KANNUR UNIVERSITY

(Abstract)

BSc Electronics & Communication Programme - Revised Scheme, Syllabus& Model Question Papers 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, 24 -10-2014**

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 15.10.2014

3. Minutes of the meeting of the Faculty of Science held 25-03-2014

4. Letter dated 15-10-2014 from the Chairman, BOS in Electronics (Cd)

ORDER

1. The Revised Regulations for UG Programme 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 & model Question Papers for Core, Complementary & open courses of BSc Electronics & Communication 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 & model question papers for core/complementary & open courses of BSc Electronics & Communication 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 & Model question papers for core/complementary and open courses of BSc Electronics & Communication 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 & model question papers of BSc Electronics & Communication Programme with effect from 2014 admission.

6. Orders, are therefore issued implementing the revised Scheme, Syllabus & Model Question Papers for core, complementary& open courses of BSc Electronics & Communication programme under CBCSS with effect from 2014 admission subject to report to Academic Council

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

Sd/-
DEPUTY REGISTRAR (ACADEMIC)
FOR REGISTRAR

To:

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

Contd.....2

Copy To:

1. The Chairman, BOS in Electronics (Cd)
2. PS to VC/PA to PVC/PA to Registrar
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Approved/By Order

Section Officer

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

KANNUR UNIVERSITY

RESTRUCTURED CURRICULUM
FOR
UNDERGRADUATE PROGRAMME
IN
ELECTRONICS
AND
COMMUNICATION

w. e. f. 2014 ADMISSION

KANNUR UNIVERSITY

B.Sc Electronics and Communication scheme and syllabus of core courses and complimentary under choice based credit and semester system for under graduate program- implemented with effect from 2014 admission

Sl No.	Semester	Course Code		Title of the course	Credit	Hrs/week	Exam hrs	Max.Marks		
								Int	Ext	Total
1	I	1B01EC		Basic Electronics	3	2	3	10	40	50
2	I*	**4B01EC-P**		**Practical-1**(Basic Electronics)	-	1	-	10	40	-
3	II	2B02EC		Electronic Devices and Circuit	3	2	3	10	40	50
4	II*	**4B01EC-P**		**Practical-1**(Electronic Devices and Circuit)	-	2	-	10	40	-
5	III	3B03EC		Analog Circuits and systems	3	3	3	10	40	50
6	III*	**4B01EC-P**		**Practical-1** (Analog circuits)	-	2	-	10	40	-
7	IV	4B04EC		Principles of Digital Electronics	3	3	3	10	40	50
8	IV*	**4B01EC-P**		**Practical-I**(Digital Electronics)	4	2	3	10	40	50
9	V	5B05EC		Electromagnetics	3	3	3	10	40	50
10	V	5B06EC		Electronic Communication	3	3	3	10	40	50
11	V	5B07EC		Microprocessor and Microcontrollers	3	3	3	10	40	50
12	V	5B08EC		Applications of linear ICs	3	3	3	10	40	50
13	V	**Elective**	5B09EC-E01	1.Computer Communication	3	3	3	10	40	50
			5B09EC-E02	2.Mobile Communication						
14	V	**OPEN**	5D0*EC	1.Biomedical Instrumentation	2	2	2	5	20	25
				2. Computer Hardware						
				3. Basic Electronics						
15	VI*		**6B02EC-P**	**Practical2** (Microcontroller and LIC lab)	3	8	-	10	40	50

16	VI		6B10EC	Advanced communication system	3	3	3	10	40	50
17	VI		6B11EC	Satellite communication	3	3	3	10	40	50
18	VI		6B12EC	Fiber optics and optical communication	3	3	3	10	40	50
19	VI		6B13EC	Embedded System Basics	3	3	3	10	40	50
20	VI	**Elective-2**	6B14EC-E01	1. Power electronics	3	3	3	10	40	50
			6B14EC-E02	2. Principles of VLSI						
			6B14EC-E03	3. Microwaves and radar						
21	VI*		**6B02EC-P**	**Pracical-2** (Microcontroller and LIC)	4	-	3	10	40	50
22	VI*		**6B03EC-P**	**Practical-3** (Communication and embedded System)	4	8	4	10	40	50
23	VI		**6B15EC**	Project work	2	2	-	5	20	25

B.Sc ELECTRONICS AND COMMUNICATION SCHEME AND SYLLUBUS

CREDIT DISTRIBUTION (B.Sc Electronics and Communication)

SEMESTER	COMMON ENGLISH	COMMON ADDITIONAL	CORE	COMPLIMEN -TORY -I	COMPLIMEN TORY 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
TOT AL	22	16	56	12	12	2	120

CREDIT DISTRIBUTION (B.Sc Electronics and Communication-LRP Scheme)

SEMESTER	COMMON ENGLISH	COMMON ADDITIONAL	LRP GENERAL	CORE	COMPLIMEN -TORY -I	COMPLIMEN TORY 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
TOT AL	14	8	16	56	12	12	2	120

Scheme of mark distribution (B.Sc Electronics and Communication)

Courses		**No of Courses**	**Marks per course**	**Total Marks**
Common	English	6	50	300
	Addl Language	4	50	200
Complimentary	Complimentary 1	4	50	200
	Complimentary 2	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 and Communication-LRP)

Courses		**No of Courses**	**Marks per course**	**Total Marks**
Common	English	4	50	200
	Addl Language	2	50	100
	General	4	50	200
Complimentary	Complimentary 1	4	50	200
	Complimentary 2	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

COURSE STRUCTURE FOR THE LRP SCHEME

Semester-1

SI No.	Semester	Course Code	Title of the course	Credit	Hrs/Wee	Exam hrs	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(Addl. Language)	4	5	3	10	40	50
4	I	1B01EC	Core Course I	3	2	3	10	40	50
5	I	4B01EC-P	Core course I-Practical	-	1	-	-	-	-
6	I		Complimentary I(Mathematics)	3	4	3	10	40	50
7	I		Complimentary II	2	2	3	8	32	40
8	I		Complimentary II practical	-	2	-	-	-	-

Semester -2

SI No.	Semester	Course Code	Title of the course	Credit	Hrs/We	Exam	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(Addl. Language)	4	5	3	10	40	50
4	II	2B02EC	Core Course II	3	2	3	10	40	50
5	II	4B01EC-P	Core course II-Practical	-	1	-	-	-	-
6	II		Complimentary I(Mathematics)	3	4	3	10	40	50
7	II		Complimentary II	2	2	3	8	32	40
8	II		Complimentary II practical	-	2	-	-	-	-

Semester-3

SI No.	Semester	Course Code	Title of the course	Credit	Hrs/Wee	Exam	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	3B03EC	Core Course III	3	3	3	10	40	50
4	III	4B01EC-P	Core course III-Practical	-	2	-	-	-	-
5	III		Complimentary I(Mathematics)	3	5	3	10	40	50
6	III		Complimentary II	2	3	3	8	32	40
7	III		Complimentary II practical	-	2	-	-	-	-

Semester -4

SI No.	Semester	Course Code	Title of the course	Credit	Hrs/Wee	Exam hrs	Max.Marks		
							Int	Ext	Total
1	IV		Common Course(General-1)	4	5	3	10	40	50
2	IV		Common Course (General-2)	4	5	3	10	40	50
3	IV		Core Course IV	3	3	3	10	40	50
4	IV	4B04EC	Core course IV-Practical	4	2	3	10	40	50
5	IV	4B01EC-P	Complimentary I(Mathematics)	3	5	3	10	40	50
6	IV		Complimentary II	2	3	3	8	32	40
7	IV		Complimentary II practical	4	2	3	8	32	40

Semester-5

SI No.	Semester	Course Code		Title of the course	Credit	Hrs/Wee	Exam	Max.Marks		
								Int	Ext	Total
1	V	5B05EC		Core Course-5	3	3	3	10	40	50
2	V	5B06EC		Core Course-6	3	3	3	10	40	50
3	V	5B07EC		Core Course-7	3	3	3	10	40	50
4	V	5B08EC		Core Course-8	3	3	3	10	40	50
5	V	Elective-1	5B09EC-E01	Core Course-9	3	3	3	10	40	50
			5B09EC-E02							
6	V	OPEN	5D0*EC	Open Course	2	2	2	5	20	25
7	V*	6B02EC-P		Core Course(Practical-2)	-	8		-	-	-

Semester -6

SI No.	Semester	Course Code		Title of the course	Credit	Hrs/Wee	Exam	Max.Marks		
								Int	Ext	Total
1	VI	6B10EC		Core Course-10	3	3	3	10	40	50
2	VI	6B11EC		Core Course-11	3	3	3	10	40	50
3	VI	6B12EC		Core Course-12	3	3	3	10	40	50
4	VI	6B13EC		Core Course-13	3	3	3	10	40	50
5	VI	Elective-2	6B14EC-E01	Core Course-14	3	3	3	10	40	50
			6B14EC-E02							
			6B14EC-E03							
6	VI*	6B02EC-P		Core Course(Practical-2)	4	-	3	10	40	50
7	VI*	6B03EC-P		Core Course(Practical-3)	4	8	4	10	40	50
8	VI	6EC (Pr)		Project Work	2	2		5	20	25

CORE COURSES

1B01EC : 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

4B01EC –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

2B02EC : 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.

4B01EC–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

3B03EC: 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

4B01EC –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

4B04EC: 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

4B01EC –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

5B05EC ELECTROMAGNECTICS

Module 1: Concept of circuit and field, vector analysis, physical interpretation of gradient, divergence and curl, integral theorems and comparison,

Module2: Electrostatics: Introduction, fundamental relations of electrostatic field, Gauss's law, special gauss surfaces, potential functions, divergence theorem, Poison's and Laplace's equations

Magnetoststics: Biot-Savart law, force between two current carrying coils, magnetic flux density, Magnetic field intensity, intensity of magnetization, Ampere's circuit theorem,Lorent's force, Magnetic vector potential, boundary condition for magnetic field

Module3: Electrodynamics: Faradays law of induction, modified Ampere's law, Maxwell's equation, wave equation, solutions of wave equation in free space, pointing vector, electromagnetic energy, boundary conditions.

Module 4: Radiation and propagation of radio waves: radiation of electromagnetic fields, polarization, isotropic radiator, plane waves, electromagnetic spectrum, propagation of waves in free space

Reference Books:

1) Electromagnetic waves and radiating systems-Jordan &Balmier-PH (New Edition)
2) Fundamental of electro dynamics-Grifth(IV Edition)
3) Fundamental of electronic waves-Hugh Hildeeth Skilling.
4) Fundamentals of electromagnetic-Micah

5B06EC ELECTRONIC COMMUNICATION

Module 1: Block diagram of an electronic **co**mmunication system,electromagnetic spectrum, band designations and application, types of electronic communication system- simplex, duplex, noise in communication- external noise(atmospheric, space noise, manmaide noise), internal noise(thermal, shot noise), definitions and relationship between bit rate,baud rate, band width and signal to noise ratio.

Module 2: Modulation: Need for modulation, amplitude modulation, side band,AM signals and spectrum, power relations, product modulator, single side and AM, AM generation, high level and low level AM transmitters, AM receivers, super heterodyne receivers,SSb generator balanced modulator,SSb transmitters,SSB receivers

Module 3: Frequency modulation –FM &PM signals,spectra,band width,narrow band &wide band FM,generation,direct FM,VCO,phase modulator,indirect FM,demodulation of FM,balanced descriminator,de-emphasis and pre-emphasis,FM transmitters and receivers,FM stereo transmission and reception

Module 4:sampling,aliasing,PAM,PWM,PPM,concept of FDM &TDM,pulse code modulation,quantization,generation and re construction,companding,concept of ASK,FSK,PSK,DPSK.

Reference Books

1.Kennedy electronic communication,2nd edition TMH

2.Frenzel electronic communication,3rd edition TMH

3.Dennis Roddy.,John Coolen Electronic Communicatin system PHI

4.Grob B.Electronic principles TMH

5B07EC MICROPROCESSOR AND MICROCONTROLLERS

Module 1: Introduction to microprocessors-evolution of microprocessors, Introduction to 8085, functional block, Pin diagram,8085 registers, bus organization, microprocessors initiated operations and internal data operations, Externally initiated operations, memory organization, mapping and types, Types of I/O addressing, instruction format, instructions and timing(programming not required), instruction classification, concept of RISC and CISC- MMX-Pentium processors

Module 2: Microcontroller architecture: Comparison between microprocessor and microcontroller, 8051 microcontroller hardware(oscillator&clock, program counter, data pointer, A&B registers,flags and PSW, internal memory, internal RAM/ROM, stack and 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, defferent groups of instructions, data transfer instruction, logical operations, arithmetic operations,jump and call instructions,

Simple programs: Arithmetic,logical,code conversion, block data transfer and timer programming

Module 4: Peripherals; timer/counter interrupt, counting,serial data i/p and serial data o/p, serial data interrupt, data transmission and 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 and LCD display, Dto A and A to D interface

Reference Books;

1) 8085 Architechture and programming techniques- Remesh S Goanker
2) Microprocessors and interfacing- Programming and Hardware-Douglas V Hall
3) 8051 microconroller architecture, programming and applications- 2nd edition- Kennath J Ayala

5B08EC APPLICATION OF LINEAR ICs

Module 1: Op-amp- selection criteria for Op-amp ICs, design of inverting and non- inverting amplifier circuits, input and output impedence and bandwidth,practical integrator and differentiator circuit and their design. Design of peak detector circuit,design of precision rectifier circuits and application.

Active filters using op-amp- design of LP, BP and HP filters for 2^{nd} order, swithed capacitor filters-concept and application

Module 2: 555 Timer- Block diagram, design of astable and monostable multivibrator circuit, VCO(IC 566)- block diagram-circuits – applications. Phase Locked Loop(IC 565)- Block diagram,Lock and Capture range, typical circuits, applications.

Module 3: Voltage regulators, linear regulator ICs, LM 723,LM 317 and three terminal regulator ICs 78XX, 79XX, LM723. Switching regulators & SMPS, typical circuits,applications

Module 4: ADC and DAC- different types,parameters, performance types and comparison, applications- popular ICs

Referance Books:

1) Linear IC application-U A Bakshi
2) Op-amp and Linear integrated Circuits- Ramakanth A Gaykward
3) Operational Amplifiers and Linear Integrated Circuits- James M Flore

Elective-1:5B09EC-E01: COMPUTER COMMUNICATION

Module 1:

Introduction: Data Communication, Networks, Protocols and Standards, Topology, Categories of Networks, OSI & TCP/IP Protocol suites
Physical Layer: Transmission modes, DTE-DCE Interface, Modems, Guided media, Unguided media, Performance, Multiplexing, Switching, DSL, FTTC

Module 2:

Data Link Layer: Data Link Control - Line discipline, Flow control, Error control; Data Link protocols – Asynchronous Protocols, Synchronous protocols, Character oriented protocols, Bit oriented protocols, Link Access Procedures
LANS and MANS: Project 802, Ethernet, Token Bus, Token Ring, FDDI, Fast Ethernet, Gigabit Ethernet, DQDB, SMDS, PPP

Module 3:

Network Layer: Repeaters, Bridges, Hubs, Switches, Routers, Gateways, Routing algorithms - Shortest path routing, Distance vector routing, Link state routing; X.25 layers and protocols, Congestion control - Leaky bucket algorithm, TCP/IP Protocol Suite- IP protocol, IP addresses, Subnetting, ARP, RARP; ICMP, ISDN Services and channels, Broadband ISDN, ATM- Design goals, architecture and layers

Module 4:

Transport Layer: Duties of Transport layer, Transport connection, OSI Transport protocol, TCP, UDP
Application Layer: BOOTP and DHCP, DNS, TELNET, FTP, SMTP, HTTP, WWW, VoIP, Four aspects of Network security, Privacy, Digital Signatures

Text/ Reference Books:

1. BEHROUZ A. FOROUZAN, Data Communications and Networking, 2nd Edition, Tata McGraw-Hill, New Delhi, 2003
2. ANDREW S. TANENBAUM, Computer Networks, 4th Edition, Prentice-Hall of India, New Delhi, 2000.
3. WILLIAM STALLINGS, Data and Computer Communication, 6th Edition, Prentice Hall of India, New Delhi, 1999.
4. DOUGLAS E COMER, Computer Networks and Internet, Pearson Education Asia, 2000

Elective-2: 5B09EC-E02 MOBILE COMMUNICATION

Module 1: Understand mobile communications, Architecture for mobile computing, Know the principle of cellular network,Explain the operation of cellular system,Evolution of telephony, Multiple access procedures, Mobile computing through telephone,Developing an IVR application,Telephony application programming interface (TAPI)

Module 2:Emerging technology

Introduction, Bluetooth, Radio frequency identification (RFID), Wireless broad band (WIMAX), Mobile IP, Internet protocol version 6 (IPV 6), Gobal system for mobile communications,GSM Architecture, GSM entities, Call ro

uting in GSM, Network aspects in GSM, Mobility management, GSM frequency allocation

Module 3:

Mobile computing over sms, Short message service , General packet radio service (GPRS), GPRS and packet network, GPRS network architecture , GPRS network operation, Application in GPRS, Limiation for GPRS.

Module 4:

Wireless application protocol (WAP) and MMS, CDMA and 3G, Spread spectrum technology, Third generation network, LAN and Hiper LAN, Wifi versus 3G

Reference books:

1 Mobile computing technology ,applications and service creation ASOKE K TALUKDER,HASAN AHAMED

2 Mobile communications JOCHEN SCHILLER

3 Wireless communication RAPPAP0RT

4 Mobile and personal communication systems and service RAJ PANDYA

.6B02EC-P MICROCONTROLLER AND LINEAR ICs LAB (PRACTICAL 2)

LINEAR IC LAB

1) Design of integrator and differentiator using IC 741 for a given specification and study its frequency response.
2) Design a precision rectifier using Op-amp
3) Design of inverting amplifier for a given input impedence and band width
4) Active filter circuits: LPF, HPF, BPF using Op-amp(first order)
5) 555-timer IC: Astable and monostable multivibrator
6) VCO-566 IC: Design, output wave form
7) PLL-NE565; Characteristics, Lock range, Capture range
8) Voltage regulators
    a) Fixed 78XX, 79XX series
    b) Variable 723; calculation of regulation(load, line
9) Study of ADC and DAC IC

MICROCONTROLLER LAB

1) Data transfer using direct and indirect addressing
2) Program to transfer a block of data
3) Addition and Subtraction(8-bit & 16-bit)
4) Multiplication of two numbers(8 & 16 bit)
5) Array addition(multibyte)
6) Logical operations: AND, OR, NOT
7) Decimal to ASCII, ASCII to decimal conversion
8) Decimal to Hex and Hex to decimal conversion
9) Sorting numbers in ascending or descending order
10) Up or down counter
11) Interfacing with LCD
12) Square wave generator
13) Digital clock

6B10EC ADVANCED COMMUNICATION SYSTEM

Module 1: Antenna: Basics of antenna, concept of radiation, parameters, evalution of lamda/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, radio detector, quadrature detector

Module 3: Transmitter: transmitters in high frequency range (block diagram), over view of RF amplifier from low frequency to GHz, RF generators (Klystron generator), RF amplifier design, Bluetooth application (2.4 GHz), impedence matching, cable specifications for high power frequency translation and multiplication, Up or down conversion, case study of typical transmitters-radio transmitter, TV transmitter

Module 4: Recievers: Mobile receiver block diagram(800 MHz), Doppler radar/ speed gun block diagram(24 GHz), introduction to low noise amplifier with block diagram
Emerging technologies: Radio frequency identification(RFID), Wirless broad band(Wi-Max), Global system for mobile communication(GSM), GSM architecture, 3G and 4G

References:

1) Electronic Communication-Roddy Coolen
2) Electronic Communication Systems-kennady
3) Antennas- Kraus
4) Antenna Theory-Balanis
5) Principles of Communication Systems-Taub Schilling

6B11EC SATELLITE COMMUNICATION

Module 1: Satellite Orbits: Kepler's law, Newton's law, orbital parameters, orbital perturbations, station keeping, geo-stationary and non-geo stationary orbits, Look angle determination, limits of visibility, eclipse, sub satellite point, Sun transit outage, launching procedures, launch vehicles and propulsion

Module 2: Space segment and satellite link design: Space craft technology, structure, primary power,attitude and orbit control, thermal control and propulsion, communication payload and supporting sub systems, telemetry, tracking and command, satellite up link and down link analysis and design, link budget,E/N calculation, performance impairments, system noise, inter modulation and interference, propagation characteristics and frequency considerations, system reliability and design life time

Module 3: Satellite Access: Modulation and multiplexing, voice, data, video, analog/digital transmission system, digital video broad cast, multiple access-FDMA, TDMA,CDMA, assignment methods, spread spectrum communication, compression and encryption

Module 4: Earth Segment: Earth station technology, terrestrial interface, transmitter and receiver, MATV,CATV

Sattellite Applications: INTELSAT series, INSAT, VSAT, Mobile satellite services- GSM, GPS, INMARSAT,LEO, MEO

Reference:

1) Satellite communication- Dennis Roddy
2) Satellite communication system engineering-Wilbur L. Pritchard
3) Design of Geosynchronous space craft- N. Agarval
4) Telecommunication transmission Systems- Robert G. Winch

6B12EC: FIBER OPTICS AND OPTICAL COMMUNICATION

Module 1: Introduction: Block diagram of fiber optic communication system, Need, fiber optic in telephony, voice communication, Video communication, data transfer, Entertainment, power system, Transportation, health care, internet, military defence, Bussiness 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: Perform 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, LEDs, operating principles, defferentr types, construction brightness control, spectral responds, LED sources in Optical communication, LASERS, principle of LASERS, different types, ruby lasers, gas lasers, semiconductor lasers, hetero-junction lasers, operation, comparison with LEDs,

PN detecter,PIN detecter, avalanche photo diode, principles 0f operation, concepts of resposivity, 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, computer link, LAN, Community Antenna Television(CATV), switched star CATV networking, digital video transmissions, opticalfiber networks. Optical fiber in cellular telephony, Long haul communication for inter networking, 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 , (2nd edition) PHI
5. Ajoy Ghatak and K. Thyagarajan Introduction to fiber optics Cambridge University Press
6. D. C. Agarwal Fiber optic communication Wheeler publication

6B13EC: 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

Elective-2: 6B14EC-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: 6B14EC-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: 6B14EC-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 EC-P: Communication and embedded system. (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

Embedded System

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

5D01EC: Biomedical Instrumentation

Module 1: Physiology: Man instrument system,problem encountered in measuring a living system,transducers for biomedical applications, cell and its structure, resting and action potential, propagation of action potential, the heart and cario vascular system,physiology of respiratory system,nervous system, central nervous system and peripheral nervous system, electrode theory,biopetential electrodes

Module 2: Electro physiological measurement: ECG, vector cardiography,EEG,EMG,ERG,EOG,lead system and recording methods, typical wave forms

Module 3: Measurement of blood pressure,blood flow and cardiac output,plethysmography,measurement of heart sounds,gas analysers, blood gas analysers,oximeters

Module 4: Pacemakers, Defibrilleters,ventilator, anesthesia mechine, nerve and muscle stimulator,audiometers,diathermy,endoscopes, lasers in biomedicine

References :

1) Hand Book of Biomedical Instrumentation- R S Kandpur
2) Biomedical Instrumentation and Measurements-lesli Cromwell, Fred. J

5D02EC: 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

5D03EC 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

6EC: 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

3A11EC – 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

3A12EC- 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 signalparameters-
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
,

4A13EC - 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

4A14EC: 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

1C01EC - 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

2C02EC- 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.

3C03EC- 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.

4C04EC - 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

4C05EC-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 PAPERS

1Semester B.Sc Electronics and communications Degree (CCSS) Examination

Core Course

1B01EC BASIC ELECTRONICS

Time:3hrs Marks: 40

Fill in the blanks Answer Any 4 4*1/2=2

1) An intrinsic semiconductor at absolute zerz temperature behaves likes ----------
2) ---------- is the unit of current
3) Cut in voltage of silicon is ----------
4) Zener diode works in ---------- bias
5) Voltage gain of CC configuration is----------
6) Transeconductance=--------

Answer any 4 4*1=4

7) Describe hall effect
8) Exlain hoe avalanche break down occur in PN junction
9) Write about forbidon energy gap
10) Write about varactor diode
11) Why CE configuration is used in amplifier circuit
12) Write about DIAC

Answer any 6 6*3=18

13) Explain UJT relaxation oscillator
14) Explain JFET parameters
15) Explain V-I characteristics of PN junction
16) Draw and explain energy band diagram

Answer any 2 2*8=16

17) With neat diagram explain the P&N type semiconductors

18) With neat diagram explain FET

19) With neat diagram explain the input and output characteristics of CB configuration

11nd Semester B.Sc Electronics and communications Degree (CCSS) Examination

Core Course

2B02EC Electronic Devices and Circuit

Time:3hrs Marks: 40

Fill in the blanks Answer Any 4 4*1/2=2

1) The h- parameter h11=-----
2) Most commonly used biasing method for a transistor is ----------
3) The voltage gain of a transistor amplifier---------as ac lod resistance increases
4) The over all voltage gain in three stage amplifier, A indB is----------
5) The input impedence of an amplifier soud be---------
6) A power amplifier is – to -- converter

Answer any 4 4*1=4

7) What is meant by PIV of a rectifier
8) Why decibel is used as the unit of amplifier gain?
9) Write the equations for hybride parameters
10) Draw he circuit diagram of a single stage amplifier
11) Why Class-B and class-C operations are more efficient than class A

Answer any 6 6*3=18

12) What are the need for biasing?
13) With neat diagram explain the working of a half wave rectifier
14) With neat diagram explain the working of cascade amplifier
15) With neat diagram explain about complimentary push-pull circuit

Answer any 2 8*2=16

16) With neat diagram explain the defferent biasing techniques in transistor

17) With neat diagram explain the working of center tapped rectifier.also find its efficiency
18) With neat diagram explain the working of apush pull amplifier.list its advantages

111rd Semester B.Sc Electronics and communications Degree (CCSS) Examination

Core Course

3B03EC Analog Circuits and systems

Time: 3hrs Marks: 40

Fill in the blanks Answer Any 54 4*1/2=2

1) The h- parameter h11=-----
2) Most commonly used biasing method for a transistor is ----------
3) The voltage gain of a transistor amplifier---------as ac lod resistance increases
4) The over all voltage gain in three stage amplifier, A indB is----------
5) The input impedence of an amplifier soud be---------
6) A power amplifier is – to -- converter

Answer any 4 4*1=4

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9) Write the equations for hybride parameters
10) Draw he circuit diagram of a single stage amplifier
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Answer any 2 2*8=16

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