				3			 0			<u> </u>			3
		Ses	sional				0			0			50
		End	l Seme	ster Ex	xamina	ation N	larks						50
Cours	se .	То	familia	rize the	e desig	n conc	ent of a	ntoele	ectronic	s device	es and	circuits	by using
Objec	<u>etives</u>	diff	erent	design	techn		s used	for	design	of of	otoeleci	tronics	devices.
		Imp	lement	ation a	approad	ch of c	optoele	ctronic	s devi	ces in r	nodern	comm	unication
		syst	em. To	study	the de	esign a	nd eval	uation	of mo	dern op	toelect	onics in	ntegrated
		syst	ems.	2		C				1			U
Cours	se	1.	To gai	n know	vledge	about t	he fund	lament	al conc	cepts of	various	s optoel	ectronics
Outco	Outcomes devices.												
		2.	Ability	to util	lized og	ptoelec	tronics	device	es in hi	igh spee	d optic	comm	unication
			system	s.									
		3.	Ability	to ana	lyze, m	odel an	id impl	ement a	advanc	ed techn	iques i	1 optoel	ectronics
			fabrica	tion.									
			1	• •	C	0 (•41		4			
	DO1	DOJ	Mapp	ing of	Course DO5	e Outco	omes w	hth pr	ogram	outcon	nes	DO11	DO12
CO1	PUI M	rO2 M	rus c	r04 6	r05 6	rU0 N	PU/ M	PU0 M	PU9	POIU M	ron s	ruiz N	r015 M
$\frac{cor}{cor}$	S IVI	IVI S	5 5	S S	5 5		IVI N	IVI S	M	M	S	N	M
$\frac{CO2}{CO3}$	5	S	S M	M	5	N	W	S	M	M	S	N	M
	6	5	IVI	IVI	<u> </u>	nit_I	••	5	IVI	IVI	5	1	8 hrs
Eleme	nts of	' light	and s	olid-st	ate nh	vsics [.]	Wave	natur	e of li	oht no	larizati	on inte	rference
diffrac	ction. 1	ight so	urce. r	eview	of qua	ntum r	nechan	ical co	oncent.	review	of sol	id state	physics.
generi	c optic	al svste	ems and	d funda	amental	l buildi	ng blog	ks. ba	sics of	semicor	iductor	optoele	ectronics.
eleme	ntal a	nd con	npound	d sem	icondu	ctor,	electro	nic pr	opertie	es and	optica	1 proc	esses in
semico	onducto	ors.	1			,		1	1		1	1	
					Un	it-II							14 hrs
Optic	al sour	ces Em	ission a	and abs	sorption	n of rad	liation,	absorp	tion of	radiatio	n, popu	lation i	nversion,
optica	l feedb	ack, th	reshold	l condi	itions-la	aser los	sses, li	ne shaj	pe funo	ction, po	opulatio	on inver	sion and
pumpi	ng thr	eshold	conditi	ions, la	aser me	odes, c	lasses	of lase	er, sing	gle mod	e oper	ation, f	requency
stabili	stabilization.												
		_			Uni	it-III							14 hrs
Photo	Photo detectors: Principle of optical detection, detector performance parameters, thermal detectors,												
photor	photon devices, solar cell.												
Displa	ay dev	ices: L	umines	scence,	, photo	lumine	scence	, catho	ode lui	minesce	nce, ca	thode 1	ray tube,
electro) lumir	nescenc	e, injec		umines	cence a	and lig	nt emit	tting di	iodes, p	iasma (usplays	, display
oright	ness, L	CD, nu	meric (usplay	s.								



Unit-IV		12 hrs
Optoelectronic integrated circuits: Introduc	tion, hybrid and monolith	ic integration, application of
optoelectronic integrated circuits, integrated tr	ansmitters and receivers.	
RECOMM	IENDED BOOKs	
Title	Author	Publisher
1. Semiconductor Optoelectronic Devices	Pallab Bhattacharya	Pearson Education Inc
2. Photonics - Optical Electronics in Modern Communications	A. Yariv and P. Yeh,	Oxford University Press
3. Opto Electronics – As Introduction to materials and devices	Jasprit Singh	McGraw-Hill International
4. Opto Electronics – An Introduction	J. Wilson and J. Haukes	Prentice Hall, 1995

P. K. Das

OEEC-302B Programming of Andring and Interfacing														
				Progr	ammi	ng of A	Arduii T	10 and	Interfac	ing	Credita			
				<u> </u>			1 0		<u>r</u>		3			
			Sessio	J nal M	orke		0		0		50			
			End S		ai ks er Exa	minat	ion M	arks			50			
Сош	'SP		Aim a	of the		is to	unde	rstand	the com	nonents o	f an Arc	luino i e		
Ohie	<u>se</u> ctives:		hardware and software components and understand the basic concepts of											
	0011051	-	progra	mming	2 Ardu	ino ID	E E	101105 0			00010 00			
Cour	se		CO1:	Unders	stand t	he basi	c conc	epts of	f program	ming.				
Outc	omes:		CO2:	Learn l	how to	protot	ype ci	rcuits v	with a bre	adboard.				
			CO3:	Progra	m basi	c Ardu	ino ex	amples	s.					
CO4: Prototype circuits and connect them to the Arduino.														
	-		Map	ping of	f cours	se outc	omes	with p	rogram	outcomes				
	PO	PO	PO	PO	PO	PO	PO	PO						
<u> </u>	1	2	3	4	5	6	7	8	PO9	PO10	PO11	PO12		
CO1	3	3	2	2	3	3	2	1	1	1	1	1		
$\frac{\text{CO2}}{\text{CO2}}$	3	3	3	2	3	2	2	2						
$\frac{CO3}{CO4}$	3	3	3	3	2			2				2		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $											121			
Intro archit	ductio	n of , Dev	Arduin ice and	no: Ov platfor	rm fea	v, Boar tures.,	rd des Conce	cription opt of d	n, Install ligital and	ation, Pin d analog p	configur orts, Fam	ation and niliarizing		
wittii .	Aluuli				nit_II	auctio	II IO A	luumo	plation	•		12 hrs		
Proc	ramm	ing]	Rasics.	Ardui	no da	ta tvn	es Va	ariable	s and co	nstants ()nerators	Control		
State	ments.	Loon	s. Array	vs. Poi	nter. S	tring f	unctio	ns.	s und et	motunto, c	perutors	, control		
Ardu	ino F	uncti	ons: P	ins Co	nfigur	red as	INPU	T. Pu	ll-up Re	sistors, Pi	ns Confi	igured as		
OUT	PUT,	pinM	ode() l	Functio	on, dig	gitalWi	rite()	Functio	on, analo	gRead() f	function,	Arduino		
Intern	upts	1	0				V			0				
Ardu	i <mark>ino</mark> Ti	i me : I	ncorpo	rating A	Arduin	o time	, delay	/ () fun	ction, de	layMicrose	econds ()	function,		
millis	s () fun	ction,	micros	s() func	tion.					1				
				Un	it-III							12 hrs		
Ardu	ino Di	isplay	s: Wor	king w	ith Ser	rial Mo	nitor,	Line gi	raph via s	serial moni	tor, Inter	facing a		
8 bit	LCD to	o Ard	uino, Fi	ixed or	le line	static 1	nessag	ge displ	lay, Runr	ning messa	ge displa	y, Using		
the L	the LCD Library of Arduino.													
Ardu	tino So	ensor	s: Ardı	11no –	Humi	dity Se	ensor,	Arduir	no – Ten	perature S	Sensor, A	rduino –		
Wate	r Dete	ctor /	Senso	r, Ard	u110 –	- PIR	Sensor	, Ardu	uno – U	Itrasonic S	Sensor, A	rduino –		
Conn	ecting	Swite	en (Mag	gnetic r	elay sv	witches	5)					121		
Circi	ng Inr	ut to 4	ho Co-	<u>Un</u> tralla	<u>IIT-IV</u>	a acri-	1 in	Cont	ollin ~ T T	Do with 1-	War	12 nrs		
	ig into	ut to t rfacir	ne Con		: USIN	g seria	i input	, Contr	larm uni	t S WITH KO	eys, Keys	as loggle		
swite	switch, interfacing a piezo Buzzer, Using a buzzer as an alarm unit.													

Arduino Communications: Parallel Communication, Serial Communication Modules, Types of Serial Communications, Arduino UART, GSM/GPRS Arduino Interfacing.

RECOMMENDED BOOKS

- 1. Arduino Projects For Engineers ,BPB Publications ,Neerparaj Rai
- 2. Beginning C for Arduino, Apress, Jack purdum

Department of Electronics & Communication Engineering

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OEEC-302C Internet of Things and Applications												
				L	net of		<u>апи А</u> Т	ррпсат	P		Credits	
		-		3			0		0		3	
		-	Session	nal Mai	rks		-		•		50	
		-	End Se	emester	· Exam	ination	Mark	5			50	
Cours	se		Aim of the course is to understand the basic concepts of Internet of Things and									nings and
Objec	tives:		able to	build]	loT app	olication	ns, Lea	rn prog	rammir	ng and use	e of Ard	uino and
			Raspbe	erry Pi b	oards.							
Cours	se		CO1. Known basic protocols in sensor networks.									
Outco	mes:		CO2. F	rogram	and co	nfigure	Arduir	no boar	ds for v	arious des	signs.	
			CO3. F	ython p	program	nming a	ind inte	rfacing	for Ras	spberry Pi		
CO4. Design IoT applications in different domains												
Mapping of course outcomes with program outc										comes	1	1
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	3	2	1	1	1	1	1
CO2	3	3	3	2	3	2	2	2	1	1	1	1
<u>CO3</u>	3	3	3	3	2	1	1	2	1	1		2
004	3	3	3		3 :4 T	I	2	3	1	1	I	12 hrs
Intro	Justian	ofIo	L. Dofir	<u>UI</u> vition or	<u>II-I</u> nd ahar	actorist	ion of L	T Dhu	vision 1 de	nian of Ia	T Thing	
Intro	rotocol		ical De	ntion al		T func	tional	blocks		mmunica	tion Mo	dels IoT,
comm	unicati	on AP	l's IoT	enablir	no Tech	nologi	es Wire	eless se	nsor ne	etworks C		mniiting
Big D	ata An	alvtics.	Comm	unicati	on prot	ocols.	embedd	led syst	tems. Ic	T Levels	and Der	plovment
templa	ates – I	oT Lev	el-1, Io	T Level	l-2, IoT	Level-	3. IoT]	Level-4	. IoT L	evel-5. Io	Γ Level-6	5
-				Uni	t-II				,			12 hrs
Doma	in spec	cific Io	T: Intro	duction	, Home	e autom	ation- S	Smart li	ighting,	smart app	liances,	intrusion
detect	ion, sm	oke for	r gas de	tectors;	Cities-	Smart	Parking	g, Smar	t lighti	ng, Smart	Roads, S	Structural
Health	n Moni	toring,	surveil	lance, 1	Emerge	ency Re	esponse	; Envir	onmen	t- Weathe	r monite	oring, air
pollut	ion mo	onitorin	g, nois	e pollu	tion mo	onitorin	ng, fore	st fire	detecti	on, river	flood's o	detection
Energ	y- Sma	rt grids	, renew	able en	ergy sys	stems, p	orognos	tics; Re	etail- In	ventory m	anageme	nt, smart
payme	ents, sn	nart ve	nding n	nachine	s; Logi	stics- I	Route g	eneratio	on and	schedulin	g, Fleet	tracking,
Shipm	Shipment monitoring, Remote vehicle diagnostics; Agriculture- Smart Irrigation, Green house											
contro	1; Indus	stry- M	achine	diagnos	is and p	brognos	sis, indo	or air Q	Quality 1	monitoring	g; Health	and Life
Style-	Health	and II	iness m	onitorin	ig, wea	rable e	lectroni	CS.				12 hrs
Intro	Justice		rduina	Drogr	<u>i-III</u> ammi-	a lan	TUAGAL	Introd	lation	to Andre	Drace	12 nrs
Integr	Integration of Sensors and Actuators with Arduino											
megi	Integration of Sensors and Actuators with Arduino.											



<u> </u>	nit-IV	12 hrs									
Introduction to Python Prog language: Introduction to Python programming, Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi.											
RECOMMENDED BOOKS											
Title	Author	Publisher									
1. "Internet of Things: A Hands-on Approach"	Arshdeep Bahga and Vijay Madisetti	Universities Press									
2. "Programming Arduino" Getting started with sketches	Simon Monk	McGraw-Hill									



QPEC-102 Computing and Peripherals Technician												
				Compu T	ung an	a Perip	nerais 1	l echnic	D		Crad	ita
							0		8		<u> </u>	115
Course		The c	ourse ai	ims to a	- auin st	udents :	with the	knowl	edge an	d practice	al skills r	equired to
Objecti	ves:	effecti periph secure ensuri empha comm	effectively assemble, configure, maintain, and troubleshoot computer hardware and peripheral devices. Students will learn to install and manage operating systems, set up and secure networks, and utilize diagnostic tools to resolve hardware and software issues, ensuring optimal system performance and customer satisfaction. The course will also emphasize the importance of preventive maintenance, data security, and professional communication in technical support scenarios.									
Course		1. De	emonstra	ate pro	ficiency	in ass	semblin	g, conf	iguring,	and ma	intaining	computer
Outcom	les:	ha	rdware	and peri	pherals		•		0 0,		U	1
		 Instant Instant Ution 	stall, con ensure cilize dia sues, ens	nfigure, optimal agnostic suring s	and tro system tools a ystem s	ublesho perform and soft ecurity a	ot opera ance an ware to and cust	ting sys d reliab identify omer sa	tems, ne ility. / and re tisfactio	etworks, a solve hare n.	nd storage dware and	e solutions d software
	Mapping of course outcomes with program outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	2	0	1	3	2	1	3
CO2	3	3	3	3	3	2	2	1	3	2	1	3
CO3	3	3	3	3	3	2	0	1	3	2	1	3
		 As Inst o As Inst o Inst o As Inst o Inst	ssemble stall Wi ccess an stall diff stall and stall and stall and onnect a stall stall a stall stall stall stall stall stall stall stall stall stall	a comp ndows a d config ferent ty l config l test a p l config al test a p l config asic wir and resol ate prop are tool reventiv pdates. l config omputer	uter fro and Linu gure BIG pes of I ure HD oower su ure a pr orate a n ure exter ed and commo ve commo ve commo	m indivi ux opera DS/UEF RAM an D and S upply ur inter and nonitor f ernal US wireless n netwo mon prin ling and gnose ar tenance etwork I ual-boot	idual co ting sys I setting d config SD stora it in a d for optir B and n networ rk issue nter issue tinstalla d fix ha tasks or nterface	mponen atems or gure the age devi lesktop of er. nal disp etwork- k and co s using les, inclu- tion tec ardware a desktop card a uration f	tts and v n a PC ar otimal per m in the ices in a case. lay perfattached onfigure diagnos uding co hniques and soft top com nd verifa	erify its f nd configu- erformance BIOS. desktop I ormance. l storage o network tic tools. onnectivity to prever tware issu puter, inc y network dows and	unctionali ure dual b e. PC. devices. settings. y and prin t ESD da luding cle c connecti Linux ope	ity. oot. t quality mage. caning and vity. erating



18. Perform data recovery on a failed storage device using recovery software.
19. Set up and configure a router and switch for a small network.
20. Use antivirus and anti-malware tools to detect and remove malicious software.
21. Configure and use cloud storage services for data backup and synchronization.
22. Install and configure virtual machines using virtualization software like VirtualBox
or VMware.
23. Set up and configure a RAID array for improved performance and redundancy.
24. Perform system backup and restore operations using different methods and tools.
25. Simulate a customer support scenario, including problem diagnosis, resolution, and
customer communication.

P. K. Das

					Q	PEC-1	02						
				Elec	tronics	worksh	op Prac	ctices					
			Ι	1		Τ		P			Credits		
			0			0		8			1		
Cours	e	The ob	jective	is to une	derstand	d basic electronic instrument terminology and to learn							
Objec	tives:	how to calibrate and monitor a variety of electronic instruments so as to apply											
~		measur	rement p	principle	es to fiel	ld applie	cations.						
Cours	ourse 1. Operate the electronic instruments like dig									g multim	neter, Cl	RO etc.	
Outco	mes:	2. To	2. To recognize and test various active and passive electronic components like resistors capacitors diodes transistors etc.										
resistors, capacitors, diodes, transistors etc.													
		5. To design and implement electronic circuits on PCB.s											
	DO1										DO1	DO1	
	POI	POZ	POS	PO4	P05	PUo	PO/	PU8	P09				
C01	3	2	2	2	2	2	2	3	3	<u> </u>	1	2	
C01	3	2	3	3	3	3	3	2	2	3	1	3	
CO2	3	3	2	3	2	2	2	2	1	3	1	3	
		_											
		List of	List of Experiments:										
		1.	1. Study of Electronic measuring Instruments: (Multimeter - Digital and										
			Analog): This topic covers the use of multimeter to check voltage, current										
			and als	o to che	eck vario	ous elec	tronic c	ompone	nts and	(Study	of CRO): This	
			topic c	overs th	e proced	dure to o	check th	e freque	ency and	d amplit	ude of a	signal	
			wavefo	rm.	1			1		1		U	
		2.	Study	of elect	ronic c	ompon	ents: Tł	nis topic	covers	the fan	niliariza	tion of	
			some	basic	electron	ic con	nonente	s and	circuit	symbo	ols (Re	sistors	
			Canaci	tors Di	odes Ti	ransistor	rs IC's	etc) an	d identi	ification	of com	nonent	
			values	1013, DI	00003, 11	ansisto	13, 10 3		a lacita	lineation		ponent	
		3	Tostin	م م مامر	otronic	compor	onte. T	his toni	c cover	how to	test ele	etronic	
		5.		g of cico		timatar	(A or integration)				test ele	cuonic	
		1	To stud	ly and y	igualiza	the colu	domina le	it and w		aldarina		tions	
		4.	To stuc Solder	ing nra	sualize	ircuit a	semblir	n and v	ice usin	o nrinte	d circui	t board	
		5. Soluering practice: Circuit assembling practice using printed circuit board											
		with electronic components.											
		0.	To Sold	the $\Omega *$	U Dase (n a gen	erai pur	pose PC er confi	D. auration	า			
		× /.	To stu	dv the	innut a	and out	but $V_{-}I$	charac	eteristic	s of co	mmon	emitter	
		0.	config	iration	mput t			Unarac		5 01 00.		Children	
		9.	To stu	dv the	input a	nd outr	ut V-I	charact	eristics	of com	mon co	ollector	
			configu	iration.	-r -r - w		·- · ±						
		10.	To stuc	ly the ar	<u>npli</u> fyin	ng chara	<u>cter</u> istic	s of NP	N and P	<u>NP</u> tran	sistor.		

11. Assembling of simple electronic circuits: This topic covers the use of
breadboards for assembly of the following circuits
a. Half wave rectifier circuit with and without filter
b. Full wave rectifier circuit with and without filter
c. Simple LED flashing circuit using Transistors / ICs
d. DC regulated power supply.

P. K. Das

	QPEC-103											
		T			PCB I	Design [Fechnic	ian –			~ .	
				4		<u> </u>		<u> </u>			Credi	its
C		T11	<u> </u>		1	<u> </u>	1 4	24	•		3	. 1 1
Cours	se ctives:	to calib princip	prate and prate to fig	to und d monit eld app	or a vari lications	iety of e	ectronic	c instrui c instru	ment ter ments s	minolog	gy and to apply m	easurement
Cours	se	1.	Unders	tanding	of type	of PCB	like sir	ngle laye	er, doub	le layer	and mu	lti-layer
Outco	omes:	2. Familiarization with the PCB Assembly procedures										
		3. Knowledge of SMT Machines										
			Mappi	ing of c	ourse o	utcome	s with p	orogran	1 outco	mes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO12
CO1	3	2	2	2	2	2	2	3	3	3	1	3
CO2	3	2	3	3	3	3	3	2	2	3	1	3
CO3	3	3	2	3	2	2	2	2	1	3	1	3
		1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15.	Learn t Study of Identifi techniq Learn t solderin Learn t Select t Insert c Solder standar Conduc Learn t to rectifi Create	the associate of various cation of various cation of various cation of ues. The use and static the base ature, et the tools the approximation of the condition of the sector function of	embly p ogy (SM us types of vario hand to on, etc. sics of tc. and t s/softwa opriate ents into mponent ting pro ional tes erent typ ame. yout for PCB La	orocessee (T), and of activ us type: ools such solderi ypes of re and p process o designa- ts onto cedures t of PCI es of er 5V regu ayout D ayout D	es such mixed e and p s of Pri h as lea ng such solderin rocess of to asser ated pla circuit (SOP). B assem rors that ulated p esign of esign of	as thru technolo assive c nted Cin ad formi h as ha of PCB 1 nble the ted throu board u ably to id t occur of ower su F Half w	-hole to ogy. ompone reuit Bc ang tool andling as dry at layout d e PCB. ugh-hol using th dentify s during f pply. ave rect ave rect	ents base pards (P s, cutter the so nd cold lesign. es (PTH e solder solderin unctiona	gy (TH' ed on the CB) and c, cutting ldering solder.	T), surface eir ratings. d soldering g machine, iron, iron the design. tion as per d errors. nd methods

Page 88



16. Schematic and PCB Layout Design of Half & Full wave rectifier with fixed
voltage regulator circuit design.

P. K. Das



						QPEC	C-201						
		1	Cor	sumer	Electro	nics Ap	pliance	es Techi	nician				
				<u>L</u>			<u>T</u>		<u>P</u>		Cred	its	
G				0	• .	1 .	0	1 1	8	1	1 1 11	• 1 .	
Course		The c	ourse at	ims to	equip st	udents	with the	e knowl	edge an	d practica	al skills r	equired to	
Objecti	ves:	electronic appliances Students will learn to install and maintain essential household											
		device	onic app	ring the	ir safe a	nts will nd effic	ient one	ration	II and I The cou	naman irse also o	essential	nousenoid setup and	
		troubl	eshootir	ng of ac	li saic a Ivanced	electror	nic syste	ems and	smart h	nome tech	nologies	nrenaring	
		studer	ts to ad	dress th	e evolvi	ing need	ls of mo	dern ho	usehold	s.	morogres,	proparing	
Course		1. De	emonstr	ate pro	ficiency	in disa	ssembli	ing. rea	ssembli	ng, and d	liagnosing	, common	
Outcon	nes:	iss	sues in v	various	consume	er electr	onic apr	oliances				,	
		2. In	stall, m	aintain,	and re	epair es	sential	househo	old appl	liances, e	nsuring s	safety and	
		fu	nctional	ity.		-				-	C	•	
		3. Se	3. Set up, configure, and troubleshoot advanced electronic systems.										
			Mapp	oing of o	course o	outcome	es with	program	n outco	mes			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
CO1	3	3	3	3	3	2	0	1	3	2	1	3	
CO2	3	3	3	3	3	2	2	1	3	2	1	3	
CO3	3	3	3	3	3	2	0	1	3	2	1	3	
		List o	List of Experiments:										
		1. 10	plot th	e direct	ional pa	ttern of	a loudsp	peaker.					
		2. To	plot th	e direct	ional pa	ttern of	a movir	ng coil n	nicropho	one.			
		3. To	study t	he bloc	k diagra	m and v	vorking	of an au	udio tapo	e recordei	•		
		4. Fa	ult Find	ling in T	Tape Tra	insport l	Mechan	ism of a	Cassett	te Tape R	ecorder.		
		5. To	study a	& plot t	he frequ	ency res	sponse o	of Audic	o Ampli	fier.			
		6. To	study &	& plot tł	ne freque	ency res	ponse o	f cross-o	over netv	work used	l in stereo	-amplifier.	
		7. To	o unders	tand the	e workin	ig of DT	TH syste	em.					
		8. To	o unders	tand the	workin	ig of dig	gital cloo	ck and f	ine out t	the faults			
		9. Di	isasseml	oly and	Reasser	nbly of	a Micro	wave O	ven.				
		10. D	iagnosi	ng and l	Replacir	ng a Mic	crowave	Oven N	Aagnetro	on.			
		11. Tr	oublesh	ooting	he Refr	igerator	Defrost	t System	1.				
		12. Re	eplacing	a Fault	y Refrig	gerator 1	l'hermos	stat.					
		13. Te	esting a	Washin	g Mach	ine Mot	or.	71	N f 1. :	_			
		14. Ke	eplacing	the Dru	im and in R	Bearing:	s in a w	asning.	Machine	Э.			
		15. Di 16 Di	isasseim	ory and R	enlacin	nory or a	an led d tv b	1 elevis	1011. t				
		10. D	sting M	lg and r	ve Oven	g all LL Safety	and Rac	liation I	evels				
		18. Di	agnosin	g and R	enlacin	g an Ele	ectric W	ater He	ater The	rmostat			
		19. Di	lagnosin	ig and R	Leplacin	g Oven	Heating	Elemer	its.	out.			
		20. Te	esting ar	nd Repla	acing an	Electric	c Kettle	Thermo	ostat.				
			0	1	0								

	QPEC-202												
		Troub	leshoot	ing & N	Mainten	ance of	Electro	<u>onic Eq</u>	uipmen	nt's			
						1		<u>P</u>		Credits			
6		0		• 1 .1	. 1	0							
Cours	e	The co	urse pro	vides th	ie studei	nts with	necessa	ary know	vledge a	and com	petency	to	
Objec	tives:	diagno	se the fa	ults for	trouble	shootin	g and fo	or syster	natic re	pair and	mainter	nance	
C		of elec	$\frac{\text{tronic eq}}{\Sigma^2}$	quipmer	$\frac{11}{11}$	testing	$\frac{\text{of comp}}{1}$	onents.	• ,	. 11			
Cours	e	1.	Find fa	ults as v	vell as r	epair va	rious el		instrun	nents lik	e C.R.C),	
Outco	mes:	2	2. Analyse the detailed functioning, fault finding and repair of UPS and home										
		Ζ.	Analys	e the de		inctioni	ng, fault	innaing	g and rej	pair of C	JPS and	nome	
		2	Inverter	r system	l. fragua		once of	landar	altan m	ioropho	no and	andia	
		5. Understand the frequency response of foudspeaker, incrophone, and at									audio-		
		amprincis.									umer		
		т.	equipm	ent/gad	oets	g princi	pic and	iaun ui	agnosis			uniter	
		N	Aappin	g of cou	rse out	comes v	vith pro	ogram o	outcom	es			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	
	101	102	100	101	100	100	10,	100	107	0	1	2	
CO1	3	3	1	3	3	2	2	1	2	1	1	2	
CO2	3	3	2	3	3	1	2	2	2	1	1	2	
CO3	3	3	3	3	3	3	1	0	2	1	1	3	
CO4	3	3	3	3	3	2	2	3	1	1	2	3	
		 List of Experiments: To study the block diagram and working of a VCR trainer. To measure the AC/DC voltage at different point in Different section of VCR trainer. To measure the waveform at different point in Different section of VCR trainer. To find out fault in different sections of VCR trainer. To measure the AC/DC voltage and waveform at different point in Different section of free trainer. Demonstration and practice of fault finding and repair of C.R.O. Demonstration and practice of fault finding and repair of Function 											
		8. 9. 10.	Genera Demon Demon To stud	tor. stration stration ly the bl	and pra and pra	ctice of ctice of gram an	fault fin fault fin d worki	nding ar nding an ng prino	nd repair d repair ciple of	r of Pow of Digi UPS sys	ver supp tal mult stem tra	lies. imeter. iner.	

11. To measure the AC/DC voltage and waveform at different point in Different
section of UPS system trainer.
12. To study the block diagram and working principle of home inverter system
trainer.
13. To measure the AC/DC voltage and waveform at different point in Different
section of home inverter system trainer.
14. Demonstration, practice of fault finding and repair of UPS system.
15. Demonstration, practice of fault finding and repair of home inverter system.
16. Testing of Integrated Circuits (ICs)
17. Use of digital tools for troubleshooting digital equipment.

P. K. Das

	QPEC-301												
	Electronic Hardware Design Technician												
			L			Т			Р		Credits		
			0			0			8		1		
Cours	e	This c	ourse ai	ms to e	quip the	e studen	ts will	the know	wledge	of micro	oprocess	or and	
Object	ectives: microcontroller related programming and interfacing with other hardware cl									are chip	s. Also		
		student	ts will be	e able to	design I	C based	circuits	as timer	, wavefo	orm gene	erator an	d other	
		circuits	circuits.										
Cours	e	1. To l	1. To learn the programming of 8085 hardware kit.										
Outco	mes:	2. To interface various hardware interfacing chips with 8085 microprocessor.											
		3. To interface various hardware interfacing chips with 8051 microcontroller.											
		4. Ana	lyse and	deign b	asic op-	amp cir	cuits, pa	rticularl	y variou	ıs linear	and nor	n-linear	
		circu	its, activ	e filters.	, signal s	generato	rs, and o	lata con	verters.				
			Mappin	g of cou	irse out	comes v	vith pro	gram ou	itcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	
										0	1	2	
CO1	3	3	1	3	3	2	2	1	0	0	0	2	
CO2	3	3	1	3	1	2	2	1	0	0	2	2	
COl	2	2	1	2	2	2	2	1	0	0	0	2	
	3	3	1	3	3	2	2	1	U	U	U	2	
CO4	3	3	1	3	3	2	2	1	0	0	0	2	

List of Experiments:

- 1. To familiarize with entering various steps of a program in 8085 kit.
- 2. Steps to enter, modify data/program and to execute a programme on 8085 kit.
- 3. Writing and execution of program for addition of two 8-bit numbers.
- 4. Writing and execution of program for subtraction of two 8-bit numbers.
- 5. Writing and execution of program for multiplication of two 8-bit numbers.
- 6. Writing and execution of program for division of two 8-bit numbers.
- 7. Write an assembly language program to perform subtraction between two 16 bit numbers on 8085.
- 8. Write an assembly language program for addition of two four-digit decimal numbers and the result is stored in BC register.
- 9. Write an assembly language program for the below stated function. 5 bytes of data are stored in memory location at 2050H to 2054H. Transfer the entire block of data to new memory location starting at 2060.
- 10. Write an assembly language program in 8085 to display a COUNT of 0 or 9 at the seven segment LED display with the delay of 0.5 sec between each COUNT.
- 11. Write an assembly language program to use Port A and B of 8255 PPI as output ports.
- 12. Write a program of Flashing LED connected to port 1 of the Micro Controller
- 13. Write a program to generate a Ramp waveform using DAC with micro controller.

- 14. Write a program to interface the ADC.
- 15. To study comparator using op amp.
- 16. To measure the performance parameters of an Op-amp.
- 17. Application of Op amp as Inverting amplifier.
- 18. Application of Op-amp as Non Inverting amplifier.
- 19. To use the Op-Amp as summing, scaling & averaging amplifier.
- 20. To Design differentiator and Integrator using Op-Amp.
- 21. Application of Op-amp as Low-pass and High-pass filter.
- 22. Application of Op Amp as square wave generator.
- 23. To Design a delay circuit using 555.
- 24. To Design a +5V unregulated power supply.
- 25. To Design +5V regulated power supply.

P. K. Das

Dilip Kumar

J. S. Ubhi



	QPEC-302												
		1	Mo	bile Pho	one Har	dware	Repair	Techni	cian				
		L				Т		Р		Credits	5		
		0				0		8		1			
Cours	e	The co	urse pro	vides th	ie studei	nts with	necessa	ary knov	vledge a	and com	petency	to	
Objec	tives:	diagno	se the fa	ults for	trouble	shootin	g and fo	or syster	matic re	pair and	mainte	nance	
G		of mob	oile phor	<u>ne.</u>	.1	1 17		. 1.		4 1	1. 1.	1 • 1	
Cours	e	1.	1. Understanding the Tools and Parts Required to Repair the Faulty Mobile										
Outco	mes:		Phone. 2 Understanding the Densiring Techniques of the Egylty Mobile Phone using										
		2.	2. Understanding the Repairing Techniques of the Faulty Mobile Phone using										
			tools ar	nd equip	oment's.								
		3.	Unders	tanding	the pro-	cedure t	o test th	e Repai	red Mo	bile Pho	ne.		
		N	Appin	g of cou	rse out	comes v	vith pro	ogram o	outcom	es			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1	
										0	1	2	
CO1	3	3	1	3	3	2	2	1	2	1	1	2	
CO2	3	3	2	3	3	1	2	2	2	1	1	2	
CO3	3	3	3	3	3	3	1	0	2	1	1	3	
		 List of Follow Follow Follow Follow Take Take Follow F	e anti-sta ow the si e anti-sta ow stan- ng KLO recomm ntain ze ng proc- bling an n the ou the bran	atic prec dard op DB with nended t ero-mate edure nd disas ter pane	epair p procedu cautions erating ESD st ools for erial def ssemblin l of the	rocedur are as do before procedu andards specific fect dur fect dur Mobile	re cumento work an re while c operation ing mat Mobile I Phone u drivers t	ed by th ad wear e handli ion sugg erial ha Phone using me	e Mobil ESD wi ng hard gested b ndling etal / pla ve the so	e Phone rist strap lware mo by the br by follo astic case crews to	brand for s or apr odules s and. wing st e openin open th	or each ons. such as andard g tools e inner	
		8. locat	te the co	nnector	s and rel	lease the	em to rer	nove th	e mothe	rboard f	rom the	device	



9. Use hot air gun and other devices to remove the LCD screen from the panel
10. Follow similar process and use appropriate tools to assemble the Mobile Phone
Diagnosing the problem
11. Take preventive measures and identify if there are any other issues in the Mobile Phone and follow the standard diagnostic procedure as documented by the Mobile Phone brand for each model.
12. Use the self-diagnostic tools (like power on self-test (POST) card) to perform standard diagnosis process and ensure functionality of different parts of the device.
Repairing the component or module16. Understand the scope of component level of repair estimate the cost of repair and verify if it is within Beyond Economic Repair (BER).
17. Heat the singled-out component using hot air gun to melt the solder joints and remove from KLOB
18. Clean the board by melting the old solder and removing and place the new component precisely on the board at specified location.
19. Solder the component on the KLOB using soldering stations and ensure the soldering is proper and the component is fixed as per the specification.
20. Operate automated BGA (ball grid array) workstation to precisely remove the chip from the board and repair them.
21. Perform reballing function by dismantling, heating the chip to be removed from the board, remove the solder remains, put new solder balls, place the chip and solder them with the KLOB
22. Check for functioning of the hardware after repairing and ensure that there is no damage of KLOB while removal and fixing of SMD components
23. Ensure other components are not damaged while using hot air gun for removal of a component which could cause damage.
Replacing faulty component



24. Identify and decide on replacing the module or component as the appropriate solution

25. Take adequate measures and follow procedures when replacing expensive or delicate components such as LCD

26. Ensure that replaced module or component is working and no further rework is required.

27. Identify and use appropriate tools and manuals for repairing the specific issue and prevent any accidents while handling hazardous tools.