KANNUR UNIVERSITY
(Abstract)

BSc Electronics Programme - Revised Scheme & Syllabus of Core, Complementary and Open Courses under Choice Based Credit Semester System for Under Graduate Programme-implemented with effect from ***2014 admission-Orders Issued.***

ACADEMIC BRANCH

No. Acad/C2/ 8558/2014 **Dated, Civil Station P.O, 16-07-2014**

Read: 1.U.O No. Acad/C2/2232/2014 dated 14-03-2014
2. Minutes of the meeting of the Board of Studies in Electronics (Cd) held on 09-10-2013.
3. Minutes of the meeting of the Faculty of Science held 25-03-2014
4. Letter dated 07.07.2014 from the Chairman, BOS in Electronics (Cd)

ORDER

1. The Revised Regulations for UG Programmes under Choice based Credit Semester System were implemented in this University with effect from 2014 admission as per paper read (1) above.

2. As per paper read (2) above the Board of Studies in Electronics (Cd) finalized the Scheme , Syllabus & Pattern of Question Papers for Core, Complementary & open courses of BSc Electronics programme to be implemented with effect from 2014 admission.

3. As per read (3) above the Faculty of Science held on 25-03-2014 approved Scheme, syllabus & Pattern of Question papers for core/complementary & open courses of BSc Electronics programme to be implemented with effect from 2014 admission.

4. The Chairman, Board of Studies in Electronics (Cd) vide paper read (4) above has submitted the finalized copy of Scheme, syllabus & Pattern of Question papers for core/complementary and open courses of BSc Electronics programme for implementation with effect from 2014 admission.

5. The Vice Chancellor, after examining the matter in detail, and in exercise of the powers of the Academic Council as per section 11(1) of Kannur University Act 1996 and all other enabling provisions read together with, has accorded sanction to implement the revised scheme, syllabus & Pattern of Question papers of BSc Electronics Programme with effect from 2014 admission.

6. Orders, are therefore issued implementing the revised scheme, syllabus & Pattern of Question papers for core, complementary & open courses of BSc Electronics programme under CBCSS with effect from 2014 admission subject to report to Academic Council

7. Implemented revised Scheme, Syllabus & Pattern of Question Papers are appended.

Sd/-
DEPUTY REGISTRAR (ACADEMIC)
FOR REGISTRAR

To

1. The Principals of Affiliated Colleges offering B.Sc Electronics Programme.
2. The Examination Branch (through PA to CE)

Contd.....2

Copy To:

1. The Chairman, BOS Electronics (Cd)
2. PS to VC/PA to PVC/PA to Registrar
3. DR/AR I Academic
4. Central Library
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Section Officer

KANNUR UNIVERSITY
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❖ ***For more details log on to www.kannur university.ac.in***

KANNUR UNIVERSITY

RESTRUCTURED CURRICULUM
FOR
UNDERGRADUATE PROGRAMME
IN
ELECTRONICS

w. e. f. 2014 ADMISSION

B.Sc ELECTRONICS SCHEME AND SYLLABUS

CREDIT DISTRIBUTION (B.Sc Electronics)

SEMESTER	COMMON ENGLISH	COMMON ADDITIONAL	CORE	COMPLI ONE	COMPLI WITH PRACTICAL	OPEN	TOTAL
I	4+3	4	3	3	2		19
II	4+3	4	3	3	2		19
III	4	4	3	3	2		16
IV	4	4	3+4	3	2+4		24
V			3+3+3+3+3			2	17
VI			3+3+3+3+3 2+4+4				25
TOTAL	22	16	56	12	12	2	120

CREDIT DISTRIBUTION (B.Sc Electronics- LRP Scheme)

SEMESTER	COMMON ENGLISH	COMMON ADDITIONAL	LRP GENE RAL	CORE	COMPLI ONE	COMPLI WITH PRACTI CAL	OPEN	TOTAL
I	4+3	4		3	3	2		19
II	4+3	4		3	3	2		19
III			4+4	3	3	2		16
IV			4+4	3+4	3	2+4		24
V				3+3+3 +3+3			2	17
VI				3+3+3 +3+3 2+4+4				25
TOTAL	14	8	16	56	12	12	2	120

Scheme of Mark Distribution (B.Sc Electronics)

Courses		No of Courses	Marks per Course	Total Marks
Common	English	6	50	300
	Addl Language	4	50	200
Complementary	Complementary1	4	50	200
	Complementary2	5(4 Theory+1 Practical)	40	200
Core	Theory	14	50	700
	Practical	3	50	150
	Project	1	25	25
Open		1	25	25
Total				1800

Scheme of Mark Distribution(B.Sc Electronics-LRP Scheme)

Courses		No of Courses	Marks per Course	Total Marks
Common General	English	4	50	200
	Addl Language	2	50	100
	General	4	50	200
Complementary	Complementary1	4	50	200
	Complementary2	5(4 Theory+1 Practical)	40	200
Core	Theory	14	50	700
	Practical	3	50	150
	Project	1	25	25
Open		1	25	25
Total				1800

KANNUR UNIVERSITY

B. Sc Electronics-Scheme & Syllabus of Core Courses and complimentary under Choice Based Credit Semester System for Under Graduate Programme - implemented with effect from 2014 admission

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	I	1B01ELE	Basic Electronics	3	2	3	10	40	50
2	I*	**4B01ELE-P**	**Practical-1**(Basic Electronics)	-	1	-			-
3	II	2B02ELE	Electronic Devices and Circuits	3	2	3	10	40	50
4	**II***	**4B01ELE-P**	**Practical -1(**Electronic Devices and Circuits**)**	**-**	**2**	**-**			**-**
5	III	3B03ELE	Analog Circuits And Systems	3	3	3	10	40	50
6	III*	**4B01ELE-P**	Practical-1(Analog Circuits)	-	2	-			-
7	1V	4B04ELE	Principles of Digital Electronics	3	3	3	10	40	50
8	**IV***	**4B01ELE-P**	**Practical -1(**Digital Electronics)	**4**	**2**	3	10	40	50
9	V	5B05ELE	Electromagnetics	3	3	3	10	40	50
10	V	5B06ELE	Electronic Communication	3	3	3	10	40	50
11	V	5B07ELE	Microprocessor And Microcontrollers	3	3	3	10	40	50
12	V	5B08ELE	Applications of Linear IC's	3	3	3	10	40	50
13	V	Elective-1 5B09ELE -E01	1. Problem Solving Using Programming Language	3	3	3	10	40	50
		5B09ELE-E02	2. Electronic Instrumentation						
		5B09ELE-E03	3. Advanced Digital System Design						
14	V	OPEN 5D0* ELE	1. Consumer Electronics	2	2	2	5	20	25
			2. Computer Hardware						
			3. Basic Electronics						
15	V*	**6B02ELE-P**	**Practical -2**(Micro controller & LIC Lab)	-	8	-	-	-	-
16	VI	6B10ELE	Advanced Communication System	3	3	3	10	40	50
17	V1	6B11ELE	Mathematical Methods and Digital Signal Processing	3	3	3	10	40	50
18	VI	6B12ELE	Fiber Optics and Optical Communication	3	3	3	10	40	50
19	VI	6B13ELE	Embedded System Basics	3	3	3	10	40	50

20	VI	Elective-2	6B14ELE –E01	1. Power Electronics	3	3	3	10	40	50
			6B14ELE –E02	2. Principles of VLSI						
			6B14ELE –E03	3. Microwaves and Radar						
21	**VI***	**6B02 ELE-P**		**Practical-2**(Micro controller & LIC Lab)	4	-	3	10	40	50
22	**VI***	**6B03 ELE- P**		**Practical-3**(Communication & Embedded System Practical	4	8	4	10	40	50
23	VI	6B15 ELE		Project Work	2	2	-	5	20	25

I, II, III, IV SEMESTER PRACTICAL EXAMINATION WILL BE AT THE END OF IV SEMESTER AS 4B01ELE- P

THOSE WHO STUDIED COMPUTER SCIENCE AS COMPLIMENTARY MUST SELECT

ELECTRONIC INSTRUMENTAION OR ADVANCED DIGITAL SYSTEM AS 5B09 ELE PAPER

Scheme of Complementary Courses

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	I	1C01ELE	Basic Electronics	2	2	3	8	32	40
2	I*	**4C05ELE-P**	**Practical-1**	**-**	**2**	**-**	**-**	**-**	**-**
3	II	2C02ELE	Digital Electronics	2	2	3	8	32	40
4	II*	**4C05ELE-P**	**Practical-1**	**-**	**2**	**-**	**-**	**-**	**-**
5	III	3C03ELE	Communication Systems	2	3	3	8	32	40
6	III*	**4C05ELE-P**	**Practical-1**	**-**	**2**	**-**	**-**	**-**	**-**
7	IV	4C04ELE	Microprocessors & Peripherals	2	3	3	8	32	40
8	IV*	**4C05ELE-P**	**Practical-1**	4	2	3	8	32	40

General courses for B.Sc Electronics LRP Scheme

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week /WEEK	Exam Hours Hours	Max. Marks		
							Int	Ext	Total
1	III	3A11ELE	Numerical Techniques	4	5	3	10	40	50
2	III	3A12ELE	Applied Electricity	4	5	3	10	40	50
3	IV	4A13ELE	Control Systems	4	5	3	10	40	50
4	IV	4A14ELE	Computer Organization and Architecture	4	5	3	10	40	50

Scheme of Open courses for V Semester

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week /WEEK	Exam Hours Hours	Max. Marks		
							Int	Ext	Total
1	V	5D01ELE	Consumer Electronics	2	2	2	5	20	25
2	V	5D02ELE	Computer Hardware	2	2	2	5	20	25
3	V	5D03ELE	Basic Electronics	2	2	2	5	20	25

COURSE STRUCTURE

Semester-1

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	I		Common course(English)	4	5	3	10	40	50
2	I		Common course(English)	**3**	**4**	**3**	10	40	50
3	I		Common course (Addln. Language)	4	5	3	10	40	50
4	I	1B01ELE	Core course 1	3	2	3	10	40	50
5	I	4B01ELE-P	Core course 1 practical	-	1	-			-
6	I		Complementary-1(Mathematics)	3	4	3	10	40	50
7	I		Complementary-2	2	2	3	8	32	40
8	I		Complementary-2 Practical		2				

Semester-2

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	II		Common course(English)	4	5	3	10	40	50
2	II		Common course(English)	3	4	3	10	40	50
3	II		Common course (Addln. Language)	4	5	3	10	40	50
4	II	2B02ELE	Core course 2	3	2	3	10	40	50
5	II	4B01ELE-P	Core course 2 practical	-	1	-			-
6	II		Complementary-1(Mathematics)	3	4	3	10	40	50
7	II		Complementary-2	2	2	3	8	32	40
8	II		Complementary-2 Practical		2				

Semester-3

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	III		Common course(English)	4	5	3	10	40	50
2	III		Common course (Addln. Language)	4	5	3	10	40	50
3	III	3B03ELE	Core course 3	3	3	3	10	40	50
4	III	4B01ELE-P	Core course 3 practical	-	2	-			-
5	III		Complementary-1(Mathematics)	3	5	3	10	40	50
6	III		Complementary-3	2	3	3	8	32	40
7	III		Complementary-3 Practical		2				

Semester-4

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	IV		Common course(English)	4	5	3	10	40	50
2	IV		Common course (Addln. Language)	4	5	3	10	40	50
3	IV	4B04ELE	Core course 3	3	3	3	10	40	50
4	IV	4B01ELE-P	Core course 3 practical	4	2	3	10	40	50
5	IV		Complementary-1(Mathematics)	3	5	3	10	40	50
6	IV		Complementary-4	2	3	3	8	32	40
7	IV		Complementary-4 Practical	4	2	3	8	32	

Semester-5

Sl. No	Semester	Course Code		Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
								Int	Ext	Total
1	V	5B05ELE		Core course.5	3	3	3	10	40	50
2	V	5B06ELE		Core course.6	3	3	3	10	40	50
3	V	5B07ELE		Core course.7	3	3	3	10	40	50
4	V	5B08ELE		Core course.8	3	3	3	10	40	50
5	V	Elective-1	5B09ELE -E01	Core course.9	3	3	3	10	40	50
			5B09ELE-E02							
			5B09ELE-E03							
6	V	OPEN	5D0* ELE	Open Course	2	2	2	5	20	25
7	V*	6B02ELE-P		Core course(Practical -2)	-	8	-	-	-	-

Semester-6

Sl. No	Semester	Course Code		Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
								Int	Ext	Total
1	VI	6B10ELE		Core course10	3	3	3	10	40	50
2	V1	6B11ELE		Core course11	3	3	3	10	40	50
3	VI	6B12ELE		Core course12	3	3	3	10	40	50
4	VI	6B13ELE		Core course1314	3	3	3	10	40	50
5	VI	Elective-2	6B14ELE –E01	Core course	3	3	3	10	40	50
			6B14ELE –E02							
			6B14ELE –E03							
6	VI*	6B02 ELE-P		Core course-Practical-2	4	-	3	10	40	50
7	VI*	6B03 ELE- P		Core course -Practical-3	4	8	4	10	40	50
8	VI	6B15 ELE		Project Work	2	2	-	5	20	25

COURSE STRUCTURE FOR LRP SCHEME

Semester-1

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	I		Common course(English)	4	5	3	10	40	50
2	I		Common course(English)	**3**	**4**	**3**	10	40	50
3	I		Common course (Addln. Language)	4	5	3	10	40	50
4	I	1B01ELE	Core course 1	3	2	3	10	40	50
5	I	4B01ELE-P	Core course 1 practical	-	1	-			-
6	I		Complementary-1(Mathematics)	3	4	3	10	40	50
7	I		Complementary-2	2	2	3	8	32	40
8	I		Complementary-2 Practical		2				

Semester-2

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	II		Common course(English)	4	5	3	10	40	50
2	II		Common course(English)	3	4	3	10	40	50
3	II		Common course (Addln. Language)	4	5	3	10	40	50
4	II	2B02ELE	Core course 2	3	2	3	10	40	50
5	II	4B01ELE-P	Core course 2 practical	-	1	-			-
6	II		Complementary-1(Mathematics)	3	4	3	10	40	50
7	II		Complementary-2	2	2	3	8	32	40
8	II		Complementary-2 Practical		2				

Semester-3

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	III		Common course(General-1)	4	5	3	10	40	50
2	III		Common course(General-2)	4	5	3	10	40	50
3	III	3B03ELE	Core course 3	3	3	3	10	40	50
4	III	4B01ELE-P	Core course 3 practical	-	2	-			-
5	III		Complementary-1(Mathematics)	3	5	3	10	40	50
6	III		Complementary-3	2	3	3	8	32	40
7	III		Complementary-3 Practical		2				

Semester-4

Sl. No	Semester	Course Code	Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
							Int	Ext	Total
1	IV		Common course(General-3)	4	5	3	10	40	50
2	IV		Common course(General-4)	4	5	3	10	40	50
3	IV	4B04ELE	Core course 3	3	3	3	10	40	50
4	IV	4B01ELE-P	Core course 3 practical	4	2	3	10	40	50
5	IV		Complementary-1(Mathematics)	3	5	3	10	40	50
6	IV		Complementary-4	2	3	3	8	32	40
7	IV		Complementary-4 Practical	4	2	3	8	32	

Semester-5

Sl. No	Semester	Course Code		Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
								Int	Ext	Total
1	V	5B05ELE		Core course.5	3	3	3	10	40	50
2	V	5B06ELE		Core course.6	3	3	3	10	40	50
3	V	5B07ELE		Core course.7	3	3	3	10	40	50
4	V	5B08ELE		Core course.8	3	3	3	10	40	50
5	V	Elective-1	5B09ELE-E02	Core course.9	3	3	3	10	40	50
			5B09ELE-E03							
6	V	OPEN	5D0* ELE	Open Course	2	2	2	5	20	25
7	V*	6B02ELE-P		Core course(Practical -2)	-	8	-	-	-	-

Semester-6

Sl. No	Semester	Course Code		Title Of The Course	Credit	Hours/Week	Exam Hours	Max. Marks		
								Int	Ext	Total
1	VI	6B10ELE		Core course10	3	3	3	10	40	50
2	V1	6B11ELE		Core course11	3	3	3	10	40	50
3	VI	6B12ELE		Core course12	3	3	3	10	40	50
4	VI	6B13ELE		Core course1314	3	3	3	10	40	50
5	VI	Elective-2	6B14ELE –E01	Core course	3	3	3	10	40	50
			6B14ELE –E02							
			6B14ELE –E03							
6	VI*	6B02 ELE-P		Core course-Practical-2	4	-	3	10	40	50
7	VI*	6B03 ELE- P		Core course -Practical-3	4	8	4	10	40	50
8	VI	6B15 ELE		Project Work	2	2	-	5	20	25

CORE COURSES

1B01ELE: Basic Electronics

Module 1: Passive Components

Study of basic circuit elements and passive components (with special reference to working principle, circuit symbols, types, specifications and applications): Resistor, Capacitor, Inductor, Transformer, Cables, Connectors, Switches, Fuses, Relays, Batteries.

Module 2: Basic Electrical Circuits and Circuit Theorems

Concept of Ideal Voltage and Current source, internal resistance, dc sources(voltage/current) and sinusoidal ac source(amplitude, wavelength, period, frequency, phase angle), Network terminology, Ohms law, series and parallel circuits of resistors, capacitors and inductors, voltage and current dividers, Kirchhoff's Laws (KCL, KVL),- Mesh & Node (DC analysis) - Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem

Module 3: Charging- discharging of capacitor - time constant, AC applied to R, C and L, concept of impedance, phase difference, - RC, RL, RLC circuits - Resonance in series and parallel RLC circuits, concept of, RC low pass and high pass filter

Module 4: Semiconductor Diodes and Circuits

Semiconductor diode - working principle, I-V characteristics, parameters - Zener diode-breakdown, light emitting diode, photo diode, opto coupler, varactor diode, solar cell, clipper and clamper circuits Rectifiers (half and full wave), rectifier with capacitor-filter, ripple factor - Zener regulator, Block diagram of power supply

Text/ Reference Books:

1. Basic Electronics: Bernard Grob, McGraw Hill Publication, 8th Revised Edition, 2010

2. Network system – Roy Chowdhary

3. Applied Electronics – R. S. Sedha - Khanna

4. A text book of Electrical Technology: B.L.Theraja, S.Chand and Co.

5. Electronic Principles: Albert Malvino, David J Bates, McGraw Hill 7th Edition.

6. Electronic Devices and Circuits: Bolyestad, TataMcGraw Hill.

7. Basic Electronics and Linear Circuits: Bhargava N.N., Kulshreshtha D.C., TMH

4B01ELE –P: Basic Electronics Practical (Practical-1)

1 Familiarization of components/Tools (Resistor, Capacitor, Inductor, Diode, Transistor, Cables, Connectors, Transformer, Switches, Fuses, Relays, Batteries) - Identification based on visual inspection/Datasheet/Specification/Notation

2 Study of Test and Measurement Instruments

- Multimeters (Analog and Digital) –
  a. Measurement of AC/DC voltage, Current, Resistance – on different ranges
  b. Measurement of Variation of Resistance of LDR, Potentiometer
  c. Continuity checking
  d. Testing of Diodes & Transistors
- Study of Power Supply
- Study of Study of Signal Generator/CRO
  a. Measurement of amplitude and frequency of Sine/Square waveform
  b. Measurement of AC/DC Voltages

3 Soldering practice - Simple circuits

4 Verification of network theorems: KCL , KVL,
Verification of network theorems: Thevenin, Norton
Verification of network theorems: Maximum Power Transfer, Superposition theorem.

5 RC Circuits: Time constant

6 Design a Low Pass RC Filter and study its frequency response

7 Design a High Pass RC Filter and study its frequency response

8 To study the frequency response of a Series LCR circuit and determine its (a) Resonant Frequency (b) Impedance at Resonance

9 To study the frequency response of a Parallel LCR circuit and determine its (a) Resonant Frequency (b) Impedance at Resonance

10 To study the I-V Characteristics of Diode – Ordinary and Zener

11 To study the Half wave rectifier and study the effect of C filter (Evaluation of Ripple factor, Efficiency, PIV).

12 To study the Full wave rectifier and study the effect of C filter.

13 Study of breakdown characteristics and voltage regulation action of Zener diode (Line regulation, Load regulation)

References

1. K A Navas “Electronics Lab Manual Vol 1”
2. T.D. Kuryachan & Shyam Mohan S,”Electronics Lab Manual, Vol. I”, Ayodhya Publications

2B02ELE: Electronic Devices and Circuits

Module 1: Bipolar Junction Transistor and Circuits

Bipolar Junction Transistor (BJT) symbol, types, construction, working principle, parameters, specifications. Transistor configurations- CB, CC and CE - characteristics - transistor as a switch, Concept of amplification , DC load line (CE), Q point and factors affecting the stability - biasing circuits-fixed bias, emitter feedback bias , voltage divider.

Module 2: Transistor Amplifiers:

General classification of amplifiers: with respect to signal amplitude, frequency and configuration. Single stage CE amplifier, concept of frequency response and bandwidth, emitter follower .

Transistor models – RE model Hybrid equivalent circuits - Small signal amplifier: A.C.-D.C. analysis - frequency response. Design of single stage amplifier. Types of coupling (quantitative analysis): RC coupled, transformer coupled and direct coupled. Multi-stage RC coupled CE amplifier: effect of coupling capacitor and bypass capacitor on frequency response (qualitative approach) and application area.

Module 3 : UJT,FETs and Applications

Symbol, types, construction, working principle, I-V characteristics, Specifications parameters of: Uni-Junction Transistor (UJT), Junction Field Effect Transistor (JFET), Metal Oxide Semiconductor FET (MOSFET), types, comparison of JFET, MOSFET and BJT Applications: UJT, JFET as voltage variable resistor, MOSFET as a switch.

Module 4 Introduction to Power Electronics

Power diodes, Power transistors and Thyristors (SCR, DIAC,TRIAC): Symbols and Characteristics.

Text/ Reference Books:

1. Basic Electronics: Bernard Grob, McGraw Hill Publication, 8th Revised Edition, 2010

2. Electronic Principles: Albert Malvino, David J Bates, McGraw Hill 7th Edition. 2012

3. Applied Electronics – R. S. Sedha - Khanna

4. A text book of Electrical Technology: B.L.Theraja, S.Chand and Co.

5. Basic Electronics and Linear Circuits: Bhargava N.N., Kulshreshtha D.C., TMH

6. Electronic Devices and Circuits: Bolyestad, TataMcGraw Hill.

4B01ELE–P:Electronic Devices and Circuits Practical(Practical-1)

1 To study the I-V Characteristics of the Common Emitter configuration of BJT - Measurement of current gain, voltage gain, Zin, Zout.
2 To study the I-V Characteristics of the Common Base configuration of BJT Measurement of current gain, voltage gain, Zin, Zout.
3 To study Fixed Bias, Voltage divider bias of transistor (Design, fixing the operating point, DC Load Line)
4 To design a Single Stage CE amplifier for a specific gain and bandwidth (voltage gain, Zin, Zout, Plot Frequency Response, Band width)
5 Study of potential divider biasing of BJT and its use in DC motor driving.
6 Study of output and transfer characteristics JFET/MOSFET
7 UJT characteristics –Intrinsic stand off ratio, peak point,valley point
8 SCR characteristics – Break over voltage

References

1. K A Navas “Electronics Lab Manual Vol 1”
2. T.D. Kuryachan & Shyam Mohan S,”Electronics Lab Manual, Vol. I”, Ayodhya Publications

3B03ELE: Analog Circuits and Systems

Module 1: Power Amplifiers

Comparison of small signal and large signal amplifiers: with respect to gain, efficiency, and distortion. Classification of power amplifiers on the basis of conduction: class-A, class-B, class-AB, class-C. Class-A amplifier: resistive load/transformer coupled load, efficiency calculation of transformer coupled amplifier, comparison for efficiency, concept of harmonic distortion. Class B amplifier: Efficiency calculation, Push-pull amplifier concept, complimentary symmetry class-B push pull amplifier, crossover distortion, class AB push pull amplifier. Concept use and types of heat sinks.

Module 2: Feedback

Concept of negative and positive feedback. Types of feedbacks circuits: current shunt, current series, voltage shunt and voltage series, comparison and applications. Effect of negative feedback: on amplifier performance, stability of an amplifier. Positive feedback: oscillator circuits -Wien bridge , Phase Shift , Hartley , Colpitts and Crystal.

Module 3: Differential Amplifier and Operational amplifiers

Concept and working of differential amplifier. Configurations of differential amplifier: Single ended, double ended. Differential and Common mode gain. CMRR.

Operational Amplifiers - block diagram of an operational amplifier (IC 741) , Op-amp characteristics, parameters - open loop and closed loop configurations.

Module 4: Op-Amp Applications : Inverting, Non-inverting, summing and difference amplifier, Integrator, Differentiator, voltage to current converter, current to voltage converter. Comparators, Schmitt Trigger. Phase shift oscillator, Wien bridge oscillator, Square wave generator.

Recommended Books

1 Malvino A.P Electronic Principles TMH

2 Gaykawad R. Operational amplifiers and linear Integrated Circuits PHP

3 Boltkar - Integrated circuits,

4 Millman, Halkias Electronic devices and circuits McGrawHill

5 Boylestead Electronic devices and circuits PHP

6 Applied Electronics – R. S. Sedha - Khanna

4B01ELE –P: Analog Circuits and Systems Practical (Practical-1)

1 To study Class A, B and C Power Amplifier.

2 Design of complementary symmetry Push pull amplifier.

3 Design and test two stage amplifier.

4 Study of effect of negative feedback on frequency response and gain of amplifier

5 Design and testing of Wien bridge oscillator

6 To study the Colpitt's and Hartely Oscillator

7 To design an amplifier of given gain for an inverting and non-inverting configuration using an op-amp.

8 Op Amp - Adder & subtractor (DC only)

9 Schmitt Trigger using Opamp

10 To design a RC Phase Shift Oscillator using op-amp for a given specification

11 Astable Multivibrator using Op Amp Design, output wave form

References

1. K A Navas "Electronics Lab Manual Vol 1& II"
2. T.D. Kuryachan & Shyam Mohan S,"Electronics Lab Manual, Vol. I & II", Ayodhya Publications

4B04ELE: Principles of Digital Electronics

Module 1: Number Systems and Logic Gates

Introduction to decimal, Binary and hexadecimal number systems and their inter-conversions, Signed and fractional binary number representations, BCD, Excess-3 and Gray codes, Alphanumeric representation in ASCII codes. Positive and Negative Logic, Basic Logic gates (NOT, OR, AND) & derived gates (NAND, NOR, EX-OR) Symbol and truth table, Applications of Ex-OR gates as parity checker and generator.

Logic Families : Introduction to Integrated circuit technologies TTL, ECL, CMOS IC parameters: Logic levels, switching speed, propagation delay, power dissipation, noise margins and fan-out of TTL and CMOS. TTL NAND & NOT gate, Open collector gates, Wired OR operation. CMOS - NOT, NAND, NOR gate, precautions while handling CMOS gates, tri-state logic.

Module 2: Boolean Algebra and Karnaugh maps

Boolean algebra rules and Boolean laws: Commutative, Associative, Distributive, AND, OR and Inversion laws, De-Morgan's theorem, Universal gates. Min terms, Max terms , Boolean expression in SOP and POS form, conversion of SOP/POS expression to its standard SOP/POS form., Simplifications of Logic equations using Boolean algebra rules and Karnaugh map (up to 4 variables).

Module 3: Combinational Circuits

Rules of binary addition and subtraction, subtraction using 1's and 2's complements, half adder, full adder, Half subtractor, Full subtractor, Four bit parallel adder, Digital comparator, Multiplexer, demultiplexer and their applications, Code converters, Encoder & decoder, priority encoder, BCD to seven segment decoder.

Module 4: Sequential Circuits

Flip flops : RS using NAND/NOR, latch, clocked RS, JK, Master slave JK, D and T - popular ICs. Counters: Ripple Binary counter, up counter, down counter, concept of modulus counters, Decade counter, Counters for high-speed applications (Synchronous counters) with timing diagrams- popular ICs. . Shift registers: SISO, SIPO, PISO, PIPO shift registers, ring counter, Johnsons counter.

Text/ Reference Books:

1. Digital Fundamentals: Floyd T.M. - Pearson Education

2. Digital Principles and Applications: Malvino Leach, Tata McGraw-Hill.

3. Digital Electronics: Jain R.P., Tata McGraw Hill

4B01ELE –P: Digital Electronics Practical (Practical-1)

1 Familiarization of logic gates using ICs (NOT, OR, AND, XOR, NAND, NOR).
2 Realization of basic gates using NAND & NOR
3 Design a Half and Full adder
4 Design a Half and Full Subtractor.
5 Design a 4x1 Multiplexer using logic gates
6 Multiplexers and Demultiplexer using ICs
7 Decoders & encoders using IC [BCD to decimal decoder, BCD to seven segment decoder]
8 Study of RS and D flip flops using NAND gates
9 Design a 3 bit Counter using JK Flip-Flop IC
10 Asynchronous binary counter using 7493 - (MOD 10, 12) - up/down
11 Study of 4-bit Shift register IC

References

1. K A Navas “Electronics Lab Manual Vol 1”
2. T.D. Kuryachan & Shyam Mohan S,”Electronics Lab Manual, Vol. I”, Ayodhya Publications

5B05ELE: Electromagnetics

Module 1: Concept of Circuit & Fields, Vector Analysis, Physical interpretation of gradient, Divergence & curl, integral theorems & comparison.

Module 2: Electrostatics : Introduction, fundamental relations of electro static field – Gauss's law - special Gauss surfaces – the potential function, divergence theorem – Poisson's & Laplace's equation. **Magnetostatics :** Biot – Savart law, force between two current carrying coils – Magnetic fiux density, Magnetic field intensity, Intensity of Magnetisation - Ampere's circuit theorem –Lorent's force- Magnetic vector potential –Boundary conditions for magnetic fields.

Module 3: Electrodynamics: Faradays law of induction – modified Amperes law – Maxwell's equation – wave equation – solutions of wave equation in free space –poynting vector- electromagnetic energy –Boundary conditions.

Module 4: Radiation & propagation of Radio waves: Radiation of electromagnetic fields – polarization –isotropic radiator –plane waves – electromagnetic spectrum – propagation of waves in free space.

Recommended Books:

1. Electromagnetic waves & radiating systems – Jordan & Balmier -PH (New edition)
2. Fundamentals of Electrodynamics- Grifith (IV Edition)
3. Fundamental of electronic waves – Hugh Hildeeth skilling. Ane books
4. Fundamental of electromagnetics – Micah
5. Engineering electromagnetics- Haytt
6. Electromagnetic field theory fundamentals – BhagGuru & Hussein Hiziroglu- Cambridge.

5B06ELE: Electronic Communication

Module I Block diagram of an electronic communication system, electromagnetic spectrum-band designations and applications. Types of Electronic Communication systems: Simplex, Duplex. Noise in communication: External noise- Atmospheric, space noise, man-made noise, Internal noise- Thermal, Shot noise Definitions and relationship between Bit rate, Baud rate, Bandwidth and signal to noise ratio.

Module II Modulation – Need for modulation- Amplitude modulation –Side band-AM signals & spectra, power relations, product modulator, single sideband AM – AM generation – High level & low level AM transmitters - AM receivers - Super heterodyne receivers –SSB generator balanced modulator -SSB transmitters –SSB receivers.

Module III Frequency modulation -FM & PM signals – spectra – Band with – narrow band & wide band FM – generation – direct FM – VCO – phase modulator – indirect FM –demodulation of FM- balanced discriminator, de- emphasis & pre–emphasis – FM transmitter & receivers – FM stereo transmission & reception.

Module IV Sampling – Aliasing - PAM, PWM, PPM – concept of FDM & TDM, pulse code modulation – quantization – generation & reconstruction – companding, concept of ASK, FSK,PSK, DPSK.

Recommended Books:

1 Kennedy Electronic Communication, 2nd edition TMH

2 Frenzel Communication Electronics,3 rd edition TMH

3 Dennis Roddy,John Coolen Electronic Communication System PHI

5 Grob B. Electronic Principles TMH

5B07ELE: Microprocessor and Microcontrollers

Module 1: Introduction to Microprocessors – Evolution of Microprocessor - Introduction to 8085 - functional block –pin diagram - 8085 registers - bus organization Microprocessors initiated operations & internal data operations – externally initiated operation – memory organization –mapping & types- types of I/O addressing – instruction format - instructions & timing (Programming not required) – instruction classification. Concept of RISC & CISC – MMX –Pentium processors.

Module 2 : Microcontroller Architecture : Comparison between Microprocessor, Microcontroller - 8051 Microcontroller Hardware (Oscillator & Clock, Program Counter, Data Pointer, A and B Registers, Flags and PSW, Internal Memory, Internal RAM/ROM, Stack & Stack Pointer, SFRs).

I/O ports, External Memory , Counters and Timers, Serial I/O Interrupts, External Memory Interfacing derivatives of 8x51: 8751, 8752,89C51, 89S52.

Module 3 : Instruction Set : Addressing Modes, Different Groups of Instructions-Data Transfer Instructions, Logical Operation, Arithmetic Operations, Jump and Call Instructions

Simple Program : Arithmetic, Logical, Code Conversion, Block Data Transfer & Timer Programming.

Module 4: Peripherals Timer / counter interrupt – counting – serial data-i/p & serial data output – serial data interrupt –Data transmission & reception – serial data transmission mode. Timer flag interrupt - serial port interrupt – external interrupt – reset – interrupt priority – software generated interrupt.– keyboard interfacing - display interfacing – Seven segment & LCD display - D/ A and A/D interface .

Recommended Books:

1. 8085 – Architecture programming & technique – Ramesh Goanker

2. Microprocessors & Interfacing - Programming & Hardware -- Douglas V Hall

3. Kenneth J. Ayala The 8051 Microcontroller, Architecture, Programming and Application [Second Edition] Penram International, (1999).

4 M.A. Mazidi, J. G. Mazidi, R.D. Mckinlay The 8051 Microcontroller And Embedded Systems, Using Assembly and C - Pearson Education , Second Edition (2009)

5. Kenneth J. Ayala, Dhanjay V. Gadre The 8051 Microcontroller And Embedded Systems, Using Assembly and C - Cengage Learning

6 Deshmukh Ajay V. Microcontrollers [Theory and Applications] TMH

5B08ELE: Applications of Linear IC's

Module 1: Opamp - selection criterion for Op Amp ICs , Design of inverting and non – inverting amplifier circuits for a given gain, input and output impedance and bandwidth. Practical integrator and differentiator circuit and their design. Design of peak detector circuit. Design of Practical S/H circuits using two Op – Amps. Design of precision rectifier circuits and application.

Active filters using Op amp - Design of LP, HP and BP filters for 2^{nd} order, Switched capacitor filters : Concept and applications.

Module 2 : 555 Timer - Block diagram, Design of astable and monostable multivibrator circuit, Voltage controlled Oscillator (IC 566) Block Diagram – Circuits – applications. Phase locked loops (IC 565) – Block diagram, lock range and capture range, typical circuits, applications.

Module 3. Voltage regulators –Linear Regulator ICs LM723, LM317 and three terminal regulators ICs-78XX,79XX, LM723 (Low and high voltage regulators). Switching regulators & SMPS, typical circuits, applications

Module 4: ADC and DAC: Converters -ADC & DAC [Different types], Parameters, performance comparison & Application – popular ICs

Recommended Books:

1. U A Bakshi – Linear IC applications - Technical Publications Pune
2. George Clayton Operational Amplifiers, 5^{th} Edition Newnes Imprint of Elsevier
3. Sergi Franco Design With operational Amplifiers and analog integrated circuits Tata McGraw Hill
4. Ramakant A. Gayakwad Op-Amps and Linear Integrated Circuits, 4^{th} Edition Prentice- Hall India Pvt. Ltd.
5. Thoman L Floyd Electronic Devices McGraw Hill Companies
6. James M Fiore Operational Amplifiers and Linear Integrated Circuits Jaico Publishing house.

Elective1: 5B09ELE-E01 Problem solving using Programming Language

Module 1 : C- Fundamentals Introduction, character set, constants and variables, Key words, Symbolic constant, statements, entering and executing C program, inputand output simple and formatted functions, operators and expressions, control structures and loops and exercises

1. To obtain solution of second order quadratic equation

2. To print first 10 natural numbers.

3. Convert Decimal to Binary numbers.

4. To generate Fibonacci Sequence upto ten terms..

5. To find equivalent resistance of series / parallel combination of resistive circuits or equivalent capacitance of capacitor combination circuit.

Module 2: Functions Defining a function, Accessing a function, function prototype, passing argument, recursion e.g.

1. To find a factorial of a number using function and recursion.

2. Display of message using function.

3. To find sum of digits of a given integer using function & recursion …. and similar

Module 3: Arrays and Pointers : Defining and processing of an array, passing array to a function, Pointers declarations, passing pointers to a function, operations of Pointers, pointers as function parameters

1. To print sum of an array elements.

2. To find addition subtraction of two matrices.

3. To find multiplication of two matrices

4. To find Inverse of matrix.

Module 4. Structures and Data Files : Defining and processing of a structure, user defined data types, Files : opening and closing of data file, read and write data file.

1. To determine a size of structure.

2. Writing to a data file.

3. To read the contents of data file and display it on the screen.

Recommended Books:

1 E Balaguruswamy Programming in –C BPB

2 Byron. S. Gottfried Schaum's Outline of Programming with C TMH

3 J. Jayasri The 'C Language Trainer with C Graphics and C++ WILEY

4 Stephens Cochan Programming in C Prentice hall of India Ltd

5 V. Rajaraman Computer Programming in C Prentice hall of India Ltd.

6 Madhusudan Mothe C for Beginner Shroff

Elective1: 5B09ELE-E02 Electronic Instrumentation

Module 1 : Qualities of Measurement: Modules: S. I. system of units, dimensions and standards; errors in measurement, types of static error, sources of error, dynamic characteristics and statistical analysis. **Basic Measurement Instruments**: DC measurement: dc voltmeter, ohmmeter and ammeter. Digital type voltmeter, ammeter and ohmmeter ,digital multimeter, AC measurement , voltmeter, ammeter. Digital frequency meter: elements of frequency meter, universal counter and its different modes, measurement errors and extending the frequency range. Digital LCR-Q meter, digital wattmeter.

Module 2 : Signal Generators: Types of generators and their operation: Audio oscillator, Function generators, Pulse generators, RF generators, Random noise generators. Probes and Connectors: Test leads, shielded cables, connectors, low capacitance probes, high voltage probes, RF demodulator probes, special probes for IC's, current probes.

Module 3 : Electronic Displays: The Cathode Ray Oscilloscope (CRO): Block diagram of a General Purpose Oscilloscope and its basic operation, electrostatic focusing and deflection, screen for CRT and graticules, CRT connections, CRO probes. Types of CRO's: dual trace oscilloscope, digital storage oscilloscope. Wave Analyzers: Operation of frequency selective wave analyzers and heterodyne wave analyzers and their application. Spectrum analyzer.

Module 4 : Transducers: Various types of transducers for measurement of displacement, speed, stress and strain Classification and selection of transducers. Strain Gages: bonded and un-bonded strain gages, strain gage transducer sensitivity. Position Transducer: capacitive, inductive, linear variable differential transformer (LVDT), Piezoelectric, potentiometric. Temperature transducers: Resistance thermometers, thermocouples, thermistor and semiconductor p-n junction transducer. Light Transducers: photo resistors, photovoltaic cells, photodiodes.

Suggested Books:

1. H. S. Kalsi, Electronic Instrumentation, Tata McGraw Hill (2006)

2. Joseph J Carr, Elements of electronic instrumentation and measurement, Pearson Education (2005)

3. C. S. Rangan, G. R. Sarma and V. S. Mani, Instrumentation Devices and Systems, Tata McGraw Hill (1998)

4. H. Cooper, Modern electronic instrumentation and measurement techniques, Pearson Education (2005)

5. R. A. Witte, Electronic test instruments: analog and digital measurements, Tata McGraw Hill (2004)

6. S. Wolf and R. F. M. Smith, Student Reference Manual for Electronic Instrumentation Laboratories, Pearson Education (2004)

Elective1: 5B09ELE-E03 Advanced Digital System Design

Module 1: Concepts of digital system design: Digital system, digital systems design process, Methodology, Types of logic circuits.

Module 2: Sequential circuit design: Introduction, State equivalence, state reduction, state assignment techniques, along with state machines, sequential machine

Asynchronous Sequential Circuits: Introduction to asynchronous sequential machine, Fundamental and pulse mode asynchronous machine, analyzing asynchronous machine, deriving flow tables, state assignment, asynchronous design problems, data synchronizers, mixed operating mode asynchronous circuits.

Module 3: Programmable logic design: Introduction to reconfigurable logic ,PLD, SPLD, PAL, CPLD's, FPGA.

Module 4 : Introduction to VHDL : Design entity synthesis, verification and implementation using E-cad tools

Case study: Traffic light controller, Stepper motor sequence generator, Rolling display, Tablet filling system.

Recommended Books:

1. Fundamental of digital logic with VHDL - Stephen Brown , Zvonko Vranesic Tata McGraw hill
2. Digital logic: Applications and design - John M. Yarbrough - Cengage Learning India (Thompson)
3. Digital fundamentals - Floyd , Thoms L., Jain R.P. - Pearson Education
4. VHDL Design - Bhaskar

6B02 ELE-P: Microcontrollers Practical (Practical-2)

1 Data transfer using direct & indirect addressing.

2 Program to transfer a block of data

3 Addition and Subtraction two-8 bit / 16 bit

4 Multiplication of two numbers – 8 bit and 16 bit

5 Array addition (multibyte)

6 Logical Operations – AND, OR, NOT

7 Decimal to ASCII and ASCII to Decimal.

8 Decimal to Hex and Hex to Decimal.

9 Sort numbers in Ascending order / Descending order

10 Up/down Counter

11 Interfacing with LCD.

12 Square wave generator

13 Digital Clock.

References

1. K A Navas "Electronics Lab Manual Vol 1I"
2. T.D. Kuryachan & Shyam Mohan S,"Electronics Lab Manual, Vol. II", Ayodhya Publications

6B02 ELE-P: Linear IC's /Practical (Practical-2)

1 Design of an integrator and differentiator using IC741 for a given specification and study its frequency response.

2 Design a precision rectifier using Op amp.

3 Design of inverting amplifier for given input impedance and bandwidth

4 Active filter circuits LPF HPF BPF using opamp (First order)

5 Timer IC 555 : Astable Multivibrator and Monostable Multivibrator

6 VCO – 566 IC : Design, output wave form

7 PLL NE 565 –characteristics Lock range, capture range

8 Voltage Regulators

a) Fixed 78xx, 79xx b) Variable 723 : Calculation of regulation (load /line)

9 Study of ADC and DAC ICs : 0808

References

1. K A Navas "Electronics Lab Manual Vol 1I"
2. T.D. Kuryachan & Shyam Mohan S,"Electronics Lab Manual, Vol. II", Ayodhya Publications

6B10ELE: Advanced Communication Systems

Module 1. Antenna: Basics of antenna: concept of radiation, parameters, evaluations for lambda/2 antenna, Interpretation of near and far field, Types of antenna, their dimensions, radiation pattern, frequency range, introduction to Propagation media

Module 2: Modulation and demodulation techniques: Balanced modulator, SSBSC with derivations, Synchronous demodulation, Phase modulation and demodulation using PLL, Ratio detector, Quadrature detector.

Module 3: Transmitter : Transmitters in high frequency range (Block diagram), Overview of RF amplifier from low frequency to GHz. , RF generator(Klystron generator), RF amplifier design-Bluetooth application(2.4GHz),Impedance matching cable specifications for high power Frequency Translation and multiplication, up/down conversion , Case study of typical transmitters- Radio Transmitter , TV Transmitter

Module 4 Receivers : Mobile receiver block diagram (800MHz), Doppler radar /speed gun block diagram (24 GHz) Introduction to low noise amplifier with block diagram

Emerging Technologies-Radio Frequency Identification (RFID)- Wireless Broadband (WiMAX) - Global System for Mobile Communication(GSM) - GSM Architecture – 3G &4G.

Recommended Books:

1 Roddy Coolen Electronic Communication (4^{th} edition) 2005 PHI

2 Kennedy Electronic Communication systems (3rd edition)2003 TMH

3 Kraus Antennas (3rd edition) 2009 TMH

4 Balanis Antenna Theory (2nd edition) 2009 Wiley Eastern

5 Taub Schilling Principles of communication systems (2nd edition) McGraw Hill

6B11ELE: Mathematical Methods and Digital Signal Processing

Module 1: Signals & systems -Analog, discrete & digital signals – concept of signal processing –Applications – comparison of Analog & digital signal processing , Signals and systems: continuous time and discrete time signals. Discrete time system – linear systems - time invariant systems - response of linear time invariant systems – convolution – stability & causality considerations – FIR systems – I I R systems – frequency responses

Module 2 : Mathematical Methods: Laplace Transform - definition, Laplace transform of simple function, properties, Inverse LT, partial fraction technique

Periodic and aperiodic wave forms - types of signals - Fourier Series Definition - Fourier representation of waveform (Square, Triangular, Half Wave, Full wave rectifiers) - Fourier transform, Definition & their properties.

Z transform - Definition & their properties, ROC.

Module 3: Discrete Fourier transform & Fast Fourier transform: Introduction – Discrete Fourier series - discrete Fourier transform of finite duration sequences – properties of DFT – circular convolution - computation of DFT. Fast Fourier transform : FFT Algorithms - general computational considerations – decimation in time & decimation in frequency algorithms – Radix 2 – FFT algorithms.

Module 4: Realization of digital systems : Recursive & non recursive systems – block diagrams & signal flow graphs – realization of IIR filters - direct form realization – cascade & parallel form realization – realization of FIR filters.

Recommended Books:

1. Digital Signal Processing, Principles, Algorithms and applications 3rd Edition– Proakis & Manolakis -PHI

2. Digital Signal Processing S K Mithra

3. Digital signal processing - Rameshbabu

4. Network theory – Van Valkenbug

5. Network system – Roy Chowdhary

6. Digital signal processing - Salai Vahanan

6B12ELE: Fiber Optics and optical Communication

Module 1: Introduction: Block diagram of fiber optic communication system. Need: Fiber optics in telephony, Voice communication, Video communication, Data Transfer, Entertainment, Power System, Transportation, Health care, Internet, Military Defense, business Development, Education. Definition and terminologies of fiber optic communication system: Bit rate, Baud rate, bandwidth, Channel capacity, Power calculation

Module 2: Fiber optics : Basic structure of optical fiber, ray transmission theory, propagation of light in optical fiber, acceptance angle, numerical aperture, skew rays, Dispersion in optical fiber. Types and specification of single mode, multimode, step index, graded index, glass and plastic fibers and advanced optical fiber.

Fabrication Techniques: Preform formation by External CVD, Internal CVD, AVD, multielement glass, double crucible method, rod in tube method, fiber drawing and coating.

Module 3 : Optical sources and detectors : Radiation sources- Light emitting diodes, operating principle - different types - construction brightness control- spectral response-LED sources in optical communication . Lasers: Principle of laser - different types, ruby lasers - gas lasers. Semiconductor lasers, hetrojunction lasers - operation - comparison with LED's

PN detector, PIN detector, avalanche photodiode-principles of operation, concepts of responsivity, sensitivity and quantum efficiency

Fiber optic link Losses : Attenuation in optical fibers, material or impurity losses, scattering losses, absorption losses, bending losses. Fiber optic link structure and link losses, connector and splicing losses

Module 4: Applications Video link(fiber optical), satellite link, computerlink - LAN, community Antenna Television(CATV), Switched star CATV networking, Digital video transmissions optical fiber networks, Optical fiber in Cellular telephony, Long haul communication for Internetworking, undersea optical fiber networks.

Recommended Books:

1 G. Kaiser Optical fiber communication McGraw Hill

2 Subir kumar Sarkar Optical fibers and fiber optic communication systems S.Chand and company

3 R. P. Khare Fiber optics and optoelectronics Oxford University Press

4 John M. Senior Optical fiber communications Principles and Practice , (2^{nd} edition) PHI

5 Ajoy Ghatak and K. Thyagarajan Introduction to fiber optics Cambridge University Press

6 D. C. Agarwal Fiber optic communication Wheeler publications

6B13ELE: Embedded System Basics

Module 1 : Introduction to Embedded Systems, Stand-alone and real-time embedded systems. Requirements of embedded systems, Components of embedded system. Embedded processors (Eg : ARM ,PIC32 etc) Programming languages and tools. Embedded operating system. Embedded system Application examples.

Module 2: PIC Microcontroller: Architecture – memory organization – addressing modes – instruction set – I/O port, RAM & ROM Allocation, Timer - Interrupts, I2C bus-A/D converter-UART.

Module 3: Embedded system software. Assembly languages, high level languages. Embedded C programming (Eg: Kiel C, Microchip C, SDCC Compiler).Data types, variables, port accessing, function. PIC in keil C (uVision IDE). Simple programs -LED blinking, LCD, Serial port.

Embedded communication standards ,RS232, I2C, SPI ,USB (Over view). **Case study**, Traffic Light controller, Water level controller., DC Motor speed control. Electronics manufacturing process, circuit designing, Programming, PCB designing using software.

Module 4: Advanced embedded systems. ARM processors general architecture. Over view of Embedded OS, Android OS. Real Time OS ,Embedded Linux (Examples).

Recommended Book:

1. The 8051 microcontroller and embedded systems using assembly and C - Kenneth.J.Ayala -CENGAGE Learning.(8051.kiel IDE)
2. The 8051 microcontroller and embedded system- Ali Mazidi. Pearson.
3. Microprocessors and micro-controllers (8085,8051)– Krishna Kant -PHI India
4. Introduction to embedded systems - Shibu .K.V - Tata McGraw Hill Publications
5. Embedded system architecture, programming and designing.-Raj kamal Tata McGraw Hill Publications.

7 Embedded Systems, -Rao, B. Kanta (ARM,PIC)

8 “Introduction to Embedded Systems”, Raj Kamal, TMS, Tata McGraw Hill Publications, 2002.

9 “Embedded / Real time systems: Concepts, Design and Programming”, Dr.K V K K Prasad, Dream Tech press, New Delhi, 2003

Elective2: 6B14ELE-E01 Power Electronics

Module1: Introduction to Power Electronics : Concept of single phase and three phase using phasors, Single phase , 3 phase transformers , power transformer ,Power diodes, Power transistors and Thyristors (SCRs): Symbols and Characteristics, Concept of Power circuits using block diagram.

Diodes and Rectifiers : Shockley equation of Diode, Reverse recovery characteristics Single phase rectifiers: Performance parameters, Half wave, Full wave centre tapped and bridge rectifier with resistive and inductive loads DC Filters: concept of C, L and LC filters

Module 2: Power transistors, DC Choppers and transistorized PWM inverter Switching Characteristics: Power BJT, power MOSFET,IGBT Choppers: Step-up, Step-down, Class A, B, C, D,E choppers (No Circuit details) Regulators: Buck, Boost and Buck-boost Invertors: Performance parameters, principle, Half Bridge and full Bridge inverter, Voltage control methods, Inverter filters

Module 3: Thyristors, AC to DC and DC to AC Converters Static Switches SCR characteristics, Two transistor static and transient model, turn-on, turn-off characteristics, dv/dt and di/dt protection Single phase Controlled rectifiers: Principle, Semi, Full and Dual Converters AC voltage controllers: on-off control, Phase angle control, Bi-directional control with Resistive and Inductive load, Cyclo converter DC Switches, Solid state relays, AC Switches and Microelectronic relays

Module 4: Safety Measures, Protection Devices and Measurement instruments : Electric Shock, safety in home and outdoors, Grounding systems, Undesirable circuit conditions, Fuses, Circuit breakers, thermal overload protections, lightening rods and arresters, High voltage probe, Differential probe, Clamp-on meter, Hall-sensor current meter, Power meters and energy meter, power factor measurement

Recommended Books:

1 M.H. Rashid Power electronics: Circuits, Devices and Applications , third Edition (2004) Pearson Education

2 Frank D Petruzella, MacMillan Essentials of Electronics A survey McGraw Hill (1993)

3 O.P. Arora Power electronics Laboratory : theory , Practice & Organization Narosa Publishing house (2007)

4 Mohan, undeland, Robbins Power Electronics , Third Edition (2006) John Wiley& Sons

5 P.C. Sen Power Electronics Tata Mc Graw Hill, (1998)

Elective2: 6B14ELE-E02 Principles of VLSI

Module 1: Introduction: General classification of integrated circuits – Scale of integration – Advantages over discrete components.

Module 2: Thick film technology: Features of hybrid IC technology – Thick film conductors – Dielectric – Resistors – Thick film processing – Thick film substrate – Design ideas – Advantages and applications.

Module 3: Thin film technology : Thin film conductors – resistors – dielectric – substrates – thin film processing – Advantages and applications – Monolithic IC process : Growth and refining of Si crystals – Substrate slicing and polishing – Wafer preparation – Diffusion – Ion implantation – Oxidation – Photo-lithography – CVD – Epitaxial grown – Metallization – Monolithic resistors and capacitors.

Module 4: Introduction – Modern VLSI devices – High field effect – MOSFET devices – long channel & short channel MOSFET. Bipolar devices – n.p.n. transistor – characteristics of typical n.p.n. transistor – Bipolar device design – Design of emitter, base and collector region – concept of HDL.

Text Books

1. Module (I, II, III) : Integrated Circuits (K.R. Botkar).

2. Module (IV) : Fundamentals of Modern VLSI Devices by Yuan Taur and Tak H. NING Cambridge Publishers.

References

1. Basic VLSI Design Systems and Circuits by Dougles A. Pucknell and Kamran Eshragian, PHI.

2 Fundamentals of Digital Design", Charles H.Roth,Jr., PWS Pub.Co.,1998.

Elective2: 6B14ELE-E03 Microwaves and Radar

Module-I Frequency spectrum ,Microwave bands, Applications of microwaves in different fields, wave guides – different types, transmission lines, types- parallel, co- axial, strip, optical & microwave guides, TE, TM &TEM waves, cut off frequency, phase & group velocities, Characteristics impedance, H- plane, E –plane & Magic Tees.

Module II Directional couplers, Isolators, circulators, Multicavity Klystron, reflex Klystron, Magnetrons, TWT – working principle & applications.

Module III Schottky diodes, point contact diodes, Varactor diodes, concept of parametric amplifier, IMPATT, TRAPATT & GUNN devices –Applications, Microwave antennas- (parabolic, lense, horn, slot)

Module IV Basic principle, fundamentals, performance factors,pulsed radar, Antennas & scanning, display methods, pulsed radar systems, MTI recons, CW Doppler radar, CW radar

Recommended books

1. Electronic communication system – Kennedy

2. Fundamental of Microwave engineering – Collins

3. Electronic communication, Roddy & Coolen,

4. Electronic & radio engineering, Terman

5. Principles of communication systems, Taub & Schilling

6B03 ELE-P: Communication Systems Practical (Practical-3)

1. Study of AM generation and Demodulation
2. Study of Frequency response of IF amplifier
3. Study of Mixer
4. Study of Frequency modulation and Demodulation
5. Study of Balanced modulator
6. Study of Pulse Amplitude Modulation and Demodulation
7. Study of Pulse Width Modulation and Demodulation
8. Study of Pulse Position Modulation Demodulation
9. Study of Time Division Multiplexing.

References

1. K A Navas “Electronics Lab Manual Vol II”
2. T.D. Kuryachan & Shyam Mohan S,”Electronics Lab Manual, Vol. II”, Ayodhya Publications

6B03ELE-P: Embedded System Practical (Practical-3)

1. One Serial Communication
2. LCD interface
3. Interfacing of Keypad / Matrix KBD/TWS
4. Interfacing SSD / Stepper Motor/ LED Bank
5. Frequency Counter
6. Interfacing RTC with 8051
7. Traffic Light Controller
8. Water level controller.,
9. DC Motor speed control

References

1. K A Navas “Electronics Lab Manual Vol II”

2. T.D. Kuryachan & Shyam Mohan S,”Electronics Lab Manual, Vol. II”, Ayodhya Publications

OPEN COURSES

5D01ELE: Consumer Electronics

Module 1. Audio systems : PA system – Microphone, Amplifier, Loudspeakers Radio receivers – AM/FM Audio recording and reproduction – Cassettes, CD and MP3

Module 2: TV and Video systems Television – standards, BW/Colour, CRT/HDTV Video system – VCR/VCD/DVD players, MP4 players ,Set Top box, CATV and Dish TV, LCD, Plasma & LED TV Projectors – DLP Home Theatres Remote Controls

Module 3. Landline and Mobile telephony Basic landline equipment – CLI, Cordless Intercom/ EPABX system Mobile phones – GPRS & Bluetooth GPS Navigation system

Module 4 : Office Equipments Scanners – Barcode / Flat bed , Printers , Xerox , Multifunction units (Print, Scan, fax, copy)

Module 5. Electronic Gadgets and Domestic Appliances Digital clock, Digital camera, Handicam, Home security system, CCTV Air conditioners, Refrigerators, Washing Machine/Dish Washer, Microwave oven, Vacuum cleaners

Recommended Books:

1 R. P. Bali Consumer Electronics Pearson Education (2008)

2 R. G. Gupta Audio and Video systems Tata McGraw Hill (2004)

5D02ELE: Computer Hardware

Module I PC overview – block diagram – functional elements, CPU- Intel Pentium processors - CPU packages, internal cache – external cache – clock doubling, pipelining, CPU core voltages- motherboard architecture – form factors – AT X – NLX – BTX – chipsets

Module II Memory modules -DRAM, parity – RAM packagers - DDR – SDRAM, RDRAM, SIMM, DIMM ,RIMM Banking, installation of SIMM & DIMM, BIOS & CMOS setup – flash ROM, POST, COM, & LPT Ports ,USB ports, EISA, VESA, PCI, AGP, PC cards.

Module –III HDD,CD - ROMS, DVD , THUMP DRIVERS- WORKING & SPECIFICATIONS, HARD DISC interface like IDE, SCSI,SATA, AUTO detection, HARD disk installation, partitioning, high level formatting - sectors – clusters, FAT – fragmentation, ESDI, SVGA monitor – LCD - TFT monitor – working - specification.

Module IV Printers – dot matrix – Laser – inkjet – modems - & standards – lap top – batteries – Ni Cd – NiMH - Lithium ion batteries - power saving – blue tooth technology – frequency hopping – fire wire - WiFi, Power supply, SMPS–types – UPS - Scanners - Digital cameras, Key board, Mouse, Touch Pad

Text books

1. Structural organization, Andrew & Tanenbaum
2. Computer organization by John P . Hayes
3. PC Hard ware Computers : Craize zaker , & John Rourke
4. Computer organization – Hamach & zaky
5. Trouble shooting maintain & repairing & Stephen JBigelaw
6. IBM clones -B Govinda Rajules

5D03ELE Basic Electronics

Module 1. Voltage and Current : Concepts of emf, potential difference and current, resistance, capacitance and inductance, S.I. units of work, power and Energy, concept of Kilo Watt Hour,

Module 2: Batteries and cells, their types, primary cells and secondary cells, Lead Acid, Ni-Cd, Ni-MH and Li-ion batteries, current capacity and cell ratings, charging and discharging of batteries, importance of initial charging, maintenance procedure, series and parallel battery connections,.

Module 3. D.C. Circuits : Resistance in Series and Parallel circuits, Shorts and Opens in series and Parallel circuits, Ohm's law, Kirchhoff's Voltage and current laws, Determination of direction of current and voltage sign, applications, Simplifications of networks using series and parallel combinations, Superposition theorem, Thevenin's theorem and maximum power transfer theorem.

Module 4. AC fundamentals : Generation of alternating voltages and currents, Transformer, Equations of AC voltage and current, Simple wave forms, concept of time period, frequency, amplitude and phase, Peak value and RMS value of amplitude, AC through resistance inductance and capacitance.

Reference

1. A text book of Electrical Technology, B L Theraja and A K Theraja

6B15 ELE: Project Work

Guideline to conduct Project work Marks : 25

There will be internal examination of 5 marks and external university examination of 25 marks for this course.

The project work should be followed with following guidelines:-

a) The name and subject of the project type must be well defined.

b) Planning of the work must be specified.

c) Theoretical, reference work must be provided.

d) Pilot experimentations / Preparations must be specified.

e) Typical design aspects, theoretical aspects, aim and objectives of the work must be specified in detail.

f) The actual work done must be reported along with experimentation procedures.

g) There must be observations, interpretations, conclusions, results of the project work.

h) Algorithm, program strategy, module wise description of parts etc be provided in case of projects related with development of computer software.

i) Applications, usefulness, student's contribution in it must be clearly specified.

j) Further extension work may be suggested for better outcome of the project.

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LRP COMMON COURSES

3A11ELE – NUMERICAL TECHNIQUES

Module I: Algorithmic approach to programming Algorithm – Description of algorithm – Narrative description – Flow chart – Tracing an algorithm – Summary of solution methodology.

Module II: Roots of Transcendental Equation Solution by iteration – convergence criterion –order of convergence – Newton Raphson method – Bisection method – False position method.

Module III: Interpolation and curve fitting Linear Interpolation – interpolating Lagrange interpolating polynomial – difference calculus – Newton forward and backward difference formula – least square curve fitting (linear and nonlinear).

Module IV: Numerical Integration Trapezoidal and Simpson's methods – Newton Cotes methods – Gauss Quadrature.
Ordinary differential equations Initial value problems – Euler's methods – Milne's method – Runga Kutta method.

Text Books
1. Shasry S S, Introductory methods of Numerical Analysis, Prentice Hall
2. Jean Paul Tremblay & Richard B Blunt, An Introduction to Computer Science An algorithmic approach
References
1. E Balaguruswamy, Numerical Methods, TMH
2. Scarborough, Numerical Mathematical Analysis, Oxford and IBH Publishing
3. William H Press, Saul A Treukolsky

3A12ELE- APPLIED ELECTRICITY

Module-1:

Quantities- charge, current, voltage, power and energy

Ideal voltage and current sources , dependant and independent sources

Electrical circuit symbols-battery,ground,resistor,capacitor,inductor,voltage source and current source

Ohm's law,KVL,KCL,voltage divider and current divider circuits,star-delta transformation

Capacitor and inductor- voltage and current relationship,energy stored and impedance

Module-2:

AC fundamentals-Periodic and aperiodic wave forms – types of signals- sinusoidal signal-parameters-cycle, time period, frquency, amplitude and phase.

Peak value, rms value, average value, form factor and peak factor of a sinusoidally varying voltage/currentPhasor representation of alternating quantities- analysis with phasor diagrams of R,L,C,R-L,R-C and RLC circuits, Real power, reactive power, apparent power and power facor.

Electromagnetism: Faradays Laws, Lenz's Law, Fleming's Rules, Statically and dynamically induced emf's. Concept of self inductance, mutual inductance and coefficient of coupling. Energy stored in magnetic field.

Module-3:

DC Machines: Working principle of DC machine as a generator and a motor. Types and constructional features. emf equation of generator, relation between emf induced and terminal voltage enumerating the brush drop and drop due to armature reaction.

DC motor working principle, Back emf and its significance, torque equation.

Types of D.C. motors, characteristics and applications. Necessity of a starter for DC motor.

Module-4:

Electromagnetism: Faradays Laws, Lenz's Law, Fleming's Rules, Statically and dynamically induced emf's. Concept of self inductance, mutual inductance and coefficient of coupling. Energy stored in magnetic field.

Transformers**:** Principle of operation and construction of single-phase transformers (core and shell types). emf equation, losses, efficiency and voltage regulation

Books for study:

1. E hughes- Electrical technology

2. B.L. Theraja, S.G. Tarnekar, A.K. Teraja -A Text Book of Electrical Technology

3. Basic Electrical Engineering", D C Kulshreshtha, ,TMH,2009 Edition.

4. "Fundamentals of Electrical Engineering", Rajendra Prasad, PHI

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4A13ELE - CONTROL SYSTEMS

Module- 1:
Modeling of Systems: Introduction to Control Systems, Types of Control Systems, Effect of Feedback Systems, Differential equation of PhysicalSystems -Mechanical systems, Friction, Translational systems , Rotational systems, Electrical systems, Analogous systems.
Block diagrams and signal flow graphs: Transfer functions, Block diagram algebra, Signal Flow graphs, Mason's gain formula.

Module-2:
Time Response of feed back control systems: Standard test signals, Unit step response of First and second order systems, Time response specifications, Time response specifications of second order systems, steady – state errors and error constants.

Module- 3:
Stability analysis: Concepts of stability, Necessary conditions for Stability, Routh- stability criterion, Relative stability analysis; More on the Routh stability criterion.
Root–Locus Techniques: Introduction, The root locus concepts, Construction of root loci.

Module-4
Frequency domain analysis: Correlation between time and frequency response, Bode plots, Experimental determination of transfer functions, Assessment of relative stability using Bode Plots. Introduction to lead, lag and lead-lag compensating networks ,Introduction to Polar Plots.

Books for study:
1. **J. Nagarath and M.Gopal**, "Control Systems Engineering", New Age International (P) Limited, Publishers, Fourth edition – 2005.
2. **"Modern Control Engineering ",** K. Ogata, Pearson Education Asia/ PHI, 4th Edition, 2002.
3. **"Automatic Control Systems",** Benjamin C. Kuo, John Wiley India Pvt. Ltd., 8th Edition, 2008.
4. **"Feedback and Control System",** Joseph J Distefano III et al., Schaum's Outlines, TMH, 2nd Edition 2007

4A14ELE: COMPUTER ORGANIZATION AND ARCHITECTURE

Module-1 :

Introduction- Function and structure of a computer Functional components of a : Function and structure of a computer, Functional components of a computer, Interconnection of components, Performance of a computer.

Representation of Instructions Representation of Instructions - Machine instructions, Operands, Addressing : Machine instructions, Operands, Addressing modes, Instruction formats, Instruction sets, Instruction set architectures - CISC and RISC architectures.

Module-2:

Processing Unit-Organization of a processor - Registers, ALU and Control unit, Data path in a CPU, Instruction cycle, Organization of a control unit - Operations of a control unit, Hardwired control unit, Microprogrammed control unit.

Module-3:

Memory Organization and Parallel Processing - Memory Hierarchy, Main Memory, Auxiliary Memory, Cache Memory, Virtual Memory. Address Space and Memory Space, Associative Memory, Page Table, Page Replacement

Pipelining, Parallel Processing, Pipelining General Consideration, Arithmetic Pipeline, Instruction Pipeline.

Module-4*:*

Input/Output Subsystem - Access of I/O devices, I/O ports, I/O control mechanisms - Program controlled I/O Interrupt controlled I/O and DMA controlled I/O I/O interfaces Program controlled I/O, Interrupt controlled I/O, and DMA controlled I/O, I/O interfaces - Serial port, Parallel port, PCI bus, SCSI bus, USB bus, Firewall and Infiniband, I/O peripherals - Input devices, Output devices, Secondary storage devices.

Books for study:

1. C. Hamacher, Z. Vranesic and S. Zaky, "Computer Organization",McGrawHill,2002
2. .P. Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.
3. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002

COMPLIMENTARY COURSES

1C01ELE - BASIC ELECTRONICS

Aim of the Course

To equip the students with basic components in electronics, identifying and testing them, to familiarize with various measuring and testing instruments and basic techniques of troubleshooting.

Objectives of the Course

- To learn the basics of electronic components
- To learn the basics of testing and measuring instruments
- To study circuit troubleshooting

Module I Introduction to electronics, applications ohm's law - Definitions – potential difference, current, voltage & its units, concept of voltage source & current source, Passive components, identification, colour coding. Introduction to semiconductor materials, metals, insulator, semiconductors doping, PN junction, majority & minority carriers, VI characteristics, reverse break down, Zener diode, LED.

Module II Bipolar Junction Transistor – operation, configuration, input – output characteristic, parameters, MOSFET, CMOS. Comparison between BJT & FET.

Module III Rectifiers - half wave, full wave. Ripple factor, efficiency, RC filter. Need for biasing, voltage divider biasing. RC coupled amplifier – working, frequency response. Operational amplifier - concept of 741 block diagram. Inverting & non inverting amplifier, applications.

Module IV Concept of feed back – positive – negative .Feed back topologies, Sinusoidal oscillator – RC oscillator , Hartley oscillator, Colpits oscillator , Crystal oscillator. Multivibrators – Astable, Mono stable & Bi-stable multivibrators.

Text Books

1) Principles of electronics - V.K. Mehta
2) Basic electronics & linear circuits – N.N . Bhargava
3) Electronic device & circuit theory - Boylested & Neshelsky
4) Operational – Amplifier & Linear integrated circuits – Gaykwad .

References

1) www. electronics – tutorials. Com
2) www. electronics how stuff works . com
3) www.science – e books . com / electronics.

2C02ELE - DIGITAL ELECTRONICS

Aim of the Course

To equip the students with detailed knowledge in digital electronics, digital IC's in the 74XX series. Many of the ideas are important to learn microprocessors.

Objectives of the Course

- To learn different number systems, logic gates, comparators, flip flops etc

Course Outline

Module I Number systems – Decimal , Binary, octal & hexa decimal conversions, digital codes –BCD, excess – 3, gray code , ASCII code , Error detection codes conversions, Boolean Algebra & theorems, SOP & POS , De- Morgan's theorems , simplification of Boolean Algebra & K- map , Logic gates.

Module II Combinational circuits – Adders, Subtractors , Comparators, Decoders, Encoders, Mux & De – mux , parity generators – Familiarisation of popular ICs.

Module III Sequential circuits – Flip- flops (RS latch , Clocked RS ,D, J-K , T, Master slave), shift registers & applications , Asynchronous counter , Synchronous counter, Ring counter, counter design & sequence generator.

Module IV Converters – ADC & DAC [different types] working & applications, Display – LED (seven segment) & LCD.

Text books

1. Thomas Floyd – Digital fundamentals.

References

1. Digital principles & applications by Malvino & Leach
2. Digital electronics circuits & systems , V.K. Puri (TMH)
3. Taub & Schilling , Digital Integrated electronics
4. Millman – Digital Integrated circuits.

3C03ELE - COMMUNICATION SYSTEMS

Module I Basic block diagram of a communication system, transmission media, Electro magnetic spectrum, uses of various frequency bands, modulation, demodulation, Need for modulation, Amplitude modulation – definition, modulation index, power relation, AM equation.

Module II Frequency modulation , FM equation, comparison of FM & AM wide band - narrow band FM , pre – emphasis , De – emphasis , phase modulation – definition, equation .FM stereo - transmission & reception.

Module III Basic block diagram of AM transmitter, function of each block, AM receiver – block diagram, principle of super heterodyne receiver sensitivity, selectivity, block diagram of FM transmitter & receiver.

Module IV Pulse communication – basis of PAM, PWM, PPM - Digital communication - PCM, block diagram. bit rate, boud rate. Digital modulation schemes – ASK, FSK, PSK.modem.

Text Books

1. Electronic communication - Kennedy
2. Radio engineering - G.K.Mittel
3. Communication system – Kumar
4. Communication system – Roddy & Coolen
5. Data & computer communication – William Stallings
6. Data communications – William L Schweber.

4C04ELE - MICROPROCESSOR & PERIPHERALS

Module I Microprocessor – Introduction to 8085, Bus organisation – Registers – Memory Organisation – I/O addressing.

Module II 8085 Architecture - functional blocks – instruction & timing – instruction classifications – word length – simple programs – instruction set of 8085 – Addressing modes.

Module III Looping – counting – indexing – simple illustrative programs – logical instruction –Branching instruction.

Module IV Introduction to programmable peripheral devices (8255A, 8254A, 8279 A) – Function of each chip – bus standards (serial & parallel) – RS 232 & USB – other processors –Features of Intel Pentium processors

Text books

1. Microprocessor Architecture, programming & application with 8085/8089,
A Ramesh .G. Gaonkar
2. Introduction to Microprocessor – Adithya. P. Mathew (TM

COMPLIMENTARY PRACTICALS

4C05ELE-P: PRACTICAL-1

1. V-I characteristics of p-n junction diodes – germanium and silicon
2. V-I characteristics of Zener diode
3. Characteristics of a transistor - common base configuration
4. Characteristics of a transistor - common emitter configuration,
5. Characteristics of FET
6. Half wave Rectifier and Full wave Rectifier (with and with out filter
7. Zener voltage regulator (load & line regulations
8.. Realization of logic gates using universal gates
9. Implementation of half adders , Full adders using gates
10. Implementation of half subtractors and Full subtractors using gates
11. Implementation of Multiplexer & Demultiplexer (using IC)
12. Realization of S-R, J-K, D and T Flip flops (using gates)
13. Familiarization of S-R, J-K, D and T Flip flops (using IC)
14. Synchronous counter
15. Asynchronous counter
16. Ring counter & Johnson counter
17. Shift Registers
18. BCD to seven segment Decoder 7448
19. RC Coupled Amplifier – gain and frequency response
20. RC Integrator and RC differentiator (using discrete component)
21. Astable multivibrator (using discrete component)
22. Monostable multivibrator (using discrete component)
23. RC Phase shift oscillator
24. Hartley and Colpitts Oscillator
25. Op-Amp – Non-Inverting and Inverting Amplifier
26. Adder and Subtractor using Op-Amp
27. Op-Amp parameters – CMRR, offset voltage, offset current, bias current, slow rate
28. AM generation and Demodulation
29. Addition and Subtraction – bit ,16 bit
30. Block data transfer
31. Multiplication and. Division
32. Logic operators -AND , OR , NOT
33. Binary to decimal & decimal to binary
34. Binary to BCD & BCD to binary
35. Largest & smallest from a set of numbers
36. Sorting - Ascending
37. Sorting – Descending
38. BCD addition and subtraction
39. Up/Down counter.

MODEL QUESTION PAPER (CORE)

TIME 3 hrs MAX MARKS -40

SECTION A (ONE WORD)

(Answer all the four question in one word)

Each carry one mark

1

2

3

4 4 marks

SECTION B (SHORT ANSWER)

(Answer any seven question out of 10 question)

Each carry 2 marks

5

6

7

8

9

10

11

12

13

14 14 marks

SECTION C (PROBLEM TYPE)

Answer any 4 out of 6 question

Each carry 3 marks

15

16

17

18

19

20 12 marks

SECTION D (ESSAY TYPE)

Answer any 2 out of 4 question

Each carry 5 marks

21

22

23

24 10 marks

MODEL QUESTION PAPER (COMPLIMENTARY)

Time 3hrs Max marks 32

SECTION A (ONE WORD TYPE)

Answer all the three question

Each carry one mark

1

2

3 3 marks

Section B (short answer type)
Answer any 5 out of 7
Each carry 2 marks

4
5
6
7
8
9
10 10 marks

Section C (Problem type)
Answer any 3 out of 5
Each carry 3 marks

11
12
13
14
15 9 marks

Section D (Essay type)
Answer any 2 out of 4
Each carry 5 marks

16
17
18
19 10 marks

Georgekutty.p.s
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