

BHARATHIAR UNIVERSITY, COIMBATORE
B.Sc. Electronics Degree Course
Scheme of Examination (CBCS PATTERN)(REVISED)
For candidates admitted during the Academic Year 2017-2018 and onwards

SEM	Part	Sub Code	Subject and Paper	Instruction Hrs./Week	Examinations					
					Dur.Hrs.	CIA	Marks	Total Marks		
I	I		Language -I	6	3	25	75	100	4	
	II		English – I	6	3	25	75	100	4	
	III		Core :							
			Paper I : Basic Electronics	5	3	25	75	100	4	
			Pract. I Basic Electronics Lab	3	-	-	-	-	-	
	Pract. II Semiconductor devices Lab	3	-	-	-	-	-			
	IV		Allied : I Mathematics –I	5	3	25	75	100	4	
			Environmental Studies #	2	3	-	50	50	2	
II	I		Language - II	6	3	25	75	100	4	
	II		English - II	6	3	25	75	100	4	
	III		Core							
			Paper II : Materials Science and Semiconductor Devices	5	3	25	75	100	4	
			Pract. I Basic Electronics Lab	3	3	40	60	100	4	
	Pract.II Semiconductor devices Lab	3	3	40	60	100	4			
	IV		Allied : II Mathematics – II	5	3	25	75	100	4	
			Value Education – Human Rights #	2	3	-	50	50	2	
III	III		Core :							
			Paper III : Principles of Communication Systems	4	3	25	75	100	4	
			Paper IV : Digital Principles and Applications	4	3	25	75	100	4	
		Paper V : Electronic Circuits	4	3	25	75	100	4		
		Pract. III. Electronics circuits & Communication lab	3	-	-	-	-	-		
		Pract. IV Digital Electronics & Microprocessor Lab	3	-	-	-	-	-		
		Allied : III Programming in C	4	3	20	55	75	3		
		Pract. V Computer Programming Lab	3	-	-	-	-	-		
		Skill based Subject I:								
		IV		Computer oriented office automation	3	3	20	55	75	3
			Tamil @ / Advanced Tamil# (OR)							
			Non-major elective - I (Yoga for Human Excellence)# / Women’s Rights #	2	3	-	50	50	2	

IV	III	Paper VI : 8085Microprocessor Interfacing & its Applications	4	3	25	75	100	4
		Paper VII : IC's and Instrumentation	4	3	25	75	100	4
		Paper VIII : Bio Medical Instrumentation	4	3	25	75	100	4
		Pract. III. Electronic circuits & communication lab	3	3	40	60	100	4
		Pract. IV Digital electronics & Microprocessor Lab	3	3	40	60	100	4
		Allied: IV Object Oriented Programming using C++	4	3	20	55	75	3
		Pract. V : Computer Programming Lab	3	3	20	30	50	2
	Skill based Subject II: PC Hardware	3	3	20	55	75	3	
IV	Tamil @ /Advanced Tamil # (OR)	2	3	-	50	50	2	
	Non-major elective -II (General Awareness #)	2	3	-	50	50	2	
V	III	Paper IX : 8051 Microcontroller & its Applications	6	3	25	75	100	4
		Elective – I	6	3	25	75	100	4
		Elective – II	6	3	25	75	100	4
		Pract. VI: IC & Medical Electronics Lab	3	-	-	-	-	-
		Pract. VII: Industrial & Power Electronics Lab	3	-	-	-	-	-
		Pract. VIII: Microcontroller Lab	3	-	-	-	-	-
		Skill based subject – III Visual Programming	3	3	20	55	75	3
VI	III	Paper X : Design with PIC Microcontroller	5	3	25	75	100	4
		Elective - III	4	3	25	75	100	4
		Pract. VI: IC & Medical Electronics Lab	3	3	40	60	100	4
		Pract. VII: Industrial & Power Electronics Lab	3	3	40	60	100	4
		Pract. VIII: Microcontroller Lab	3	3	40	60	100	4
		PROJECT	-	-	-	-	150*	6
		Skill based subject –IV Practical V i s u a l Programming	3	3	30	45	75	3
	V	Extension Activities @	2	--	50	-	50	2
Total						3500	140	

@ No University Examinations. Only Continuous Internal Assessment (CIA)

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* for Project report 120 marks and viva-voce 30 marks.

List of Elective papers (Colleges can choose any one of the paper as electives)		
Elective – I	A	PCB design and Fabrication
	B	Advanced communication systems
	C	Computer Hardware and Maintenance
Elective – II	A	Modern Television Engineering
	B	Microwave and fiber optic communication
	C	Automotive Electronics
Elective - III	A	Industrial and Power Electronics
	B	Robotics
	C	Programmable Logic Controllers

SEM –I

Core Paper- I

BASIC ELECTRONICS

Subject Description: This subject is the introductory for electronics; it presents the basic components theorems, devices and circuit

Goals: Enable the students to learn the basics of Electronics

Objectives: Upon completion of the subject, the student should understand the Basic components and its operations Gain knowledge about Electric and Electronic circuits and Network theorems

UNIT I ELECTRICITY

Electricity: Positive and Negative Polarities – Electrons and Protons in the atom –Conductors, Insulators and semiconductors. The coulomb unit of electric charge – the volt unit of Potential Difference – charge in motion is current – Resistance , Conductance – the closed circuit – the direction of the current – Direct current and Alternating Current – sources of electricity.

Resistors: Types – Colour coding – Variable resistors – Rheostats and Potentiometers –Power rating of resistor – Resistance in series – Parallel, simple problems.

UNIT II CAPACITORS and INDUCTORS

Capacitors: Charge Stored in Dielectric – Charging and Discharging Capacitor – The Farad Unit of Capacitance – Typical Capacitors – Electrolytic Capacitors – Parallel Capacitors – Series Capacitors. **Inductors:** Types of Inductors: Fixed, Variable - Self and Mutual Inductance - Faraday's Law and Lenz's law of Electromagnetic Induction - Energy Stored in an Inductor - Inductance in Series and Parallel - Testing of Resistance and Inductance using Multimeter.

UNIT III CIRCUIT CONCEPTS

Ohms Law: The current – the Voltage – the Resistance – Practical, Multiple units. Electric Power – Power dissipation in resistance – Power formulas – choosing the resistor for a circuit. Kirchoff's law-Kirchoff's current law - Analysis of resistance in series circuits, parallel circuits and series parallelcircuits - Voltage divider; Current divider; Concept of voltage source and current source - Voltage source in series and current source inparallel - Simple problems in DC circuits.

UNIT IV NETWORK THEOREMS

Superposition theorem - Thevenin Theorem - Thevenizing a circuit with two voltage sources – thevenizing a bridge circuit - Norton's Theorem - Thevenin Norton conversion - Conversion of voltage and current sources - Millman's Theorem - Star and Delta conversion - Maximum power transfer theorem - Simple problems in DC circuits.

UNIT V AC CIRCUITS

Introduction to Sinusoidal wave - RMS value - Average value - AC circuits with resistance - Circuits with XL alone – Circuits with XC alone - Series reactance and resistance - Parallel reactance and resistance - Series parallel reactance and resistance - Real power - Series resonant circuit – Parallel resonant circuit - Q factor. Passive filters: Low pass filters, High pass filters, Band pass filters and Band rejection filters.

TEXT BOOK:

1. BernardGrob “**BASIC ELECTRONICS**” Tata McGraw-Hill Publishing Company Limited, 9thEdition.

Reference books:

2. S.Salivahanan, N.Suresh Kumar, A.Vallavaraj “**ELECTRONIC DEVICES AND CIRCUITS**”-Tata McGraw-Hill Publishing Company Limited, New Delhi. 1998.
3. B.L.Theraja, “**BASIC ELECTRONICS-SOLID STATE DEVICES**”,S.Chand Company Ltd. 2000

SEM –II

Core Paper- II

MATERIAL SCIENCE AND SEMICONDUCTOR DEVICES

Subject Description : This subject is the introductory for electronic devices, it presents the basic components devices and circuits

Goals : Enable the students to learn the basics of Electronic devices

Objectives : Upon completion of the subject, the student should understand the Basic components and its operations Gain knowledge about Electric and Electronic circuits and devices

UNIT I SEMICONDUCTOR MATERIALS AND DIODE

Introduction – Chemical bonds in semi conductors like Germanium and Silicon – Intrinsic and Extrinsic semiconductors – Carrier concentration in intrinsic Semiconductors - Carrier concentration in N type Semiconductors - Carrier concentration in P type Semiconductors. Energy band Structure and conduction in Insulator - Formation of PN Junction diode - Forward bias - Reverse bias condition – characteristics - Clipping and Clamping.

UNIT II SPECIAL DIODES

Zener diode - VI Characteristics – Breakdown - Backward diode - Varactor diode - Step recovery diode - Point contact diode - Scott key diode - Tunnel diode - Gunn diode - IMPATT diode – TRAPATT diode - PIN diode - PNP diode.

UNIT III BJT

Introduction to Bipolar Junction Transistor – Construction - Transistor Biasing - Operation of NPN and PNP transistor - CB, CE & CC configuration - Bias stability - Load line. Method of Biasing: Fixed bias - Collector to base bias - Voltage divider bias – Bias compensation - Thermal Runaway - Heat sink.

UNIT IV FET AND UJT

Introduction to FET - Construction and operation of N-channel JFET - Drain characteristics - Comparison of JFET & BJT - Introduction to MOSFET - Enhancement MOSFET – Depletion MOSFET - FET as a voltage variable Resistor(VVR) - Introduction to UJT – Characteristics – UJT as relaxation oscillator - Introduction to PUT – SCR – TRIAC – DIAC

UNIT V OPTOELECTROIC DEVICES

Principles, operation and characteristics of opto electronic devices: LDR – Photo diode - Photo Transistor – Photo Voltaic cell – Solar Cell – Photo Emissive sensors – Vacuum Photo tube – Gap filled photo tube – Photo Multiplier – LED – IR Emitter – LCD – Opto – Couplers.

TEXT BOOK:

1. S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, “ELECTRONICS DEVICES AND CIRCUITS”, Tata McGraw Hill Publishing Company Limited, New Delhi, 8th edition.
2. S. L. Kakani, K. C. Bhan Dai “A TEXT BOOK OF ELECTRONICS”.
3. B. L. Theraja, “BASIC ELECTRONICS – SOLID STATE DEVICES”, S.Chand & Company Ltd. 2000.

SEM – I & II

Core Practical – I

BASIC ELECTRONICS LAB (Any 16 Experiments)

1. Study of Multimeter – Checking of components.
2. Measurement of Amplitude, Frequency & Phase difference using CRO.
3. Verification of Ohm's Law.
4. Voltage sources in series, parallel and series – Parallel.
5. Resistance in series, parallel and series – Parallel.
6. Voltage and Current dividers
7. Verification of Kirchoff's Law.
8. Verification of Norton's theorem.
9. Verification of Thevenin's Theorem.
10. Verification of Millman's Theorem.
11. Band pass and Band Rejection Filter.
12. Verification of Superposition Theorem.
13. Measurement of resistance and capacitance in series and parallel
14. Series resonance circuit.
15. Parallel resonance circuit.
16. Transient response of RC Circuit.
17. Verification of Maximum power transfer Theorem
18. Capacitors & Inductors in series & Parallel.
19. Frequency response of R, L & c.
20. Low Pass Filter & High Pass Filter.

SEM – I & II

Core Practical – II

SEMICONDUCTOR DEVICES LAB
(Any 16 Experiments)

- 1.
2. V-I Characteristics of Junction Diode.
3. V-I Characteristics of Zener Diode.
4. Transistor Characteristics of CE Configuration.
5. Transistor Characteristics of CB Configuration.
6. Transistor Characteristics of CC Configuration.
7. Clipping Circuits.
8. Clamping Circuits.
9. Measurement of stability factor of Fixed Bias.
10. Measurement of stability factor of Self Bias.
11. V-I Characteristics of JFET.
12. V-I Characteristics of UJT.
13. UJT as Oscillator.
14. FET as Voltage Variable Resistor (VVR).
15. Characteristics of LDR.
16. Characteristics of Solar Cell.
17. Study of IR (Tx & Rx).
18. Study of 7 Segment display.
19. Temperature Co-efficient of Junction Diode.
20. Zener as a Voltage regulator.

SEM –III

Core Paper- III

PRINCIPLES OF COMMUNICATION SYSTEMS

Subject Description : An important consideration in the design of the subject is to provide knowledge about communication medium, transmitter, receiver and modulation techniques

Goals : Enable the students to learn the basic principles used in communication systems.

Objectives : After successful completion of the course the students should understand the concepts and techniques in communication systems

UNIT I MODULATION TECHNIQUES

Need for modulation – Amplitude modulation – Modulation factor – Analysis of AM wave – Side band frequencies – Transistor AM modulator – Power in AM wave – Limitation – Frequency modulation – Analysis of FM wave.

UNIT II TRANSMITTERS

Block diagram of AM Transmitter – Single sideband principle – Balanced modulator – SSB generation – FM generation – Direct and indirect methods.

UNIT III RECEIVERS

Super heterodyne principle – Image rejection – Choice of IF and oscillator frequencies – Tracking – Block diagram of AM receiver – FM receiver – SSB receiver

UNIT IV ANTENNA

Qualitative theory of short dipole antenna – Radiation power – radiation resistance – Radiation pattern – Grounded and ungrounded antenna – folded dipole – Yagi uda antenna – Helical antenna – Rhombic – Horn – Fan dipole and Parabolic reflectors

UNIT V PROPAGATION OF RADIO WAVE

Reflection and refraction of radio waves: Reflection of radio waves at the surface of the earth – Ground or surface wave propagation – Space wave propagation – Sky wave propagation – Structure of Ionospheric Layer – Skip distance – Maximum Usable Frequency (MUF)

TEXT BOOKS

1. Kennedy Davis “ ELECTRONIC COMMUNICATION SYSTEMS” Tata McGraw Hill Publishing Company Limited, New Delhi.
2. Dennis Roddy, Hohn Coolen “ ELECTRONIC COMMUNICATIONS” Prentice Hall of India Private Limited, New Delhi. 4th edition, 1995.
3. Ashok raj “ MODERN ELECTRONIC COMMUNICATION” Theory & Systems, Umesh Publication, 2001.

SEM – III

Core Paper – IV

DIGITAL PRINCIPLES AND APPLICATIONS

Subject Description : The design of the subject is to impart the knowledge about code conversion,

Boolean algebra, logic gates, combinational and sequential logic, and converters.

Goals : Enable the students to design the logical circuits

Objectives : Upon Completion of the subject, the student should be able to Convert one Number system to another number system, Construct truth tables for logic gates, Simplify Boolean expression, Write VHDL coding for logic circuits

UNIT I NUMBER SYSTEM AND CODES

Decimal, Binary, Octal and Hexa Decimal numbers – Conversion – Floating point representation – Binary addition, Subtraction and Multiplication – 1's and 2's compliments. Binary Coded Decimal (BCD) – Weighted codes and Non-weighted codes – Excess three – Grey code – Error detection codes – Hamming codes – ASCII codes – EBCDIC codes – Hollerith code – Parity advantages.

UNIT II BOOLEAN ALGEBRA AND LOGIC GATES

Boolean logic operations – Boolean functions – Truth Tables – Basic laws – DeMorgans theorem – Sum of Products and Products of Sums – Karnaugh map – Logic gates – OR, AND, NOT, NAND, NOR, EX-OR AND EX-NOR GATES – Code conversion – VHDL Coding for Logic gates.

UNIT III COMBINATIONAL LOGIC CIRCUITS

Half adder – Full adder – Half subtractor – Full subtractor – Parallel binary adder – 4 bit binary adder / subtractor – BCD adder – Multiplexer – Demultiplexer – Decoders – Encoders – Parity generators / checkers – Magnitude comparators – VHDL coding for Combinational Circuits

UNIT IV SEQUENTIAL LOGIC CIRCUITS

Flip Flops – RS, Clocked RS, JK, JK Master Slave, D and T Flip Flops – Shift Registers and its types – Ring counters – Ripple counters – Synchronous counter – Up down counter – Mod-3, Mod-5 counters – Decade counter – Applications.

UNIT V D/A AND A/D CONVERTERS

Digital to Analog converters: Resistive divider type and Ladder type – Accuracy and Resolution. Analog to Digital converters: Counter – Ramp type – simultaneous conversion – Dual slopotype – Successive approximation type – Accuracy and resolution.

TEXT BOOKS

1. Malvino & Leech, "DIGITAL PRINCIPLES AND APPLICATIONS", Tata McGraw Hill Edition V, 2002.
2. M.Morris Mano "DIGITAL LOGIC AND COMPUTER DESIGN" PHI 2005.
3. M.Morris Mano "DIGITAL DESIGN" PHI 2005.

SEM – III

Core Paper – V

ELECTRONIC CIRCUITS

Subject Description : This subject describe the classification and operation of amplifiers, oscillators, rectifiers and filter circuits

Goals : Enable the students to become an electronic technician and circuit designer

Objectives : Upon completion of the subject, the student should be able to design and troubleshoot the amplifiers, oscillators, power supply and filters

UNIT I RECTIFIERS AND REGULATORS

Half wave, Full waves and bridge rectifiers – Calculation of RMS value – Average value – Ripple factor – Efficiency – Transformer utility factor – Peak inverse voltage – Inductor filter – Capacitor filter – LC filter – π filter. Voltage doubler– Voltage regulator – Zener diode shunt regulator – Transistor shunt and series regulator – Overload protection – Construction of DC power supply

UNIT II SMALL SIGNAL AMPLIFIERS

CE, CB, CC amplifiers – Calculation of I/P resistance, O/P resistance – Current gain - Voltage gain – power gain – single stage transistor amplifier – DC and AC load line – RC coupled amplifier – gain frequency response – bandwidth – transformer coupled amplifier – impedance matching – FET amplifier.

UNIT III POWER AMPLIFIERS

Operation and graphical representation of Class A, Class B, Class C and Class AB amplifiers – Maximum collector efficiency of class A power amplifier – Collector dissipation curve – Harmonic distortion – Class B push pull amplifier – Crossover distortion – Complementary symmetry push pull amplifier

UNIT IV FEEDBACK AMPLIFIERS

Basic concepts of feedback – Positive feedback – Negative feedback – Effects of negative feedback on gain, bandwidth and distortion – Noise – Voltage series feedback - Voltage shunt feedback – Current series feedback – Current shunt feedback

UNIT V OSCILLATORS AND MULTIVIBRATORS

Barkhausen criterion – Hartley Oscillator – Colpitts oscillator – Phase shift oscillator – Weinbridge oscillators – Piezo electric crystal and its effects – Crystal oscillator. Astable multivibrator – Monostable multivibrator – Bistable multivibrator – Schmitt trigger.

TEXT BOOK

1. S.K. Sahdev, “Electronic Principles”, Dhanpat Rai & Co (P) Ltd, 2nd Edition, 1998
- 2 B.L.Theraja, “**BASIC ELECTRONICS**”, S.Chand Company Ltd.2000
- 3 Bernard Grob “**BASIC ELECTRONICS**”-Tata McGraw-Hill Publishing Company Limited,9th Edition.

SEM – III

Skill based Subject – I

COMPUTER ORIENTED OFFICE AUTOMATION

Subject Description: This paper deals with the basics of MS office.

Goal: To learn about the basic concepts of MS word, MS excel and Power point

Unit I (9 hrs) BASICS OF COMPUTER

Introduction: What is a Computer - Software and Hardware Hardware Components – Hardware Accessories Operating System Software -Software Applications. **Computer**

Network: LAN - Internet - E-Mail – Browsers- E-Mail -- Clients

Unit II (9 hrs) MS WORD

Setting Page Style - Formmating -Border & Shading –Columns -Header & foot- Setting Footnotes - Inserting manual Page break - Column break and line break.-Creating sections and framesInserting. Clip arts, pictures, and other files-. Anchoring & Wrapping

Setting Document Styles -.Table of Contents -Index - Page Numbering, data &Time, Author,etc., - Creating Master Documents -Web page

Unit III (9 hrs) MS EXCEL:

Creating worksheet - entering and editing text, numbers, formulas - saving – Excel functions modifying worksheet range selection copying and moving data - defining names - inserting of deleting rows of columns - moving around worksheet naming worksheet, copying inserting of deleting worksheet - formatting, gauging, heading displaying value- changing of selecting fonts, protesting data using style so templates - reprinting worksheet creating charts - managing date - what if tables pate tables wraps, macros, linking worksheets.

Unit IV (9 hrs) MS POWER POINT

Creating a presentation : Setting presentation style - Adding Text to the presentation.

Formatting a presentation: Adding style - Color, gradient fills - Arranging objects – Adding Header & Footer - Slide Background - Slide layout. **Adding Graphics to the presentation:** Inserting pictures, movies, tables, etc into the presentation - Drawing Pictures using Draw. **Adding effects to the presentation:** Setting Animation & transition effect - Adding audio and video

Unit V (9 hrs) MS Access

Introduction: Database concepts - Tables - Queries - Forms – Reports. **Opening &**

Saving database files: Creating Table Design - Indexing - Entering data - Importing

Data. **Creating Queries:** SQL statements - Setting relationship - Using wizards.

Creating Forms: GUI - Form Creating & printing reports

Text Books:

1. Step by Step 2007 Microsoft Office System (W/CD) by Curtis Frye, Joyce Cox, Steve Lambert
2. Microsoft Office Word 2007 Plain & Simple by Jerry Joyce & Marianne Moon
3. The Unofficial Guide to Microsoft Office Excel 2007 Julia Kelly & Curt Simmons
4. Microsoft Office Powerpoint 2007 Plain & Simple Nancy Muir

SEM – IV

Core Paper – VI

8085 MICROPROCESSOR INTERFACING & ITS APPLICATIONS

Subject Description : This subject presents the architecture, Programming in 8085ALP and real world applications of the 8085 microprocessor

Goals : To enable the students to learn the instruction set, programming, and interfacing concepts of 8085microprocessor

Objectives : On successful completion of the course the students should have: Developed the programming skills in 8085ALP Understood the interfacing concept memory, & I/O devices. Understood the concept of microprocessor based system design

UNIT I MICROPROCESSOR ARCHITECTURE

Microprocessor architecture and its operation – Memory map of 1k memory chip – memory and instruction fetch – 8085 micro processing unit – Bus timing-Demultiplexing the bus AD₇ – AD₀ – Generating control singles – Functional Block diagram of 8085.

UNIT II TIMINGS AND INSTRUCTION SET

Decoding and Execution of an instruction – 8085 based microcomputer – Timing of the memory write cycle and read cycle – Opcode fetch cycle timing – Instruction classification – Instruction format – addressing modes - Data transfer operations – arithmetic operations – Logical operations – Branch operations – Looping, counting and indexing – addition, subtraction of 8 and 16 bit numbers – Time delay program.

UNIT III INTERFACING CONCEPTS

Peripherals I/O instruction – device selection and data transfer – input interfacing – interfacing I/P using decoders – interfacing O/P display: LED display – 7 segments LED display –Interfacing memory bus contention memory time and wait states.

UNIT IV PERIPHERALS

The 8255A Programmable peripherals interface: Block diagram of 8255A, Mode 0 Simple i/p or o/p BSR mode, Programming the 8255A in mode1, mode 2 – Bidirectional data transfer – The 8259 Programmable Interrupt Controller – Block diagram of 8253 – Direct Memory access and the 8257 DMA Controller – 8279 Keyboard/Display Interfacing.

UNIT V APPLICATIONS

Application of Microprocessors – System Requirements – Overall System design and software design, Temperature Monitoring System – Data acquisition system – Traffic light control system– Stepper Motor control – Digital clock – Washing machine control.

TEXT BOOKS

1. Ramesh S Goanker, Microprocessor Architecture Programming and Application with 8085/8080A, 2nd Edition, New Age International (P) Ltd.
2. Aditya. P. Mathur, Introduction to Microprocessors, 3rd Edition.
3. S.Malarvizhi, Microprocessor and Its Application, II edition, Anuradha Agencies Publications, March 2006.

SEM – IV

Core Paper – VII

IC'S AND INSTRUMENTATION

Subject Description : The design of the subject is to impart the knowledge on IC fabrication, Timer, PLL, Op-amp., transducers and electronic instruments.

Goals : Enable the students to acquire the knowledge of IC fabrication, and its application in electronic circuits and know the measurements using electronic instruments

Objectives : Upon Completion of the subject, the student should : Understand the IC fabrication, Design circuits with ICs and Gain knowledge about electronic instruments.

UNIT I IC FABRICATION TECHNOLOGY

Fundamentals of Monolithic IC technology – Basic planar process – Wafer preparation – Epitaxial growth – Oxidation – Photolithography – Diffusion of impurities – Isolation techniques – Metallization – Monolithic transistors –Integrated resistors – Integrated capacitors- integrated. Inductors- Thin and Thick film technology

UNIT II TIMER AND PLL

Functional block diagram of 555 timer – Monostable operation – Applications: – Linear ramp generator – Pulse width modulator – Astable operation – Applications: Schemitt trigger – FSK Generator Phase locked loop: Functional block diagram – Phase detector / Comparator –Voltage Controlled Oscillator – Low pass filter – Applications: Frequency multiplier/Division – AM detection

UNIT III OPERATIONAL AMPLIFIER

Ideal characteristics - Inverting and non inverting amplifier – Op-amp parameters – Summing Amplifier – Difference Amplifier – Integrator – Differentiator – Instrumentation Amplifier – Voltage to current converter – Current to Voltage converter – Precision half wave rectifiers – Precision full wave rectifiers.

UNIT IV TRANSDUCERS

Introduction – Electrical Transducer – Basic requirements of Transducer – Classification of transducers – selection of transducers – resistive transducers – potentiometers – Thermistors – Thermocouple – LVDT – RVDT – Piezoelectric transducers – hall effect transducers – Photoelectric transducers – digital displacement transducers.

UNIT V ELECTRONIC INSTRUMENTS

Q Meters- CRO: Block Diagram – cathode ray tube – Measurement of frequency – Measurement of voltage and current – Digital Oscilloscope – digital voltmeter: Ramp type DVM – dual slope integrating type DVM – Digital multimeter – Humidity and humidity measurement – Measurement of PH.

TEXT BOOKS

1. D.Roy Choudhury and Shahil B Jain, “Linear Integrated Circuits”, Second Edition New Age International Publishers 2004.
2. K.R.Botkar, “Integrated Circuits”, 10th Edition Khanna Publishers 2006.
3. J.B.GUPTA “A course in electronic and electrical measurements and instrumentation”, 12th Edition, S.K Kataria & sons

SEM – IV

Core Paper – VIII

BIO-MEDICAL INSTRUMENTATION

Subject Description : The design of the subject is to impart the knowledge on Biomedical Equipments like Biopotential Recorders , Pacemakers, Diathermy equipments and biotelemetry

Goals : Enable the students to acquire the knowledge on diagnostic and therapeutic equipments in the field of Biomedical Instrumentation

Objectives : Upon Completion of the subject, the student should : Understand the knowledge about Biomedical Equipments

UNIT I

Cells and their structure – transport of ions through the cell membrane – resting and action potentials – characteristics of resting potential – bio electric potentials – nerve tissues and organs. Design of medical instruments – component of bio medical instrument system – electrodes – half cell potential – purpose of electrode paste – electrode material – types of electrodes: Microelectrode – micropipette – needle electrode – surface electrode – chemical electrodes.

UNIT II

Bio potential recorders: Introduction – characteristics of recording system – writer and pen damping effects – ECG origin of cardiac action potential – ECG lead configuration – ECG recording setup – practical considerations for ECG recording – analysis of recorded ECG signals – vector cardiography.

UNIT III

Phonocardiography: Echocardiography – Electroencephalography (EEG) – origin of EEG – brain waves – placement of electrodes – recording setup – analysis of EEG – Electromyography (EMG) – rerecording setup – Electroretinography (ERG) and Electrooculography (EOG)

UNIT IV

Pacemakers – energy requirements to excite heart muscle – methods of stimulation – different modes of operation – pacemaker batteries – artificial heart valves – different natural heart valves – different types of artificial heart valves – defibrillators – different types of defibrillators – heart lung machine

UNIT V

Introduction to diathermy – surgical diathermy – short-wave diathermy – microwave diathermy – ultrasonic diathermy Introduction to biotelemetry: Elements of biotelemetry system – design of biotelemetry – audio telemetry system – problems in telemetry – uses of telemetry.

TEXT BOOKS

1. Leslie Cromwell, Fred J Weibell, Erich A. Pfeiffer, “BIOMEDICAL INSTRUMENTATION AND MEASUREMENTS” PHI second edition.
2. Dr. M. Arumugam “BIO MEDICAL INSTRUMENTATION” Anuradha Agencies second edition.

SEM – III & IV

Core Practical – III

ELECTRONIC CIRCUITS & ELECTRONIC COMMUNICATION LAB

(Any 16 Experiments)

ELECTRONIC CIRCUITS

1. DC regulated power supply using Zener diode
2. Voltage doubler
3. Feedback amplifier
4. Emitter follower
5. Transformer coupled amplifier
6. Hartley Oscillator
7. Colpitts oscillator
8. Phase shift Oscillator
9. Wein Bridge oscillator
10. RC coupled amplifier
11. Half wave and full wave rectifier
12. Filter circuits

ELECTRONIC COMMUNICATION

13. Performance of IF Amplifier
14. AM Modulation and Detection
15. FM Modulation and Detection
16. PAM modulation
17. PIN diode oscillator
18. Alignment of dish antenna
19. Alignment of satellite receiver
20. PWM modulation
21. PPM modulation
22. PCM modulation
23. GUNN diode oscillator

SEM – III & IV

Core Practical – IV

DIGITAL & MEDICAL ELECTRONICS LAB
(Any 16 Experiments)

DIGITAL ELECTRONICS

1. Verification of basic gates and universal gates
2. Verification of Demorgan's Theorem
3. Half adder and full adder & Half subtractor and full subtractor
4. Decade counter & BCD counter
5. Study of Flip Flops
6. Multiplexer and De multiplexers
7. Encoder and Decoder
8. BCD to 7-segment Display
9. Design and Simulation of Logic Gate using VHDL Coding
10. Design and Simulation of Adder Circuits using VHDL Coding

8085 MICROPROCESSOR LAB

1. Addition / subtraction/ Multiplication / division of 8 bit data.
2. Block data transfer and Sum of N 8 bit numbers
3. To arrange in ascending / descending order.
4. UP/DOWN counter using 7 segment displays.
5. Traffic light control interface.
6. Stepper motor interface.
7. Solid State Relay Interface
8. Data transfer using 8255 (PPI).
9. Square wave generator using 8255.
10. Interfacing ADC / DAC with 8085

SEM – IV

Skill based Subject – II

PC HARDWARE

SUBJECT DESCRIPTION : This Subject deals with the Architecture and Design of a Personal Computer and Related Peripherals.

GOAL : To enable the student to get a detailed knowledge of all the hardware components of a personal computer and different interfaces.

OBJECTIVES : To Introduce Issues Related to CPU and Memory. To Understand the Components on the Motherboard. To Understand Different Storage Media

UNIT-I HARDWARE & MOTHER BOARD ORGANIZATION OF IBM PC

Introduction to Computer Organization – Components of IBM PC : System Unit – Monitor – Input Device – Printer – Interface – I/O Buses – Parallel and Serial Ports – USB – Block Diagram of Mother board of a PC System – Support Chips – Memory Organization.

UNIT-II DRIVER

Principle of Magnetic Storage – Floppy Disk Drive – Hard Disk Drive – IOE Interface – Block Diagram, Pins & Signals, Registers – SCSI Interface – SCSI Configuration – SCSI Variations – SCSI Signals – SCSI Wiring Techniques – CD ROM Drive.

UNIT-III PERIPHERALS

Introduction – Video Display System: CRT Display – Video Display Adapters – LCD Monitors – Keyboard : Keyboard Organization – Keyboard Interface - BIOS Keyboard Service - Mouse : Interface Types – Modes of Operation – BIOS Mouse Services - Printer: Types – Printer Interface.

UNIT-IV I/O BUSES & PORTS

Buses : 8 bit ISA Bus – Pins & Signals – MCA bus – EISA bus – Local bus – V1 bus – PCI bus – Features – AGP.

Ports : Standard Parallel Port – IEEE 1284 Standard – Serial Port – Pins & Signals – BIOS Serial Port Services – UART – USB.

UNIT-V TROUBLESHOOTING

Introduction – System – Troubleshooting Procedure – Motherboard Problems – FDD, FDC Problems – HDD, HDC Problems – Monitor Problems – Serial Port Problems – Keyboard Problems – SMPS Problems – Printer Problems.

TEXT BOOKS :

1. B.Govindarajulu “**IBM PC And Clones**”, Tata MCGraw Hill Publications.Eleventh Reprint, 2008.
2. N. Mathivanan “**Microprocessors, PC Hardware And Interfacing**”, PHI Publishers, Second Edition, 2005.

REFERENCE BOOKS :

1. Robert C. Brenner “**IBM PC Troubleshooting and Repair Guide**”, BPB Publishers.
2. Peter Norton “**Inside The IBM PC and PS/2**”, PHI Publishers, Fourth Edition.
3. Stephen J Bigelow “**Troubleshooting Maintaining and Repairing PC’s**”, Tata MCGraw Hill Publications, Second Edition.

SEM – V

Core Paper – IX

8051 MICROCONTROLLER AND ITS APPLICATIONS

Subject description: This subject deals with the introduction to microcontroller 8051, Internal peripherals, simple programs & Applications.

Goal: To introduce the microcontroller 8051

Objective: To study the architecture of 8051, instruction set and addressing modes of 8051, To develop skill in program writing & introduce commonly used peripherals for simple applications.

UNIT-I MICROCONTROLLER OVERVIEW

Introduction To Microcontroller – Comparison of μP & μC - 8051 Microcontroller Block Diagram - 8051 Oscillator and Clock – A, B & Register Banks – Stack - Program Counter & Data Pointer – Flag & PSW – Special Function Registers – Internal Memory – Input / Output Pins & Ports.

UNIT – II ADDRESSING MODES, ARITHMETIC & LOGICAL INSTRUCTION Introduction – Addressing Modes: Direct – Indirect – Register - Indexed – Arithmetic Instructions: Addition, Subtraction, Multiplication, Division, Increment And Decrement – Logic & Compare Instructions: AND, OR, XOR, CPL & Compare – Rotate & Swap Instruction: RR, RL, RRC, RLC - Simple Programs.

UNIT – III DATA TRANSFER AND BRANCH OPERATIONS

Introduction – Internal Data Move - External Data Move – Code Memory Read Only Data Move - Loop and Jump Instructions – Conditional Jump – Unconditional Jump – Call Instructions: LCALL and ACALL – Push and Pop Instructions – Simple Programs.

UNIT – IV PERIPHERALS

Timer and Counter: Timer Registers – TMOD – TCON - Mode 1 & 2 Programming – Counter Programming – Serial: MAX232 – Baud Rate – SBUF Register – SCON Register – Program to Transfer and Receive Data Serially - Interrupts: Enabling & Disabling Interrupt.

UNIT – V INTERFACING

Interfacing of LCD – LCD Operation – Pin Descriptions – Command & Data to the LCD – ADC 0804 – LM34 Temperature Sensor – Stepper Motor – Step Angle – Motor Speed – Interfacing Key Board – Scanning & Identifying the Keys.

TEXT BOOKS:

1. Mohamed Ali Maszidi & Janice Gillispie Maszidi, “**The 8051 Microcontroller and Embedded System**”, Pearson Publishers.
2. Kenneth J. Ayala, “**The 8051 Microcontroller Architecture, Programming and Application**” 2nd Edition, Penram International.

REFERENCE BOOK:

1. Myke predko, “**Programming And Customizing The 8051 Microcontroller**”, Tata McGraw hill, 1st Edition.

SEM – V

Skill based Subject – III

VISUAL PROGRAMMING

Subject Description : The subject presents windows programming, visual basic programming, Visual c++ programming, ODBC and GUI

Goals : Enable the students to learn the Visual programming

Objectives : After successful completion of the course the students student acquire knowledge about visual programming and able to program the applications using VB and VC++

UNIT I

Introduction to Windows Programming – Event Driven Programming – Data Types – Resources – Window Message – Device Context – Document Interfaces – Dynamic Linking –Software Development Kit (SDK) Tools – Context Help.

UNIT II

Visual Basic Programming – Forum Design – VBX Controls – Properties – Event Procedures – Menus and Toolbars – Using Dialog Boxes – Working with Control Arrays – Active X Controls – Multiple Documents Interface (MDI) – File System Controls – Data Control – Database Applications.

UNIT III

Visual C++ Programming – Frame Work Classes – VC++ Components – Resources – Event Handling – Message Dispatch System – Model and Modeless Dialogs – Important VBX Controls – Document view Architecture – Serialization – Multiple Document Interface – Splitter Windows – Coordination between Controls

UNIT IV

Database Connectivity – Min Database Applications – Embedding Controls in View creating user defined DLL's – Dialog Based Applications – Dynamic Data Transfer Function – Data Base Management with ODBC – Communicating with other applications – Object Linking and Embedding.

UNIT V

Basics of GUI Design – Visual Interface Design – File System – Storage and Retrieval System – Simultaneous Multi Platform Development

TEXT BOOKS

1. Petzold, “Windows Programming”, Microsoft Press, 1995.
2. Marion Cottingham, “Visual Basic”, Peachpit Press, 1999.
3. Kate Gregory, “Using Visual C++”, Prentice Hall of India Pvt. Ltd.

REFERENCES

1. Pappar and Murray, “Visual C++: The Complete Reference”, Tata McGraw Hill, Delhi,2000.
2. Brian Siler and Jeff Spotts, “Using Visual Basic 6”, Prentice Hall India, Delhi, 2002.

SEM – VI

Core Paper –X

DESIGN WITH PIC MICROCONTROLLERS

Subject description: This subject deals with the introduction to microcontroller 8051, Internal peripherals, simple programs & Applications.

Goal: To introduce the microcontroller 8051

Objective: To study the architecture of 8051, instruction set and addressing modes of 8051, To develop skill in program writing & introduce commonly used peripherals for simple applications.

UNIT I CPU Architecture and Instruction Set

Overview – Harvard Architecture and Pipelining – Program Memory Considerations – Register File structure and Addressing modes – CPU registers – Instruction set – Simple operations.

UNIT II Loop Time Subroutine, Timer2 and Interrupts

Timer2 use – Interrupt Logic – Timer2 Scaler initialization – IntService Interrupt Service Routine – Loop time subroutine.

UNIT III External Interrupts and Timers

RB0/INT External Interrupt input – Timer0 – Compare mode – Capture mode – Timer1/CCP Programmable Period Scaler – Timer1 External event counter – Timer1 and Sleep mode – PulseWidthModulated Outputs – PortB change interrupts.

UNIT IV I/O Port Expansion

Synchronous Serial Port Module – Serial Peripheral Interface – Output port expansion – Input port expansion – LCD display.

UNIT V I²C Bus for Peripheral Chip Access

I²C Bus operation - I² Bus subroutines – DAC output – Temperature sensor – Serial EEPROM.

Text Books:

1. John B. Peatman " Design with PIC Microcontrollers “, Pearson Education Publishing.

SEM – V & VI

Core Practical – VI

IC, TV AND MEDICAL ELECTRONICS LAB
(ANY 16 EXPERIMENTS)

IC LAB

1. Astable multivibrator using 555
2. Monostable multivibrator using 555
3. Inverting and Non Inverting amplifier
4. Adder and Subtractor using IC 741
5. Instrumentation Amplifier
6. Voltage to Current Converter and Current to Voltage
7. Wein Bridge oscillator using IC 741
8. Square wave and Triangular generator
9. Schmitt Trigger using IC 741

TV LAB

10. Video IF section of TV Receiver
11. Sync Separator
12. Horizontal Section faults
13. Vertical Section faults
14. Tuner Section faults
15. Video Section faults

MEDICAL ELECTRONICS

16. Pulse Rate Monitor.
17. Temperature monitor using AD 590
18. ECG Measurement
19. Notch filter
20. Pacemaker

SEM – V & VI

Core Practical – VII

INDUSTRIAL AND POWER ELECTRONICS LAB
(ANY 16 EXPERIMENTS)

1. Characteristics of LDR
2. Characteristics of Photo Diode
3. Relay driver using Photo Diode
4. Firing angle control of SCR
5. Relay driver using LDR
6. Burglar alarm
7. Smoke detector
8. Forced commutation
9. Sequence Timer
10. Fan Regulator using Triac
11. Automatic Street light
12. Single Phase Inverter
13. DC Choppers (Step up and Step down)
14. R and RC Triggering
15. External Pulse Commutation
16. DC motor controller and Light Dimmer
17. Time delay circuit
18. ON / OFF control of relay using Opto – Couplers.
19. Characteristics of SCR
20. TRIAC Characteristics

SEM – V & VI

Core Practical – VIII

MICROCONTROLLER LAB
(ANY 16 EXPERIMENTS)

8051/ PIC PROGRAMMING

1. Addition / subtraction of 8 / 16 bit data.
- 2 Multiplication / division 8 bit data.
3. Block data transfer.
- 4 Smallest / largest of N numbers.
5. To arrange in ascending / descending order.
6. Sum of N 8 bit numbers.
7. 1's and 2's compliment of an array (8 / 16 bit).
8. UP/DOWN counter using 7 segment displays.
9. Traffic light control interface.
- 10 Wave form generation.
11. ADC interface.
12. DAC interface.
13. Stepper motor interface.
14. Solid State Relay Interface
15. DC motor interface
16. Temperature controller
17. Rolling and Blinking of a message
18. LCD interface
19. Frequency Counter
20. Water level Indicator

SEM – VI

Skill based Subject - IV

VISUAL AND JAVA PROGRAMMING LAB

VISUAL PROGRAMMING (ANY 8 EXPERIMENTS)

1. Building Simple Applications using Basic Tools.
2. Working with Intrinsic Control and Active X controls.
3. Create an Application with multiple forms and dialogs.
4. Write a VB program to design an e-mail registration form.
5. Create an Application with Menu editor.
6. Create an Application with DAO controls
7. Create an Application using Common dialogs.
8. Write a program for Drag and Drop Events.
9. Create a Database for library management using ADD controls.
10. Creating an application using Active X control.
11. Create a Scientific calculator in VB.
12. Develop a VB application to either link or embed MS Word document to an OLE control.
13. Display Student information using Grid control.
14. Create an Application using RDO controls.
15. Develop an application to perform the following operation in the Employee table using DAO.
 - i) Add a new Record.
 - ii) Delete a Record.
 - iii) Modify a Record.

SEM – V

Elective I – A

PCB DESIGN AND FABRICATION

UNIT I TYPES OF PCB

Single sided board – double sided – Multilayer boards – Plated through holes technology – Benefits of Surface Mount Technology (SMT) – Limitation of SMT – Surface mount components: Resistors, Capacitor, Inductor, Diode and IC's.

UNIT II LAYOUT AND ARTWORK

Layout Planning – General rules of Layout – Resistance, Capacitance and Inductance – Conductor Spacing – Supply and Ground Conductors – Component Placing and mounting – Cooling requirement and package density – Layout check.

Basic artwork approaches – Artwork taping guidelines – General artwork rules – Artwork check and Inspection.

UNIT III LAMINATES AND PHOTO PRINTING

Manufacture of copper clad laminates – Properties of laminates – Types of Laminates – Manual cleaning process – Basic printing process for double sided PCB's – Photo resists – wet film resists – Coating process for wet film resists – Exposure and further process for wet film resists – Dry film resists

UNIT IV ETCHING AND SOLDERING

Introduction – Etching machine – Etchant system.

Soldering: Principles of Solder connection – Solder joints – Solder alloys – Soldering fluxes.

Soldering Tools: Soldering, Desoldering tools and Techniques – Man Soldering – Solder mask – Safety, health and medical aspects in Soldering practice.

UNIT V DESIGN RULES AND AUTOMATION

Reflection – Crosstalk – Ground and Supply line noise – Electromagnetic interference from pulse type EM fields and automation – Automated artwork drafting – CAD.

Text Books:

1. Walter C.Bosshart "PCB DESIGN AND TECHNOLOGY" Tata McGraw Hill Publications, Delhi. 1983
2. Clyde F.Coombs "Printed circuits Handbook" III Edition McGrawhill.
3. R.G.Gupta "Electronic instruments and system" Tata McGraw Hill Publication. NewDelhi.

SEM – V

Elective I – B

ADVANCED COMMUNICATION SYSTEMS

UNIT I DATA COMMUNICATION

Introduction – Data Forms – Transmission Modes – Simplex, Half Duplex – Full Duplex – Point to Point Network – Star Network – Ring Network – Bus Network – Telephone Lines – Dial-up Lines – Dedicated Lines – Data Communication System – Asynchronous and Synchronous Transmission – USART's and ACIA's – RS 232 inter connect cable – Modems – Protocols

UNIT II PULSE COMMUNICATION

Basic concepts of pulse modulation – Sampling Theorem – PAM – PTM – PFM – PPM – PCM – Differential PCM – Delta Modulation – Adaptive Delta modulation – TDM – FDM – ASK – FSK – PSK

UNIT III SATELLITE COMMUNICATION

Introduction – Satellite Orbit – Satellite Position – Up link – Down link – Cross link – Assignable Satellite Frequencies.

Inside Satellite: Transponder – Antenna System – Power Package and Station Keeping – Forms of Modulation – Free path space losses – Ground Station – Aligning the satellite dish

UNIT IV CELLULAR COMMUNICATION SYSTEM

Introduction Cellular Mobile System – Basic Cellular System – Operational Cellular System – Maximum number of Calls per cell – Maximum number of Frequency channels concept of frequency channel cell splitting – permanent splitting – real time splitting – Frequency Management – Channel Assignment

UNIT V OPTICAL COMMUNICATION

Introduction to Optical fibers – Optical fiber structure – Numerical aperture – Propagation of light rays through it – Application of Optical Fiber (Video link, Satellite link, Computer link, Communicating antenna Television link)

TEXT BOOKS:

1. Robert J. Shoernbeck, "Electronic communications modulation and transmission", PHI, 1999
2. Anok singh, "Principles of communication Engineering", S.Chand and Company, 2nd edition
3. Sanjeev Gupta, "Electronic Communication system", Kanna publishing company
4. William C.Y.Lee, "Mobile Cellular Communication systems", McGraw Hill Publications, 1995
5. Subir Kumar Sarkar "Optical Fiber Communication systems", S.Chand and Company

SEM – V

Elective I–C

COMPUTER HARDWARE AND MAINTENANCE

UNIT I COMPUTER HARDWARE OVERVIEW

Introduction – Computer organization – PC hardware – Functional block of a PC – Buses – Bus concept – Bus cycle – Bus interface unit – Peripheral devices – Keyboard – CRT display – Monitor – Printer – Floppy disk drive – SMPS

UNIT II MOTHER BOARD FUNCTIONS

Introduction – Functional units and inter communication – Reset logic – CPU nucleus logic – DMA logic – Wait state logic – Bus arbitration logic – RAM logic – NMI logic – Speaker logic – Mode switch input logic – New generation mother board

UNIT III FLOPPY DISK CONTROLLER

Introduction – Floppy disk controller overview – Disk format – FDC system interface – FDD interface – Overall operation of floppy disk subsystem – New generation floppy disk controller

Display adapter introduction – CRT display – 6845 CRT controller – CGA & AGA – Device interface

UNIT IV HARD DISK CONTROLLER AND PRINTER

Introduction – Overview of HDC organization – Disc drives types and interface – Hard disk card – Hard disk format

Printer introduction: Centronics interface programming – Programming sequence – Hardware overview – Printer controller

UNIT V TROUBLE SHOOTING

Introduction – Types of faults – Hardware and software – Nature of faults – Solids and intermittent – Fault elimination process – Systematic troubleshooting – FDC & HDC problems – CRT monitor problems – Keyboard problems – SMPS problems.

TEXT BOOK

1. Govinda Rajulu B, “PC IBM and Clones – Hardware, Troubleshooting and Maintenance”, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1991

SEM – V

Elective II –A

TELEVISION ENGINEERING

UNIT I TELEVISION STANDARDS

Geometric form & Aspect ratio of the picture – Vertical scanning – Horizontal scanning – Number of scanning lines – Interlaced scanning – Vertical and horizontal resolution –negative modulation – Complete Channel bandwidth – Reception of VSB Signals – allocation of Frequency band for TV signal Transmission – Standards of TV System – Complete channel bandwidth – Composite video signal – CCIR – B standards – camera tubes.

UNIT II TELEVISION RECEIVER SECTION

Monochrome receiver block diagram – Receiving antennas – Balun – IF Filters RF tuners – VHF Stage and Response – Video detector – sound section – video amplifiers DC restoration – Picture tubes.

UNIT III SYNC SEPARATOR

Sync separator – Basic principle – Noise in sync pulses – Vertical and horizontal sync separation – Automatic frequency Control (AFC) – Horizontal AFC – Vertical and horizontal output stage – EHT generation.

UNIT IV COLOUR TELEVISION

Nature of color – Color perception – Compatibility – Three color theory – Chromaticity diagram – Luminance and color difference signals – weighting factors – color picture tube – Bandwidth for color signal transmission – PAL Color TV systems- Block diagram of color TV Receiver.

UNIT V ADVANCE TECHNIQUES

CCD camera – HDTV – Digital TV – Satellite TV – Cable TV –LED TV – LCD TV – OLED TV - Plasma TV.

TEXT BOOKS

1. R.R. Gulati, “MONOCHROME AND COLOUR TELEVISION”, New Age International (P)Limited, Publishers, New Delhi.
2. R.R. Gulati, “MODERN TELEVISION PRACTICE”, New Age International (P) Limited, Publishers, New Delhi.
3. R.R. Gulati, “COLOUR TELEVISION PRINCIPLES AND PRACTICE”, New Age International (P) Limited, Publishers, New Delhi.
4. SP Bali, “COLOUR TELEVISION THEORY AND PRACTICE”, Tata McGraw Hill Publishing Company Limited New Delhi, V edition 2002.

SEM – V

Elective II–B

MICROWAVE AND L FIBER OPTIC COMMUNICATION SYSTEMS

UNIT I INTRODUCTION TO MICROWAVES

Introduction – Maxwell’s equation – Amperes law – Faradays law – Gauss law – Wave equation – Types of wave guides – TE and TM modes – Propagation of TM waves in rectangular wave guide – TM modes in rectangular wave guide.

UNIT II MICROWAVE AMPLIFIERS AND OSCILLATORS

Microwave tubes: - Two cavity Klystron – Multi cavity Klystron – Reflex Klystron – Traveling wave tube (TWT) – Backward wave Oscillator (BWO) – Magnetron – Applications

UNIT III MICROWAVE DEVICES

Microwave transistors – Gallium Arsenide (GaAs) metal semi-conductor FET – Varactor Diode – PIN diode – Schottky diode – MASER principle – Applications

UNIT IV RADAR

Introduction – Block diagram – Classification – Radar range equation – Factors affecting the range of a radar receivers – Line pulse modulator – PPI (Plane Position Indicator) – Moving Target Indicator (MTI) – FM CW Radar- Applications.

UNIT V OPTICAL FIBER COMMUNICATION

A basic fiber optic system – Frequencies – Fiber optic Cables – Refraction – Numerical Aperture – Graded index cables – Single mode – Multi mode – Cable Constructions – Cable losses – Connectors – Light Sources – Light Detector – Systems Components – Advantages and Disadvantages.

TEXT BOOKS

1. Kennedy; Davis – “ELECTRONIC COMMUNICATION SYSTEMS” Tata McGraw Hill Publishing Company Limited, III edition.
2. Robert J Schoenbeck “ELECTRONIC COMMUNICATIONS MODULATION AND TRANSMISSION”, PHI,1999

REFERENCE

- 1.M.Kulkarni – “MICROWAVE AND RADAR ENGINEERING” Umesh Publications, 2nd edition.
2. Samuel Y.Liao – “MICROWAVE DEVICES AND CIRCUITS” PHI Private Limited, 2nd edition.
3. Anikh Singh – “PRINCIPLES OF COMMUNICATION ENGINEERING” S.Chand & Company Limited, 2nd Edition

SEM – V

Elective II –C

AUTOMOTIVE ELECTRONICS

UNIT I Introduction :

Automotive component operation Electrical wiring terminals and switching Multiplexed wiring systems Circuit diagrams and symbols. Charging Systems and Starting Systems : Charging systems principles alternations and charging circuits New developments requirements of the starting system Basic starting circuit.

UNIT II Ignition systems:

Ignition fundamental, Electronic ignition systems. Programmed ignition distribution less ignition direct ignition spark plugs. Electronic Fuel Control : Basics of combustion Engine fuelling and exhaust emissions Electronic control of carburation Petrol fuel injection Diesel fuel injection.

UNIT III Instrumentation Systems:

Introduction to instrumentation systems Various sensors used for different parameters sensing Driver instrumentation systems vehicle condition monitoring trip computer different types of visual display

UNIT IV Electronic control of braking and traction:

Introduction and description control elements and control methodology Electronic control of Automatic Transmission: Introduction and description Control of gear shift and torque converter lockup Electric power steering Electronic clutch.

UNIT V Engine Management Systems:

Combined ignition and fuel management systems Exhaust emission control Digital control techniques Complete vehicle control systems Artificial intelligence and engine management Automotive Microprocessor uses. Lighting and Security Systems: Vehicles lighting Circuits Signaling Circuit Central locking and electric windows security systems Airbags and seat belt tensioners Miscellaneous safety and comfort systems

TEXT BOOK

1. TOM DENTON, Automobile Electrical and Electronic Systems, Edward Arnold pb., 1995

REFERENCES

- 1.DON KNOWLES, Automotive Electronic and Computer controlled Ignition Systems, Don Knowles, Prentice Hall, Englewood Cliffs, New Jersey 1988.
2. WILLIAM, T.M., Automotive Mechanics, McGraw Hill Book Co.,
3. WILLIAM, T.M., Automotive Electronic Systems, Heiemann Ltd., London ,1978.
4. Ronald K Jurgen, Automotive Electronics Handbook, McGraw Hill, Inc, 1999.

SEM – VI

Elective III –A

INDUSTRIAL AND POWER ELECTRONICS

Objective: Enable the students to acquire designing Knowledge in Industrial & Power Electronic circuits.

UNIT I THYRISTORS

Introduction– Principles, Construction, Operation & Characteristics of SCR – Two Transistor Model –TRIAC – DIAC – GTO – SCS – SUS – SBS – LASCR – MOSFET – UJT– Relaxation Oscillator– PUT.

UNITII TURN ON/OFF MECHANISMS

Introduction– Types of Turn on Methods: AC Gate Triggering: Forward Voltage Triggering– Thermal Triggering– Radiation Triggering– DC Gate Triggering: Pulse Triggering – Types Of Turn Off Methods: Natural Commutation – Forced Commutation: Self Commutation – Complimentary Commutation – Auxiliary Commutation – External Pulse Commutation—Line Commutation – Thyristor Rating.

UNIT III CONTROLLED RECTIFIERS & INVERTERS

Introduction– Single phase Half Wave Controlled Rectifiers with Resistive Load – HWCR with Inductive Load – HWCR with Free Wheeling Diode – Single phase Full Wave Controlled Rectifiers with Resistive, Inductive Loads – FWCR with Freewheeling Diode. INVERTERS: Single Phase Half & Full Bridge Voltage Inverters.

UNIT IV CYCLO CONVERTERS AND CHOPPERS

Introduction – Single Phase Centre Tapped Step-Up Cyclo converter – Single Phase Centre Tapped Step-Down Cyclo converter – Three Phase to Single Phase Cyclo converter—Three Phase To Three Phase Cyclo converter— Step-up & Step-down choppers.

UNIT V APPLICATIONS

Introduction –Dielectric heating – Induction heating – SMPS – UPS – Static circuit breaker – Battery charger –Emergency lighting system – Time delay control – Static switches.

TEXT BOOKS:

1. MD Singh, “Power Electronics”, 2nd Edition, Tata- Mc Graw hill, 2007.
2. M. Ramamoorthy, “Thyristor and their Applications”, 2nd Edition, East west pvt.ltd, 1999.

REFERENCE BOOK:

1. Muhammed H Rashid, “Power Electronics Devices, Circuits and Applications”, 3rd Edition, Pearson Education, 2005.

SEM – VI

Elective III –B

ROBOTICS AND AUTOMATION

Subject Description: To provide fundamental knowledge about Robotics and its applications.

Goals: Enable the students to learn the Fundamentals and applications of robots.

Objectives: Upon completion of the subject, the student should understand the Basic concepts and the applications of robots in automation

UNIT I Fundamentals of Robots

Introduction: Automations and robotics; Laws of robotics - Robotics Drive system; Robot anatomy; Work volume - Control system and precision of movement - Serial Robot - Robot subsystems, Motion sub systems - Recognition sub system: Robot classification by coordinate systems, Robot classification by actuation systems - Robot classification by control method Robot classification by program method

UNIT II Robot End Effectors

Introduction: Types of End effectors - Mechanical Grippers; Other types of Gripper - Vacuum Cups, Magnetic Gripper, Adhesive Gripper - Hook, Scoops other Miscellaneous Device - Tools as end effectors- Considerations in Gripper Selections and Design

UNIT III Sensors in Robots

Sensor classification; internal sensors - External sensors; Vision system; sensor selections - Sensors in robotics: Tactile Sensors: proximity and range sensors - Miscellaneous sensors and sensor based systems - Uses of sensors in robotics - Actuators in Robotics - Pneumatic actuators, Hydraulic actuators - Electric actuators; DC motors, AC Motors

UNIT IV Mobile Robotics locomotion

Introduction key uses for locomotion - Leg mobile robots; Leg configuration and assembly - Consideration for Dynamics; types of legged robot locomotion - One leg; two legs biped - Four legs(Quadruped); Six legs (Hexapod) - Concept of Wheeled mobile robots

UNIT V Robotic Applications

Industrial Applications: Material Handling - Processing Applications - Arc welding - Assembly applications - Inspection applications - Robotics for Arc welding - Assembly applications - Robot safety - Non Industrial Application of Robotics: Home sector, Health sector, Service sector, Agriculture farms, Research and exploration

Text Books:

1. M.P.Groover, Mitchell weiss, Roger.N.Nagel, Nicholas G. Odrey, “*Industrial Robotics – Technology, programming and Application*”, McGraw-Hill, 2008.
2. S.K.Saha, “*Introduction to Robotics*”, Tata McGraw Hill, Reprint 2009.
3. Roland Siegart, Illah R. Nourbakhsh, Davide Scaramuzza, “*Introduction to Autonomous mobile Robots*”, PHI Publication, Second Edition, 2011.
4. R.K. Mittal , J. Nagrath “*Robotics and Control*” Tata Mc Graw Hill, 2003.
5. K.S.Fu, R.C.Gonazalez, C.S.G.Lee, “*Robotics; Sensing, Vision & Intelligence*”, Tata McGraw Hill Publication, 2008.

SEM – VI

Elective III –C

PROGRAMMABLE LOGIC CONTROLLER

Subject Description: To provide the knowledge in PLC architecture, Programming skill in PLC and working knowledge in PLC applications

Goals: Enable the students to learn the Fundamentals and applications of robots

Objectives: Upon completion of the subject, the student should understand the Basic concepts and the applications of PLC

UNIT I Programmable Logic

Introduction; Programmable Logic Arrays (PLA); Programmable Array Logic (PAL) - Complex Programmable Logic Devices (CPLD); Field Programmable Gate Arrays (FPGA) - Sequential circuit design: Design of sequential circuits using ROMs and PLAs - Sequential circuit design using FPGAs

UNIT II Programmable Logic Controllers (PLCs)

Introduction; Parts of PLC; Principles of operation; PLC size and application - PLC Hardware Components - The I/O section; Discrete I/O section; Analog I/O section - The CPU; Programming devices

UNIT III Basics of PLC Programming

PLC Programming Languages - Relay type instructions - Instruction addressing; Programming Examine IF closed and Examine IF open instructions - Electromagnetic control relay; Motor starters; Manually operated switches; Mechanically operated switches - Proximity sensor: Inductive and capacitive Proximity sensor - Output control devices - Converting relay schematics into PLC ladder programs

UNIT IV PLC Instructions

Timer Instructions: ON-Delay timer instructions - OFF-Delay timer instructions - Counter Instructions: UP Counter - Down Counter - Allen-Bradley SLC-500 PLC Instructions: Program control instructions - Data manipulation instructions; Math instructions

UNIT V Applications of PLC

Simple sequence control concepts; Automatic packing mechanism - Automatic control of warehouse door; Automatic lubricating oil supplier - Conveyor belt motor control Bottle label detection - Ball sorter mechanism

Text Books:

1. Charles H. Roth, Jr., “*Fundamentals of Logic Design*”, Cengage Learning India Pvt. Ltd., Fifth Edition, 2009.
2. Frank D. Petruzella, “*Programmable Logic Controllers*”, TataMcGrawHill, Third edition, 2010.

Reference Manuals:

1. Siemens “*PLC Handbook*”
2. Allen-Bradley “*PLC Handbook*”