

<b>BHARATHIAR UNIVERSITY, COIMBATORE</b>									
<b>B.Sc. Electronics with compulsory Diploma in Computer Technology</b>									
<b><u>Scheme of Examination (CBCS PATTERN)</u></b>									
<b>For candidates admitted during the Academic Year 2008-2009 and onwards</b>									
SEM	Part	Subject and Paper	Instruction Hrs./Week	Exam				Credit	
				Dur.Hrs.	CIA	Marks	Total Marks		
I	I	Language -I : Tamil/Hindi/French/Malayalam	6	3	25	75	100	3	
	II	English – I	6	3	25	75	100	3	
	III	<b>Core :</b>							
		Paper I : Basic Electronics	5	3	25	75	100	5	
		Pract. I Basic Electronic Lab	3	-	-	-	-	-	
		Pract.II Semiconductor Devices Lab	3	-	-	-	-	-	
		<b>Allied : I</b> Mathematics –I	5	3	25	75	100	5	
IV	Environmental Studies #	2	3	-	50	50	2		
II	I	Language - I : Tamil/Hindi/French/Malayalam	6	3	25	75	100	3	
	II	English - II	6	3	25	75	100	3	
	III	<b>Core</b>							
		Paper II :Semiconductor Devices	5	3	25	75	100	5	
		Pract. I Basic Electronic Lab	3	3	40	60	100	3	
		Pract.II Semiconductor Devices Lab	3	3	40	60	100	3	
		<b>Allied : II</b> Mathematics – II	5	3	25	75	100	5	
IV	Value Education – Human Rights #	2	3	-	50	50	2		
III	III	<b>Core :</b>							
		Paper III : Electronic Circuits	4	3	25	75	100	5	
		Paper IV : Digital Principles and Applications	4	3	25	75	100	4	
		Paper V : Principles of Communication Systems	4	3	25	75	100	4	
		Pract. III Electronic Circuits & Communication Lab	3	-	-	-	-	-	
		Pract. IV Digital & Medical Electronics Lab	3	-	-	-	-	-	
		<b>Allied :III</b>							
		Programming in C	4	3	20	55	75	4	
		Pract. V Computer Programming Lab	3	-	-	-	-	-	
IV	<b>Skill based Subject 1 (Diploma) :</b>								
	Computer Architecture and Organization	3	3	25	75	100	3		
	Tamil @ / Advanced Tamil# (OR) Non-major elective - I (Yoga for Human Excellence)# / Women’s Rights#	2	3		75	75	2		

IV	III	Paper VI : IC's and Instrumentation	4	3	25	75	100	5
		Paper VII : Bio Medical Instrumentation	4	3	25	75	100	4
		Paper VIII: Television Engineering	4	3	25	75	100	4
		Pract. III : Electronic Circuits & Communication Lab	3	3	40	60	100	3
		Pract. IV: Digital & Medical Electronics Lab	3	3	40	60	100	3
		<b>Allied : IV Object Oriented Programming using C++</b>	4	3	20	55	75	4
	IV	Pract. V : Computer Programming Lab	3	3	20	30	50	2
		<b>Skill based Subject 2 (Diploma) :</b> Visual Programming	3	3	25	75	100	3
		Tamil @ /Advanced Tamil # (OR) Non-major elective -II (General Awareness #)	2	3	75	75	2	
V	III	Paper IX : 8085 Microprocessor	6	3	25	75	100	5
		Paper X : Industrial Electronics	6	3	25	75	100	5
		Pract. VI: IC, TV and Industrial Electronics Lab	3	-	-	-	-	
		Pract. VII: Microprocessors and Interfacing Lab	3	-	-	-	-	
		Pract. VIII: Microcontroller Lab	3	-	-	-	-	
	IV	<b>Elective – I</b>	6	3	25	75	100	5
		<b>Skill based subject – 3 (Diploma)</b> Internet and Java Programming	3	3	25	75	100	3
VI	III	Paper XI : 8051 Microcontroller and It's Application	6	3	25	75	100	5
		Pract. VI: IC, TV and Industrial Electronics Lab	3	3	40	60	100	3
		Pract. VII: Microprocessors and Interfacing Lab	3	3	40	60	100	3
		Pract. VIII: Microcontroller Lab	3	3	40	60	100	3
		IV	<b>Elective – II</b>	6	3	25	75	100
	<b>Elective – III</b>		6	3	25	75	100	5
	V	<b>Skill based subject – 4 (Diploma)</b> Practical Visual and Java Programming	3	3	40	60	100	3
		Extension Activities @	-	-	50	-	50	1
<b>Total</b>						3600	140	

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

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

<b>List of Elective papers (Colleges can choose any one of the paper as electives)</b>		
Elective – I	<b>A</b>	Home Appliances & its Servicing *
	<b>B</b>	Automotive Electronics
	<b>C</b>	PCB Design and Fabrication
Elective – II	<b>A</b>	8085 Microprocessor interfacing & its Applications
	<b>B</b>	Microwave and Fiber Optic Communications
	<b>C</b>	Advanced Communication System
Elective - III	<b>A</b>	Programmable Logic Control
	<b>B</b>	Design with PIC Microcontroller
	<b>C</b>	Computer Hardware and Maintenance

\* - yet to be submitted

SEM –I

Core Paper- I

## **BASIC ELECTRONICS**

### **UNIT I RESISTORS & INDUCTORS**

Types of resistors: Fixed, Variable\_ Brief mention of their construction and characteristics -Color coding of resistors-Connecting resistors in series and parallel. 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 II CAPACITORS**

Principles of capacitance-Parallel plate capacitor-Permittivity-Definition of Dielectric Constant-Dielectric strength-Energy stored in a capacitor-Types of capacitors: Air, Paper, Mica, Teflon, Ceramic, Plastic and Electrolytic: Construction and application-Connecting capacitors in series and parallel-Factors governing the value of capacitors-Testing of capacitors using millimeters.

### **UNIT III ELECTRICAL ELEMENTS AND CIRCUITS**

Potential difference- Electric current-Electromotive force-Ohms law-Kirchoff's law-Kirchoff's current law-Analysis of resistance in series circuits, parallel circuits and series parallel circuits-Concept of voltage source and current source-Voltage source in series and current source in parallel-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, Band rejection filters.

#### **TEXT BOOK:**

1. S.Salivahanan, N.Suresh Kumar, A.Vallavaraj "**ELECTRONIC DEVICES AND CIRCUITS**"-Tata McGraw-Hill Publishing Company Limited, New Delhi. 1998.
2. B.V.Narayana Rao "**PRINCIPLES OF ELECTRONICS**", Wiley Eastern Limited, 1992.
3. B.L.Theraja, "**BASIC ELECTRONICS-SOLID STATE DEVICES**", S.Chand Company Ltd.2000
4. Bernard Grob "**BASIC ELECTRONICS**"-Tata McGraw-Hill Publishing Company Limited, 9th Edition.

SEM –II

Core Paper- II

## **SEMICONDUCTOR DEVICES**

### **UNIT I PN JUNCTION DIODE**

Energy band Structure and conduction in Insulator - Semiconductor, conductor - Intrinsic and Extrinsic semiconductor – doping – P type – N type semiconductor - 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 - Impaat 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 Multiplexer – 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. Wheatstone Bridge.
9. Verification of Norton's theorem.
10. Verification of Thevenin's Theorem.
11. Verification of Millman's Theorem.
12. Verification of Superposition Theorem.
13. LCR Bridge.
14. Series resonance circuit.
15. Parallel resonance circuit.
16. Transient response of RC Circuit.
17. Transient response of RL Circuit.
18. Capacitors & Inductors in series & Parallel.
19. Frequency response of R, L & c.
20. Low Pass Filter & High Pass Filter.
21. Band pass and Band Rejection Filter.
22. Verification of Maximum power transfer Theorem
23. Measurement of resistance and capacitance in series and parallel

SEM – I & II

Core Practical – II

**SEMICONDUCTOR DEVICES LAB**  
(Any 16 Experiments)

1. Band Gap energy of Silicon / Germanium Diode.
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 LED and 7 Segment display.
19. Temperature Co-efficient of Junction Diode.
20. Zener as a Voltage regulator.
21. ON / OFF control of relay using Opto – Couplers.
22. Characteristics of SCR
23. TRIAC Characteristics

SEM – III

Core Paper – III

## **ELECTRONIC CIRCUITS**

### **UNIT I 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 –  $\pi$  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 – 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

Core Paper – IV

## **DIGITAL PRINCIPLES AND APPLICATIONS**

### **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 slopetype – 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

## **PRINCIPLES OF 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

Diploma Paper – I

## **COMPUTER ARCHITECTURE AND ORGANIZATION**

### **UNIT 1 MODERN COMPUTER ORGANIZATION**

Introduction – Layers in modern computer - Computer organization – Main Memory – CPU Operation – Computer types – System performance and measurement – High performance techniques – Booting sequence – Computer design process – Computer structure – Computer Function – Architecture and Organization – CISC Vs RISC

### **UNIT 2 PROCESSOR DESIGN AND DATA PATH**

Introduction – Processor role – Processor design goals – Processor design process – Data path organization – Main memory interface – Local storage register file – Data path simple instructions

### **UNIT 3 MEMORY DESIGN AND MANAGEMENT**

Introduction – Memory parameters – Classification of memory – Memory Technology – Main memory allocation – Static RAM IC – Dynamic RAM – ROM logic – Multiple memory decoding – Memory Hierarchy – Main memory drawbacks – Cache memory – Principle of cache – Virtual memory Concept – Advantage of Virtual memory

### **UNIT 4 COMPUTER PERIPHERALS**

Introduction – Keyboard – CRT display monitor – Printer – Magnetic storage devices – Floppy disk drive – Hard disk drive – Special types of disk drives – Mouse and Track ball – Modem – CD-ROM Drive – Scanner – Digital Camera – DVD – Special peripherals

### **UNIT 5 ADVANCED SYSTEM ARCHITECTURE**

Introduction – High performance computer architecture – RISC systems – Superscalar architecture – VLIW architecture – EPIC architecture – Multiprocessor Systems

### **TEXT BOOK**

1. Govindarajalu.B “Computer Architecture and Organization Design Principles and Applications” Tata McGraw-Hill, 2006

SEM – IV

Core Paper – VI

## **IC'S AND INSTRUMENTATIONS**

### **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**

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”, 12<sup>th</sup> Edition, S.K Kataria & sons

SEM – IV

Core Paper – VII

## **BIO-MEDICAL INSTRUMENTATION**

### **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 past – 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 – IV

Core Paper – VIII

## **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 VSD 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 – Video Disc – Cable TV – Video Cassette Recorder.

### **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 – 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
4. Half subtractor and full subtractor
5. 4-bit binary adder
6. Multiplexer and De multiplexers
7. Encoder and Decoder
8. BCD to 7-segment Display
9. Study of Flip Flops
10. Binary to Grey and Grey to Binary conversion
11. Shift registers and ring counter
12. Analog to Digital converter
13. Digital to Analog converter
14. Design and Simulation of Logic Gate using VHDL Coding
15. Design and Simulation of Adder Circuits using VHDL Coding
16. Design and Simulation of Encoder and Decoder using VHDL Coding
17. Parity checker and generator
18. 4 bit binary counter
19. Decade counter
20. BCD counter/ adder

**MEDICAL ELECTRONICS**

21. Pulse Rate Monitor.
22. Temperature monitor using AD 590
23. ECG Measurement
24. Notch filter
25. Pacemaker

SEM – IV

Diploma Paper – II

## **VISUAL PROGRAMMING**

### **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. Pappas 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 – V

Core Paper – IX

## **8085 MICROPROCESSOR**

### **UNIT I MICROPROCESSOR ARCHITECTURE**

Microprocessor architecture and its operation – Memory map of 1k memory chip – memory and instruction fetch – 8085 microprocessing unit – Bus timings – Demultiplexing the bus AD 7 – AD0 – Generating control signals – 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.

### **UNIT III PROGRAMMING THE 8085**

Data transfer operations – arithmetic operations – Logical operations – Branch operations – Looping, counting and indexing – addition, subtraction of 8 and 16 bit numbers.

### **UNIT IV TIME DELAY**

Time delay using a single register – Time delay using a register pair – Counter design of Time delay program. Function of PUSH, POP, CALL and RET instructions.

### **UNIT V MEMORIES**

Semiconductor memories – Classification – ROM, RAM – Static RAM – Dynamic RAM – PROM – EPROM – EEPROM – CCD – Magnetic Bubble memories.

### **TEXT BOOKS**

1. Computer System Architecture – M.Morris Mano – PHI 3<sup>rd</sup> Edition.
2. Ramesh S Goanker, “Microprocessor Architecture Programming and Application with 8085/8080A. New Age International (P) Ltd.

SEM – V

Core Paper X

## **INDUSTRIAL ELECTRONICS**

### **UNIT I THYRISTORS AND THEIR OPERATIONS**

Principles and operations of SCR – Voltage amplifier gate characteristics of SCR – Characteristics of two transistor models – Thyristor construction – Rectifier circuit using SCR – GTO – Operation and characteristics of DIAC – TRIAC – Silicon Controlled Switch – Silicon Unilateral Switch – Silicon Bilateral Switch – Light activated SCR

### **UNIT II TURN ON/OFF MECHANISM**

Types of turn on methods: AC gate triggering: R triggering – RC 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 APPLICATION OF SCR**

Multiple connections of SCR – Series operation – Triggering of series connected SCR – Parallel operation – Triggering of parallel connected SCR – SCR di/dt calculation – Snubber circuit – dv/dt calculation across SCR – Types of converters – Half wave rectifiers with resistive load – HWCR with inductive load – HWCR with free wheeling diode – Full wave controlled rectifier with resistive load – FWCR with inductive load – FWCR with free wheeling diode

### **UNIT IV INVERTORS**

Types of invertors – Single phase bridge inverter – Mc Murray impulse communication inverter – Single phase half bridge voltage source inverter – Single phase full bridge voltage inverter – Step down choppers – Step up choppers – Chopper classification

### **UNIT V APPLICATIONS**

Induction heating – Resistance welding – Over voltage protection – Zero voltage switch – SMPS-UPS-DC circuit breaker – Battery charger – AC static switch – DC static switch – Time delay – Fan regulator using TRIAC

### **TEXT BOOKS:**

1. Harish C Rai, “ Power Electronic Devices, Circuits, Systems and Applications”, Gac Gotia Publication Pvt. Ltd., 1<sup>st</sup> Edition, 1998
2. Ramamourthy “ Thyristor and their applications” East-West Publishers, 2<sup>nd</sup> Edition
3. Shamir K Datta “ Power Electronics and Controllers” PHI, 3<sup>rd</sup> Edition

SEM – V

Diploma Paper – III

## **INTERNET & JAVA PROGRAMMING**

### **UNIT I**

Internet – Introduction- Understanding Internet- Internet Addressing - Hardware Requirements to Connect to the Internet

### **UNIT II**

Data types, Arrays, Operators, Flow control – Branching, Looping

### **UNIT III**

Classes – New Operator, Dot Operator, Method Declaration and Calling, Constructors, This In Constructors, Inheritance, Super, Method Overriding Final, Finalize, Static, Package and Import Statement, Interface and Implements

### **UNIT IV**

Exception Handling – Exception Types, Uncaught and Calling, Nested Try Statements, Java Thread Model, and Thread, Runnable, Thread Priorities, Synchronization, Deadlock

### **UNIT V**

File – Input Stream, Output Stream, and File Stream. Applets-Tag, Order of Applet Initialization, Repainting, Sizing Graphics- Abstract Window Tool Kit Components

### **TEXT BOOKS**

1. Harley Hahn, The internet complete reference, Tata McGraw publicity, 2<sup>nd</sup> Edition, 1997
2. Patrick Naughton., “ Patrick Naughton”, Then Java hand book, Tata McGraw, 1997

SEM – VI

Core Paper –XI

**8051 MICROCONTROLLER AND IT'S APPLICATION**

**UNIT I**

Microprocessor and Microcontroller – 8051 Microcontroller hardware:  
8051 oscillator and clock – Program counter and data pointer – A & B CPU register –  
Flags & PSW – Internal memory – Internal RAM – Stack and stack pointer – Special  
function registers – Internal ROM – Input/Output pin, ports and circuits – External  
memory

**UNIT II PERIPHERAL**

Counter & Timer: Timer/Counter interrupts – Timing – Timer modes of  
operation – Counting – Serial data input/output: Serial data interrupt – Data transmission  
– Data reception – Serial data transmission modes

Interrupts: Timer flag interrupt – Serial port interrupt – External interrupt – Reset  
– Interrupt control – Interrupt priority – Interrupt destination – Software generated  
interrupts

**UNIT III ARITHMETIC AND LOGICAL OPERATIONS**

Introduction – Addressing modes – Byte level logical operations – Bit  
level logical operations – Rotate and swap operations – Simple program

Arithmetic Operations: Introduction – Flags – Increment and decrementing –  
Addition – Subtraction – Multiplication and Division – Simple programs

**UNIT IV INSTRUCTION SET**

Introduction – External data move – Code memory read only data move –  
Push & pop – Opcodes – Data exchanges – Simple programs

Jump and call instruction: Introduction – Jump and call program range – Jumps –  
Calls and subroutine – Interrupt and returns – More detail on interrupts – Simple  
programs

**UNIT V APPLICATIONS**

Keyboard interfacing – Display interface – 7 Segment and LCD display –  
D/A conversion – A/D conversion – Stepper motor interface

**TEXT BOOKS:**

1. Kenneth J. Ayala, “ The 8051 Microcontroller architecture, programming and application” 2<sup>nd</sup> Edition, Penram International
2. Mohamed Ali Maszidi & Janice Gillispie Maszidi, “ The 8051 Microcontroller and Embedded System”, Pearson Publishers

SEM – V & VI

Core Practical – VI

**IC, TV AND INDUSTRIAL 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. EHT Generation
12. Sync Separator
13. Horizontal Section faults
14. Vertical Section faults
15. Tuner Section faults
16. Video Section faults
17. Picture tube basing faults
18. Video IF section faults

**INDUSTRIAL ELECTRONICS LAB**

19. Automatic Street light
20. Single Phase Inverter
21. DC Choppers (Step up and Step down)
22. R and RC Triggering
23. External Pulse Commutation
24. DC motor controller and Light Dimmer
25. Time delay circuit

SEM – V & VI

Core Practical – VII

**MICRO PROCESSOR AND INTERFACING LAB**  
**(ANY 16 EXPERIMENTS)**

**8085 MICROPROCESSOR LAB**

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. Data transfer using 8255 (PPI).
11. Square wave generator using 8255.
12. ADC interface.
13. DAC interface.
14. Stepper motor interface.
15. Solid State Relay Interface
16. Time Delay Programme
17. Digital Clock
18. Rolling and Blinking of a message
19. LCD interface
20. Frequency Counter
21. Water level Indicator
22. DC motor interface
23. Temperature controller

SEM – V & VI

Core Practical – VIII

**MICROCONTROLLER LAB**  
**(ANY 16 EXPERIMENTS)**

**8051 MICROCONTROLLER LAB**

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. Time Delay Programme
16. Digital Clock
17. Rolling and Blinking of a message
18. LCD interface
19. Frequency Counter
20. Water level Indicator
21. DC motor interface
22. Temperature controller

SEM – VI

Diploma Paper - 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.

### **JAVA PROGRAMMING (ANY 8 EXPERIMENTS)**

1. Program to print the following triangle of numbers  
1  
12  
123  
1234
2. Defining a class with the following attributes 1. xname 2. Date of Birth 3. Date on which leg injection has to be given (sixty days from date of birth) 4. xdate on which polio drops is to be given (45 days from Date of birth). Write a constructor to construct the baby object. The constructor must find out the leg and polio drops dates from the date of birth. In the main program define a baby and display its details.



3. Program, to create and display a message on the window.
4. Program to draw several shapes in the created window.
5. Program to create an applet and draw gridlines.
6. Java program to create a frame with two buttons called father and mother. When we click the father button the name of the father, his age and designation must appear. When we click mother similar details of mother appear.
7. Java program to create a frame with four text fields for name, age and qualification and a text field of multiple lines for address.
8. Program to draw circle, ellipse, square and rectangle at the mouse click position.
9. Java program to create four text fields for the name, street, city and pin code with suitable labels. Also add a button called my details, when you click the button your name, street, city and pin code must appear in the text fields.
10. Java program to demonstrate the multiple selection list boxes.
11. Program to create a canvas which displays a clock with hour hand and a minute hand depending upon an int variable minutes. Write another program with a frame, which displays the clock canvas. It must also have three buttons, tick, reset and close. When we click reset, the clock must reset to 12 hrs. When we click close, the frame closes.
12. Java program to create a menu bar and pull down menus.
13. Java program to create a window when we press M or m the window displays Good Morning A or a the window displays Good Afternoon E or e the window displays Good Evening N or n the window displays Good Night.
14. Java program to move different shapes (Circle, Ellipse, Square, and Rectangle) according to the arrow key pressed.
15. Java program to create a frame which responds to the mouse click. For each event with mouse (such as mouse up, mouse down etc) the corresponding message must be displayed.
16. Program to handle the divide by zero exception.
17. Program to explain the multithreading with the use of multiplication tables. Three threads must be defined and each one must create one multiplication table; they are 5 tables, 7 tables and 13 table.
18. Program to illustrate thread priority. Create three threads and assign three different priorities.

## **ELECTIVE I - A**

### **HOME APPLIANCES AND SERVICING**

**(yet to be submitted)**

## **ELECTIVE I - B**

### **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.

## **ELECTIVE I - C**

### **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. New Delhi.

**ELECTIVE II - A**

**8085 MICROPROCESSOR INTERFACING AND ITS APPLICATIONS**

**UNIT I 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 segment LED display – Interfacing memory bus contention memory time and wait states.

**UNIT II DATA TRANSFER**

Data transfer schemes – Programmed data transfer – Synchronous Transfer, Asynchronous transfer, Interrupt driven data transfer, Multiple interrupts, Enabling, Disabling and Masking of interrupts, Direct memory access data transfer: DMA devices, DMA transfer in a 8085 based system – Serial data transfer.

**UNIT III 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 8359 Programmable Interrupt Controller Block diagram of 8259A Interrupt Operation, Programming the 8259, priority modes and other features, additional features of the 8259A.

**UNIT IV PERIPHERAL INTERFACES**

Block diagram of 8253 – Programming the 8253 – The 8253 as a counter – 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 control system – Stepper Motor control – Digital clock – Washing machine control

## **TEXT BOOKS**

1. Aditya P Mathur, "Introduction to Microprocessors" 3rd edition.
2. Ramesh S Goanker, "Microprocessor Architecture Programming and Application with 8085/8080A. New Age International (P) Ltd.

## **ELECTIVE II - B**

### **MICROWAVE AND OPTICAL FIBER 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 guides.

#### **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 – Tunnel diode – Gunn diode – IMPATT diode – TRAPATT diode – BARITT 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, 2<sup>nd</sup> edition.
2. Samuel Y.Liao – “MICROWAVE DEVICES AND CIRCUITS” PHI Private Limited, 2<sup>nd</sup> edition.
3. Anikh Singh – “PRINCIPLES OF COMMUNICATION ENGINEERING” S.Chand & Company Limited, 2<sup>nd</sup> Edition

## **ELECTIVE II - C**

### **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, 2<sup>nd</sup> 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

## **ELECTIVE III - A**

### **PROGRAMMABLE LOGIC CONTROL**

#### **UNIT I**

Programmable Logic Introduction, programmable Logic structures Programmable Logic Arrays (PLAs), Programmable Array Logic (PALs), Programmable Gate Arrays (PGAs), Field Programmable Gate Arrays (FPGAs) Sequential network design with Programmable Logic Devices (PLDs) Design of sequential networks using ROMs and PLAs Traffic light controller using PAL.

#### **UNIT II**

Programmable Logic Controllers (PLCs) Introduction Parts of PLC Principles of operation PLC sizes PLC hardware components I/O section Analog I/O section Analog I/O modules, digital I/O modules CPU Processor memory module Programming devices Diagnostics of PLCs with Computers.

#### **UNIT III**

PLC programming Simple instructions Programming EXAMINE ON and EXAMINE OFF instructions Electromagnetic control relays Motor starters Manually operated switches Mechanically operated and Proximity switches Output control devices Latching relays PLC ladder diagram Converting simple relay ladder diagram in to PLC relay ladder diagram.

#### **UNIT IV**

Timer instructions ON DELAY timer and OFF DELAY timer counter instructions Up/Down counters Timer and Counter applications program control instructions Data manipulating instructions math instructions.

#### **UNIT V**

Applications of PLC Simple materials handling applications Automatic control of warehouse door Automatic lubricating oil supplier Conveyor belt motor control Automatic car washing machine Bottle label detection Process control application.

#### **Text Books:**

1. Charles H. Roth, Jr " Fundamentals of Logic Design ", Fourth Edition, Jaico Publishing house, 1999,
2. Frank D. Petruzella " Programmable Logic Controllers ", McGraw- Hill book, company, 1989
3. Siemens " PLC Handbook ".

**References:**

1. William I. Fletcher " An Engineering Approach to Digital Design ", Prentice, Hall of India Ltd., New Delhi, 1999.

**ELECTIVE III - B**

**DESIGN WITH PIC MICROCONTROLLERS**

**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 I<sup>2</sup> Bus for Peripheral Chip Access**

I<sup>2</sup> Bus operation - I<sup>2</sup> Bus subroutines – DAC output – Temperature sensor – Serial EEPROM.

**Text Books:**

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



## **ELECTIVE III - 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

