

# SYLLABUS FOR M.SC. (ELECTRONICS)



**FOUR STARS**  
**(Accredited by NAAC)**

EFFECTIVE FROM JUNE 2007

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**SAURASHTRA UNIVERSITY**  
**DEPARTMENT OF ELECTRONICS**  
**M.Sc. (ELECTRONICS) SYLLABUS**  
**SEMESTER I TO IV**

**SEMESTER I**

- Paper 1: Advance linear electronics: concepts, devices and circuits
- Paper 2: Advance digital concepts: microprocessor
- Paper 3: Computer fundamentals & basic environment
- Paper 4: Elements of electromagnetics

**SEMESTER II**

- Paper 5: Advance electromagnetics
- Paper 6: Communication electronics
- Paper 7: Advance microprocessors
- Paper 8: MS-office

**SEMESTER III**

- Paper 9: Advance communication
- Paper 10: The 'C' language
- Paper 11: Electronic techniques
- Paper 12: Computer hardware

**SEMETER IV**

- Paper 13: Fiber optics
- Paper 14: Circuit simulation using PSpice
- Paper 15: Advance computer hardware
- Paper 16: Optional paper (Any One)
  - i. Microwave Electronics
  - ii. Power Electronics
  - iii. Bio-medical instrumentation
  - iv. Robotics

# SEMESTER I

## PAPER I: ADVANCE LINEAR ELECTRONICS: CONCEPTS, DEVICES AND CIRCUITS

### **Unit: 1 Introduction to data acquisition:**

Glossary of Data Conversion terms.

Principles of data acquisition and conversion

Introduction, basic data distribution system, Quantizing theory, sampling theory, coding for data converters, Amplifiers and filters, settling time, digital to analog converters, voltage reference circuits, analog to digital converters, integrating type A/D converters, Analog Multiplexers, Sample - Hold circuits, specification of converters.

REFERENCE: INTERSIL application hard book, GE solid State, 1988.

### **Unit: 2 ANALOG SWITCHES:**

Definition of terms used for analog switch.

$R_{ON}$ ,  $I_S$ ,  $I_D$ ,  $C_S$ ,  $C_D$ ,  $I_D-I_S$ ,  $t_{RAN-t_{ON}}$ ,  $t_{OFF}$

Monolithic analog current switch AH5009/AH5010/AH5011/AH5012.

Packing information, Schematic and Connection diagram, Test Circuit and timing waveform, and application.

Quad bilateral switch CD 4066.

### **Unit: 3 A/D converters chips:**

ADC 0800 8 BIT A/D CONVERTER: Block diagram, functional description, pin description, Application hints, typical application.

ADC 0808 / 0809 pp compatible A/D converts with 8- Channel Multiplexer.

Block diagram, functional description, connection diagram, timing diagram, Application information, typical application.

### **Unit: 4 digital to analog converters:**

DAC 0808 / DAC 0807/ DAC 0806 8-bit digital to analog converters. Block diagram, connection diagram, Application hints, test circuit, equivalent circuit, typical application.

DAC 1000/ DAC 1001/ DAC 1002 / DAC 1006/ DAC 1007/ DAC 1008 up compatible double buffered D to A converter.

Block diagram, connection diagram, definition of package, Pin outs, double buffering, application hints, Analog application, digital control description, microprocessor, interface.

REFERENCE : Data Acquisition Linear Devices Data Book. National Semiconductor, 1989.

## **PAPER 2: ADVANCE DIGITAL CONCEPTS: MICROPROCESSOR**

### **UNIT - 01 Basic Microprocessor Concepts:**

Block diagram of 8085 and functional description, Addressing mode, Detail instruction set, Directives,

### **UNIT - 2 Keyboard and display controller - 8279**

Keyboard basics - matrix organization and scanning, Block diagram of 8279- Detailed functional description of 8279-Programming 8279- Interfacing of 8279-with a typical Hex Keyboard, and seven segment display.

### **UNIT - 03 Peripheral Programmable Interface - 8255**

Block diagram and functional description, Programming 8255 (For All Modes) - Interfacing examples.

### **UNIT - 04 Universal Synchronous and Asynchronous: Transmitter and Receiver - 8251**

Block diagram of 8251- Detailed functional description - programming 8251- interfacing examples - RS232 Standard.

### **UNIT - 05 PROGRAMMABLE INTERVAL TIMER 8253**

Block diagram - Detailed functional description, programming - interfacing examples

### **UNIT - 06 DMA Controllers - 8257**

Block diagram - Detailed functional description, programming - interfacing examples

### **UNIT - 07 Programmable Interrupt Controller - 8259**

Block diagram-Detailed functional description - Programming - Interfacing examples

### **UNIT - 08 General interfacing modules**

Stepper motor - Hardware – Software, Elevator - Simulated hardware – software, Traffic light simulation - hardware - software

### **UNIT - 09: FLOPPY DISK CONTROLLER : 8272**

Block Diagram. Functional Description. and Programming concepts.

### **UNIT - 10 : CRT CONTROLLER : 8275**

Block Diagram, Functional, Description, and Programming Concepts.

### **RECOMMENDED BOOK/S:**

- (01) Digital logic and computer design By M.M. Mano / PHI
- (02) 8080 to 8085: Introduction to Microprocessor for engineers and scientists. By P.K. Ghosh and P.R. Sridhar , PHI.
- (03) Microprocessor Book, John Wiley & Sons New York.

### **Reference Book**

- 01 Microprocessor, Architecture, programming and applications with the 8085/8085A  
By : R.S, Gaonkar.

# **PAPER 3 COMPUTER FUNDAMENTALS & BASIC ENVIRONMENT**

## **UNIT 01 UNDERSTANDING THE COMPUTER**

Importance of Computer, History of Computer, Types of Computers, Computing Concepts, Classification of Computers, Input Devices, Processing Unit, Output Devices, External Storage devices, Driving the Computer: The Software Programming Language, Common High Level languages, Program Execution Modes

## **UNIT 02 FUNDAMENTALS OF OPERATING SYSTEM**

Introduction to Operating System, Process Management, Memory Management File Management

## **UNIT 03 DOS FUNDAMENTALS**

Working in DOS, Types of Commands, Versions of DOS, Directories and Files, Root directory, Path, Naming files and directories, Types of files, DOS commands, Displaying your files on screen, Coping file, Wild card, Deleting a file, Creating a directory with a make directory command, changing the directory command, the autoexec.bat file, the config.sys file.

## **UNIT 04 WINDOWS 98**

Introducing windows 98, Windows 98 requirements, Mouse basics, Using Mouse, Working in Windows 98, Desktop, Learning more about the mouse, Working with the mouse, Performing mouse actions, Components of window, Menu bar options, Quitting windows 98, Starting windows 98, Getting familiar with desktop, Opening an icon from desktop, starting a program, Moving from one window to another, Making the my computer window active, Making the notepad window active, Enlarging a window to the screen size, Reverting a window to its previous size, Reducing a window to a taskbar window, Opening a taskbar button into a windows, Adjusting the windows size freely, Closing a window, Creating a shortcut for a program, Deleting the shortcut icon, Deleting the contents of the recycle bin.

## **Unit 05 EXPLORER AND ACCESSORIES**

Managing files in explorer, Opening a program, saving a file, printing a file, printing selected pages of your file, printing the entire contents of your file, installing a printer, quitting a program, Files and folders in windows, Opening the explorer program, Parts of the explorer windows, Working in explorer, Opening and closing a file in explorer, Copying a file, Renaming a file, Copying a folder or Sub-folder, Renaming a sub-folder, Moving a file, Deleting a file, Deleting a folder, Removing the contents from recycle bin, Closing explorer window and quitting windows, Familiarizing Accessories: Opening a WordPad program, Entering text in WordPad, Formatting text in WordPad, Selecting, Centering, Underlining the text, Marking entries in bold, italics, Saving a WordPad document, Closing document and Quitting WordPad, Printing documents and quitting windows, Opening the paint program, Working in paint, Saving a paint file, Printing a paint file, Quitting the paint program, Calculator, Closing calculator and quitting windows.

## **RECOMMENDED BOOKS:**

1. Peter Norton DOS guide By Peter Norton
2. Programming in Basic By E Balaguruswamy Tata McGraw Hill
3. Operating system - concept and Design By Madnick & Donovan McGraw Hill
4. "Comdex Computer Course Kit" By: Vikas Gupta. Publisher: Dreamtech.

# **PAPER 4**

## **ELEMENTS OF ELECTROMAGNETICS**

### **UNIT 1 VECTOR ANALYSIS**

Vector Algebra Scalars and vectors-unit vector-vector addition and subtraction - position and distance vectors-vector multiplication-components of a vector  
Coordinate system and Transformation. Introduction-Cartesian coordinates-cylindrical and spherical coordinates

### **UNIT 2 VECTOR CALCULUS**

Differential length, area and volume-line, surface and volume integrals-del operator-gradient of scalar-divergence of vector and divergence theorem-curl of vector and stoke's theorm- Laplacian of a scalar.

### **UNIT 3 ELECTROSTATICS**

Electrostatic Fields Coulomb's law and field intensity-electric field due to continuous charge distributions electric flux density-gauss's law-electric potential-relationship between E and V-Maxwell's equation-an electric dipole-energy density in electrostatics Electric Field and material space Properties of materials-convection and conduction current-polarization in dielectrics- dielectric constant and strength-continuity equation-boundary conditions Electrostatic Boundary Introduction - poission's and laplace's equations-uniqueness theorem-general procedure for solving poission's or laplace's equations

### **UNIT 4 MAGNETOSTATICS**

Magneto-static Fields, Introduction-Biot Savart's law-Ampere's circuital law-magnetic flux density-Maxwell s equations for static EM fields-magnetics scalar and vector potential-derivation of Biot Savart's law and Ampere's law  
Magnetic Forces and Materials  
Force due to magnetic fields-magnetic torque and moment-a magnetics dipole magnetization in materials-magnetic boundary conditions-magnetic energy.

### **RECOMMENDED BOOKS**

Elements of Electromagnetics by Matthew N. O. Sadiku  
Saunders College Publication, 2<sup>nd</sup> edition

### **REFERENCE BOOKS**

- 1 . Electromagnetics theory and its applications by U.Sinha;
2. Introduction to electrodynamics by David J. Griffithe , PHI
3. Elements of engineering electromagnetics by Narayaaa Rao, PHI

## **LIST OF EXPERIMENTS OF SEMESTER I**

1. Study of analog switches.
2. Study of ADC 0800/0808.
3. Study of DAC 0808/DAC. 1008.
4. Study of 8253.
5. Serial data transmission and reception on the same microprocessor kit using 8251.
6. Data transfer between two microprocessor kits using 8251.
7. Interface keyboard and display using 8279.
8. Study of 8255 in simple mode 0.
9. Study of 8255 in mode 1.
10. Study of 8255 in mode 2.
11. Study of interrupts of 8085.
12. Study of interfacing module stepper motor.
13. Study of elevator module in microprocessor kit.
14. Study of traffic light module in microprocessor kit.
15. Understanding DOS commands and windows environment.

## **SEMESTER II**

### **PAPER 5: ADVANCE ELECTROMAGNETICS**

#### **UNIT 1 ELECTROMAGNETIC WAVE & APPLICATIONS**

Maxwell's Equations Faraday's law-transformer and motional emf's-displacement current-Maxwell's equations in final form for MS-time varying potentials

#### **UNIT 2 ELECTROMAGNETIC WAVE PROPAGATIONS**

Plane wave in free space-good conductors-power and the Poynting vector-reflection of a plane wave at normal incidence-reflection of a plane wave at oblique incidence

#### **UNIT 3 TRANSMISSION LINES**

Transmission line parameters-transmission line equations-input impedance, SWR and power-the Smith chart-some application of transmission lines.

#### **UNIT 4 WAVEGUIDES**

Rectangular wave guide-transverse magnetic (TM) modes-transverse electric (TE) modes wave propagation in the guide-power transmission and attenuation-waveguide current and mode excitation-waveguide resonators.

#### **UNIT 5 ANTENNAS**

Hertzian dipole half wave dipole-antenna arrays-quarter wave monopole antenna-small loop antenna characteristics-antenna arrays-effective area and Friis equation-the RADAR equation.

#### **RECOMMENDED BOOKS**

Elements Of Electromagnetics by Matthew N. O. Sadiku  
Saunders College Publication, 2<sup>nd</sup> edition

#### **REFERENCE BOOKS**

- 1 . Electromagnetics theory and its applications by U.Sinha;
2. Introduction to electrodynamics by David J. Griffiths , PHI
3. Elements of engineering electromagnetics by Narayana Rao, PHI



# **PAPER 6: COMMUNICATION ELECTRONICS**

## **UNIT 1 BASIC COMMUNICATION CONCEPTS**

Signal analysis-mixing-noise analysis-phase locked loops-frequency synthesizers-principle of amplitude modulation (AM)- AM circuits-AM receivers-TRF, superheterodyne-AM receivers circuit, RF amplifying-low noise amplifier-mixer/converter-IF amplifier-AM detector, AGC-Single side band systems: AM single side band full carrier-AM independent side band-AM vestigial side-comparison of single side band to double sideband AM- advantage and disadvantage of SSB transmission-single side band generation balanced ring modulator- FET push pull modulator-balanced bridge modulator.

## **UNIT 2 ANGLE MODULATION**

Angle modulation and mathematical analysis-FM and PM waveforms-phase deviation modulation index and frequency deviation-percent modulation-phase and frequency modulators and demodulators-phase representation and average of an angle modulator wave-frequency modulator transmission-direct FM-indirect FM-phase locked-loops FM transmitter.

## **UNIT 3 ANGLE MODULATOR RECEIVERS**

FM receiver FM demodulator-slope detector-balanced slope detector-Foster-Seely discriminator-ratio detector-PLL FM demodulator-amplitude limiters and FM thresholding-limiter circuit~linear integrated circuits FM receivers-mobile telephone service cellular radio-frequency allocation-basic cellular radio concept-electronics switch in center-cellular telephone block diagram-digital cellular radio-TDMA digital cellular standard-code division multiple access(CDMA).

### **RECOMMENDED BOOK: -**

- 1) Electronics Communication Systems: Fundamental through advanced  
By Wayne Tomasi, Pearson Education Asia

### **REFERENCE BOOK: -**

- 1) Elements of engineering electromagnetic by Narayana Rao, PHI

# **PAPER 7: ADVANCE MICROPROCESSORS**

## **UNIT 1 8086**

Block diagram, functional description and pins details-addressing modes, complete instruction set and assembler directives-interrupt processing

## **UNIT 2 Hardware details of 8088**

CPU specifications, CPU pin descriptions, the 8284 clock generator, the 8288 Bus controller, system timing diagrams, personal computer Bus standards.

## **UNIT 3 Memory System design**

The 8088 address and data buses, bus buffering, accessing memory, designing a memory address decoder, partial address decoding, generating wait states, complete RAM/EPROM memory, dynamic RAM interfacing, Direct Memory Access, Memory-Mapped I/O.

## **UNIT 4 8086 software aspects**

- **Introduction to Programming 8086**

Tackling a large programming assignment-writing a software driver-data gathering searching data tables-string operations-sorting-computational routines-control applications-number conversion-data structure-troubleshooting technique

- **Programming with DOS and BIOS function calls**

Introduction-using the keyboard-controlling the video display-controlling the speaker controlling the printer-using the command line interface-additional applications troubleshooting technique

## **UNIT 5 Advance Programming**

Using the EXTRN and PUBLIC directives-using macros-instruction execution times working with interrupt vector-multitasking-memory management-using the mouse-writing a memory resident program-protected mode detection-interfacing C with assembly language-troubleshooting technique

## **UNIT 6 Using DISK and FILES**

Organization of floppy and hard disks-reading and writing disk headers-directory function reading text files-creating a text file-accessing an existing file-miscellaneous file and disk function-troubleshooting technique.

## **RECOMMENDED BOOK**

1. An introduction to the Intel family of microprocessors  
By James L. Antonakos, Pearson Education Asia Publishers
2. Microprocessor and peripheral Vol. I Microprocessor, Intel Corporation

## **REFERENCE BOOKS**

1. The Intel microprocessors 8086/8085, 80186, 80286, 80386 and 80486 Architecture, programming and interfacing by Barry B. Brey, PHI
2. Programming the 80286, 80386, 80486 and Pentium based personal computers by Barry B. Brey, PHI

## **PAPER 8: MS-OFFICE**

### **UNIT 1: MICRO-SOFT WORD 2000**

Starting word 2000, Word processor basics, word wrapping, adding or deleting tools, Selecting blocks of text, Copying text, Moving text, search and replace, editing a document, character formatting and style, Margin settings and columns, Justification of text, Line spacing, Setting tabs, Automatic tasks, Creating letters in readymade formats. Menus in Microsoft word: Menus, Menu bar, Toolbar. Familiarizing with word 2000: Starting MS-2000 word, Introduction to word, guidelines for typing, saving the document, previewing the document, printing the document, closing the word document, changing the size of the document, reducing Microsoft word windows, Maximizing a taskbar button into a windows, Adjusting the Microsoft word windows, Closing document and quitting Microsoft word. Editing the document: Starting Microsoft word, Opening existing word document, Moving cursor, Making changes in your document, Saving changes made to the document, checking spellings in the document, Automatic correction of errors, Printing the file, saving and closing the document, quitting MS-word. Designing your document: Opening windows and Microsoft word, Creating a well formatted document, previewing the document before printing, setting the page numbers on your document, headers and footers, Creating tables, Selecting text using mouse, how to select word, sentence and paragraph, how to select any portion of text, Operations with selection, Inserting rows, Inserting columns, Formatting text, Changing the font size, looking the print preview before printing, closing document and quitting word. Mail Merge: Creating a Mail Merge document, Modifying records in the data source.

### **UNIT 2: MICRO-SOFT EXCEL 2000**

Introduction to spreadsheets, Use of spreadsheets, spreadsheets basics, Labels, Values and Functions, Formula, Functions, What-if analysis, Automatic recalculation, formatting spreadsheet, graphs. Introduction to Excel 2000: Functions of Microsoft Excel, starting MS-excel, Excel work environment, changing the size of work book and excel window, Cell and Cell address, Standard toolbar, Formatting toolbar, the formula bar, status bar, Components of an excel workbook, closing excel workbook without saving, quitting MS-excel. Working in Excel 2000: Moving inside a workbook, Moving the cell pointer quickly, Selecting a command, types of data, Entering data at cell address, Making changes to an entry, saving your workbook, closing the workbook, quitting MS-excel, Mathematical Calculations: Formulas using numbers, Formulas using cell address, Opening MS-excel and entering data, Defining functions, writing a function, Common excel functions, Manipulating data: Moving data, Copying data, Relative cell addressing, absolute cell addressing, Copying values, NOT formula, OR function, deleting rows and columns, Deleting contents of a row, Inserting rows, inserting columns, Automatic filling of entries, quitting MS-excel, Changing the layout: Aligning data, Increasing or decreasing the column width, Increasing or decreasing the height of rows, Erasing the contents of a sheet, Deleting data from the cell address, Setting column width to zero, Values formatting, Points to remember, Closing workbook and quitting excel, Simple Graphs: Drawing a graph, Naming the sheet, saving the workbook, printing and closing a graphic sheet, opening the saved graphic sheet, quitting MS-excel, Database Management: Entering data into database, Modifying a database, Sorting a database, closing workbook and quitting MS-excel, Manipulating Sheets: Adding sheet to a workbook, Adding many sheet to a workbook, renaming a sheet and entering data in it, Moving sheet, Copying data between sheets, Protecting the workbook, Deleting a sheet from a workbook, Saving

the workbook automatically, Closing the workbook, recovering the deleted workbook, quitting MS-excel

**UNIT 3: MICRO-SOFT POWER POINT 2000**

Starting PowerPoint, Creating presentations, Creating presentation using templates, Creating blank presentations, saving presentations.

**RECOMMENDED BOOK:**

1. "Microsoft Office 2000 Complete" by Sybex, BPB Publication.
2. "Peter Norton Complete Guide to Microsoft Office 2000" by Wayne S. Freeze, BPB Publication

## LIST OF EXPERIMENTS FOR SEM II

1. Study of standing waves (V & I).
2. Measurement of VSWR.
3. Study of characteristic impedance  $Z_0$ .
4. To find out unknown impedance.
5. Stb matching
6.  $T_L$  Losses.
7. Study of 8086 microprocessor kit :: lay out, command.
8. To hand assemble the code of small ALP for 8086.
9. Write and Execute the ALP.
10. Exercise the DOS function calls through ALP of 8086.
11. Study of instruction set of 8086.
12. Study of AM modulation and de-modulation circuits.
13. Study of RF amplifier
14. FET push-pull modulator for SSB generation.
15. Study of frequency modulation.
16. Study of PLL.
17. Foster-Seely discriminator Ratio detector
18. Limiters.
19. Linear integrator FM receiver.
20. Study of mobile phone.
21. Exercise on MS-WORD.
22. Exercise on MS-EXCEL.
23. Exercise on MS-POWERPOINT.

### NOTES:

1. Minimum 10 practical from above list are to be performed.
2. Any three will be asked in the practical examination. Each practical will carry 50 marks.
3. Following compulsory project will carry 50 marks.  
"Contraction, testing, working and fault finding of transistorized radio receiver"
4. Total 200 marks are to be allocated for practical examination for semester II. i.e. 150 marks for practical and 50 marks for project.

## **SEMESTER III**

### **PAPER 9: ADVANCE COMMUNICATION**

#### **UNIT 1: INTRODUCTION TO TELECOMMUNICATION**

Digital communication system functional architecture, communication channel, coded and uncoded digital communication system architecture, ISO- OSI network architecture, telecommunication network and service (DNS, TDRSS, GPS, ISDN) iridium.

[ page : 22, chapter 1, digital communication technique by Simon etal, PHI

#### **UNIT 2: DIGITAL TRANSMISSION**

Advantage of digital transmission, pulse modulation, PCM, folded binary code, linear vs. non-linear PCM codes, companding, delta modulation PCM, differential pulse code modulation, pulse transmission

[page : 621- 652 = 31 pages chapter 15 electronics communication system by w. tomasi, Pearson edu.]

#### **UNIT 3: MULTIPLEXING**

. Time division multiplexing, t1 digital carrier system, d- type channel banks, super frame format, ccitt tdm carrier system, combo chips, north American digital hierarchy, t carriers, Frequency division multiplexing AT & T's FDM hierarchy, composite base band signal formation of different groups, hybrid data

[pages 657 - 700 = 57 pages, chapter 16 electronics communication system by w. tomasi, Pearson edu.]

#### **UNIT 4: SIGNAL PROCESSING**

Fourier series, exponential form of Fourier series, examples of Fourier series, the sampling function, Fourier transform, correlation between waveform power and cross correlation, auto correlation.

#### **UNIT 5: INFORMATION THEORY AND CODING**

Discrete message, concept of amount of information, average information entropy, information rate, shanon's theory, channel capacity of a gaussian channel, bandwidth - s/n trade off.

[Principles of communication systems, by taub and schilling, tmh]

#### **UNIT 6: SATELLITE COMMUNICATION**

History, orbital satellite, geostationary satellites, orbital pattern, look angles, classification and frequency allocation, radiation pattern, link models, system parameters, link equations, link budget.

[chapter 18 pages : 30 electronics communication system by w. tomasi Pearson edu]

#### **RECOMMENDED BOOK:**

- (1) Electronics communication system  
By Wayne Tomasi, Pearson Education Asia
- (2) Principles of communication systems  
By Taub and Shilling Mc-Graw Hill

# PAPER 10: THE `C' LANGUAGE

## UNIT 1: BASIC CONTROL STRUCTURE OF C:

- FUNDAMENTALS: What is C, getting started with C, C instruction- the first C program control instructions in C.
- DECISION CONTROL STRUCTURE: THE `if' statement- the `if-else' statement - use of logical operator hierarchy of logical operator - a word of caution - the conditional operator
- THE LOOP CONTROL STRUCTURE: Loops - the "while" loop - the "for" loop - the "do-while" loop - the "break" statement - the "continue" statement - the "do-while" loop
- THE CASE CONTROL STRUCTURE Decision using "switch"- the "go to" statement

## UNIT 2: FUNCTIONS AND DATA TYPES

- FUNCTIONS What is a function- passing values between function- scope rule of function advance features of functions
- DATA TYPES Integers long and short - integer signed and unsigned - chars signed and unsigned- floats and doubles - storage classes in C

## UNIT 3: ARRAYS, STRINGS AND STRUCTURES

- ARRAYS What is array- more on arrays- pointer and arrays- more than one dimensions- array of pointers
- STRINGS What are strings- more about strings- standard library string function - two dimensional array of characters - array of pointers to strings- limitation of array of pointers to strings
- STRUCTURES Why use structures - arrays of structures - additional features of structures use of structures

## UNIT 4: I/O IN C AND HARDWARE THROUGH C

- I/O Types of I/O- console INPUT/ OUTPUT function - disk I/O functions - I/O redirection in DOS
- HARDWARE Of approaches- the CPU registers- interrupts and IVT - inverting ROM BIOS function- unions- the int86 ( ) function - interrupts to access ROMBIOS services - Dos function requests.

## UNIT 5: BITS GRAPHICS AND MORE PROGRAMMING

Bit wise operators - all lines are not same - stylish lines - drawing and 'filling imager - pattern with a difference - why use a bar ( )? Filling regular and non-regular shapes of palette and colours- drawing with mouse - building mouse cursors-freehand drawing using mouse - menus using mouse

### RECOMMENDED BOOK

1. LET US C

BY YASHAVANT KANETKAR

BPB PUBLICATION, 3RD EDITION

# **PAPER 11: ELECTRONIC TECHNIQUES**

## **UNIT 1: USING PCB DESIGNING SOFTWARE**

Run the software - initial settings - preparation of schematics - using library facility and creating library symbols - preparing layouts - auto routing - printing the designed document

## **UNIT 2: HARDWARE DEBUGGING TOOLS**

- Logic state analyzer
- In circuit emulator (working and use of above tools)

## **UNIT 3: TRANSFORMER BASICS**

- PRINCIPLE OF POWER TRANSFORMER DESIGN:-  
Transformer on no load - hysteresis loss - remanent flux density - induced EMF and eddy currents - turns ratio - Volt Sec product -- stacking factor - transformer on load - leakage flux - equivalent circuit.
- POWER HANDLING CAPACITY OF A TRANSFORMER:-  
Voltage equation - power handling capacity - empirical formula for choice of core of a power transformer - window utilization factor - transformer polarities and dot convention - testing for polarity

## **UNIT 4: DESIGN AND MANUFACTURING**

- DESIGN WITH EXAMPLE: -  
Introduction - basic equation - window utilization factor - factors affecting efficiency - winding - winding resistance - calculations for iron loss - temperature rise and thermal design - shielding of transformer - one design example
- MANUFACTURING PROCESS  
Winding - bifilar winding - core assembly - termination - electrical tests - impregnation

## **UNIT 5: SURFACE MOUNT DEVICES:**

Advantages of SMDs, components, SMD production techniques, PC Board Layout, soldering techniques, Automatic components placement unit.

### **REFERENCE:**

Semiconductors : Technical information and characteristic data for students.  
Semen's Aktiengesellschaft Publication.

### **RECOMMENDED BOOKS:**

- 1) UNDERSTANDING PCB DESIGNING SOFTWARE BY DR. H. N. PANDYA
- 2) DESIGN AND TECHNOLOGY OF LOW POWER TRANSFORMER AND INDUCTOR BY DR. N. RADHEKRISHNAN AND DR. S.R. BHAT CEDT - I.I.S.C BANGALOR
- 3) MANUAL FOR LOGAN AND PCICE OF ESA, BANGALORE

### **REFERENCE BOOKS:**

- 1) PRINTED CIRCUIT BOARD BY DR. H. N. PANDYA  
UNIVERSITY GRANTH NIRMAN BOARD GUJARAT STATE



# **PAPER 12: COMPUTER HARDWARE**

## **UNIT 1: THE VISIBLE PC**

How the PC Works: Input, Processing, Output, Storage, the Art of the PC Technician  
Essential Tools of the Trade and ESD Avoidance: Tools of the Trade, Avoiding Electrostatic Discharge, Results of Electrostatic Discharge, Anti-static Tools  
Recognize the Major Components of a PC: CPU, RAM, Motherboard, Case, Power Supply, Floppy Drive, Hard Drive, and CD-ROM Drive, Connectors: DB Connectors, DIN Connectors, Centronics Connectors, RJ Connectors, BNC Connectors, Audio Connectors, USB Connectors, Fire Wire Connectors All Kinds of Connectors: Sound Cards, Video Cards, Network Cards, Keyboard, Mouse, Modem, Printer, Joystick

## **UNIT 2: MICROPROCESSORS**

CPU Core Components: The Man in the Box, External Data Bus, Registers, Clock, Back to the External Data Bus, Memory: Memory Storage Options, RAM: Random Access Memory, Address Bus, Modern CPUs: Manufacturers, CPU Packages, The Pentium CPU: The Early Years, Pentium Pro, Later Pentium-Class CPUs, Pentium II, Pentium III, Early AMD Athlon CPUs, AMD “Thunderbird” Athlon CPUs, AMD Duron, Intel Pentium 4, AMD Athlon XP, Speciality Processors: Intel Xeon Processors, 64-Bit Processing, Mobile Processors, Installing CPUs: Why Replace a CPU?, Determining the Right CPU, Buying a CPU, Preparing to Install, Inserting a Slot 1/Slot A CPU, Inserting a PGA-Type CPU, Testing Your New CPU, The Art of Cooling, Know Your CPUs, Overclocking.

## **UNIT 3: RAM**

DRAM: Organizing DRAM, You Are a Byte Victim!  
RAM Sticks, Part I: DIPPs, 30-Pin SIPPs, 30-Pin SIMMS, SIMM Sticks and Parity, Access Speed RAM Sticks, Part II: 72-Pin SIMMS, Banking, Part I-Filling the Bus, DIMM Improvements in DRAM Technology: EDO, SDRAM, PC100/133 Standards, ECC, Double Pumping, RDRAM, DDR SDRAM, Banking Part II-Dual-Channel, Architecture, Double-Sided SIMMS/DIMMS Installing RAM: Do You Need RAM?, Getting the Right RAM, Installing SIMMS, Installing DIMMS and RIMMS, Installing SO DIMMS in Laptops, The RAM Count Troubleshooting RAM: Testing RAM, MRAM

## **UNIT 4: BIOS AND CMOS**

The Function of BIOS: Talking of the Keyboard, BIOS and Its Relation to Memory Addressing, All Hardware Needs BIOS, CMOS Setup Utilities: Updating CMOS: The Setup Program, A Quick Tour Through a Typical CMOS Setup Program, And the Rest of the CMOS Settings, Modern CMOS, BIOS and Device Drivers: Option ROM, Device Drivers, BIOS, BIOS, Everywhere!, Power-On Self Test (POST): Before and During the Video Test: The Beep Codes, Text Errors, POST Cards, The Boot Process, Boot Configuration

## **UNIT 5: EXPANSION BUS**

Structure and Function of the Expansion Bus: PC Bus, 16-Bit ISA System Resources, I/O Addresses, Interrupt Requests, Direct Memory Access (DMA), Memory Addresses Modern Expansion Bus: False Starts, PCI Installing Expansion Cards: Step 1: Knowledge, Step 2: Physical Installation, Step 3: Assigning Resources to the Card,

Step 4: Device Drivers, Step 5: Verify Troubleshooting Expansion Cards: Device Manager PCI-X and PCI-Express

### **UNIT 6: MOTHERBOARDS**

How Motherboards Work Types of Motherboards: AT Motherboards, The Need for a New Form Factor, Enter ATX Chipset Varieties: Functions, Features, and Expandability Upgrading and Installing Motherboards: Choosing the Motherboard and Case, Installing the Motherboard, Wires, Wires, Wires Troubleshooting Motherboards: SymptomS, Techniques, Options

### **UNIT 7: POWER SUPPLIES**

Understanding Electricity Powering the PC: Securing AC, Supplying DC, Cooling Troubleshooting Power: When Power Supplies Die, Fuses and Fire, It Glows!, Server SystemS and the EPS12V Standard, Active PFC

### **UNIT 8: FLOPPY DRIVES**

Floppy Drive Basics: Formatting, Types of Disks, Drive Size Installing Floppy Drives: Inserting Ribbon Cables, Determining Drive Letters, Connectors, Power, CMOS Floppy Drive Maintenance and Troubleshooting: Repairing Floppy Drives, Other CMOS Options, Radial Misalignment, USB Floppy Drives, USB Flash Memory Drives

Recommended-Book:

1. "PC Hardware" by Michael Meyers, Scott Jernigan. TMH Edition.

Reference-Book

1. "Troubleshooting, Maintaining and Repairing PCs" by Stephen J. Bigelow, TMH
2. "PC Upgrade and Maintenance Guide", Minasi, BPB publication.
3. "Upgrading and Repairing PCs" by Mueller, PHI
4. "Hardware Bible" by W. L. Rosch, Techmedia Publication.

## **LIST OF EXPERIMENTS FOR SEMESTER III**

1. Study of assembling a typical PC
2. Study of HDD, FDD and CD-ROM
3. `C' programming practice
4. `C' programming practice
5. Study of QPSK modulation/demodulation system
6. Phase shift keying, Amplitude shift keying, Frequency shift keying
7. Study of Logic State Analyzer
8. Study of PCICE
9. PCB designing the Schematic and layout
10. Transformer manufacturing practice

### **PROJECT**

Any project given by the in charge teacher

# **SEMESTER IV**

## **PAPER 13: FIBER OPTICS**

### **UNIT 1:-OVERVIEW**

Overview of optical Fiber communication- elementary idea about optical fiber transmission link - optical fiber systems, Optical fibers The nature of light and laws of optical reflection- fiber modes and configuration ray optical representation - wave representation - mode theory - waveguide equation - step index fiber - modal equation - modes in step index fiber - graded index fiber - numerical aperture - modes in graded index fibers

### **UNIT 2:-FIBER FABRICATION**

Attenuation and absorption - scattering and radiation losses - material dispersion - waveguide dispersion - pulse broadening in graded index waveguide - mode coupling Fiber to Fiber joints, Mechanical misalignment - fiber related losses - fiber end face - preparation splicing - fiber connectors.

### **UNIT 3:-OPTICAL SOURCE**

LED - modulation capability - transient response- semiconductor losses - diode structure and threshold conditions - modulation - temperature effects - source linearity and reliability, Photo detectors, PIN photo detector - avalanche photodiode - noise consideration - response time - depletion layer photocurrent - avalanche multiplication noise – materials

### **UNIT 4:-ATTENUATION MEASUREMENTS**

Cutback- optical time domain - reflectometer - fiber fault location - dispersion time domain dispersion measurements - frequency domain measurements

### **UNIT 5:-REFRACTIVE INDEX PROFILE MEASUREMENTS**

End reflection technique - transmitted near field scanning method - refracted near field technique - interferometer of optical source characteristics - response time – distortions

### **RECOMMENDED BOOK:**

1. Optical fiber communication by Cerd Keiser.
2. An introduction to optical. Fiber by Allen H. Cherin.

# **PAPER 14: CIRCUIT SIMULATION USING PSPICE**

## **UNIT 1 CIRCUIT DISCRPTION AND DC ANALYSIS**

Element values, nodes, circuit elements, sources, types of analysis, output variables, PSPICE output commands, format of circuit files, format of output files, Examples of SPICE simulations, Graphical Input Files, Resistors, Modelling of Elements, Operating Temperature, Independent Sources, Dependent Sources, Dc output variables, Types of Output, Types of Dc Analysis.

## **UNIT 2 AC AND TRANSIENT ANALYSIS**

Capacitors and inductors, modelling of transient sources, transient sources, transient output variables, transient output commands, transient response, switches, AC output variables, Independent AC sources, AC analysis, Magnetic Elements, Transmission Lines, Multiple analyses.

## **UNIT 3 ADVANCE SPICE COMMANDS AND ANALYSIS**

Behavioural modelling, .SUBCKT (sub circuit), .ENDS (end of sub circuit), .FUNC (Function), .GLOBAL (Global), .INC (Include File), .LIB (Library File), .NODESET (Nodeset), options, .PARAM (parameter), Fourier Analysis, Noise Analysis, .SENS (Sensitivity Analysis), .STEP (Parametric Analysis), .DC (Dc parameter Sweep), Monte Carlo Analysis, DEV/LOT Device and Lot Tolerances, Sensitivity/Worst-Case Analysis.

## **UNIT 4 SEMICONDUCTOR DIODES AND BJT ANALYSIS**

Diode Characteristics, Analysis of Diode Circuits, Diode Model, Diode Statement, Diode Parameters, Examples of Dc, Ac and Transient Analysis, BJT Model, BJT statements, BJT Parameters, Examples.

## **UNIT 5 FET AND OP-AMP CIRCUITS ANALYSIS**

Junction Field-Effect Transistors, JFET Parameters, Examples of JFET Amplifiers, MOSFET, Some MOSFET Parameters, Examples of MOSFET Amplifiers, Gallium Arsenide MESFETs, Dc Linear Models, Ac Linear Models, Nonlinear Macromodel.

## **UNIT 6 DIGITAL LOGIC CIRCUITS ANALYSIS**

Digital Devices and Nodes, Digital Primitives, Digital Gates and Timing Models, Flip – Flops and Latches, Pullup and Pulldown, Delay Line, Stimulus devices, digital input and output, examples of digital logic circuit.

## **RECOMMENDED BOOK**

- 1) Spice for circuits and electronics using PSPICE  
by M.H. Rashid PHI second edition

# **PAPER 15: ADVANCE COMPUTER HARDWARE**

## **UNIT 1: HARD DRIVE TECHNOLOGIES**

Historical/Conceptual, How Hard Drives Work: Data Encoding, Moving the ArMS, Geometry, Hard Drive Interfaces: Parallel ATA, Serial ATA, BIOS Support: Configuring CMOS and Installing Drivers: CMOS, Device Drivers, Protecting Data with RAID, Troubleshooting Hard Drive Installation, Partitioning and Formatting Hard Drives: Partitioning, Formatting, Beyond A+: Spindle (or Rotational) Speed, S.M.A.R.T

## **UNIT 2: CD AND DVD MEDIA**

CD Media: How CD-ROMS Work, CD-ROM Formats, CD-ROM Speeds, CD-R, CD-RW, Music CDs, DVD Media: DVD-Video, DVD Players, DVD-ROM, Recordable DVD, Installing CD and DVD Media Drives: Connections, Device Drivers, Device Manager, Auto Insert Notification, Applications, Booting to CD-ROMS, Troubleshooting: Installation Issues, Burning Issues, Firmware Updates, Color Books

## **UNIT 3: VIDEO**

CRT and LCD Displays: CRT Monitors, LCD Displays, Common Features, Power Conservation, The Video Card: Modes, Resolution, Color Depth, and Memory Requirements, Accelerated Graphics Port, Graphics Processor, Video Memory, Installing and Configuring Video Software: Drivers, Using the Display Applet, Working with Drivers, 3-D Graphics, Troubleshooting Video: External Adjustments, Internal Adjustments, Common Monitor Problems, Video and CMOS.

## **UNIT 4: SCSI**

SCSI Chains: SCSI IDs, Termination, SCSI Flavors, SCSI-1, SCSI-2, SE, HVD, and LVD SCSI, SCSI-3, Last Notes on Termination, Bus Mastering, SCSI Cables and Connectors, SCSI Performance, Troubleshooting SCSI: Power and Connectivity, Boot Firmware, Memory Chips, Storage, I/O, Device Drivers, Costs and Benefits of SCSI: SCSI vs. IDE, Serial-Attached SCSI.

## **UNIT 5: SOUND**

How Sound Works in a PC: Sound-Capture Basics, Recorded Sound Formats, Playing Sounds, MIDI, Other File Formats, Video, Applications, Streaming Media, Getting the Right Sound Card: Processor Capabilities, Speaker Support, Recording Quality, Jacks, Extra Features, Audio Cables, Speakers, Installing a Sound Card in a Windows System: Physical Installation, Installing Drivers, Installing Sound Programs, Installing Applications, Troubleshooting Sound: Hardware Problems, Configuration Problems, Application Problems, Sound Card Benchmarking.

## **UNIT 6: PORTABLE PCs**

Portable Computing Devices: Desktop Replacements, Desktop Extenders, PDAs, Enhance and Upgrade the Portable PC: PC Cards, Limited-Function Ports, General-Purpose Ports, The Modular Laptop, Managing and Maintaining Portables: Batteries, Power Management, Cleaning, Heat, Centrino Technology, Express Card.

## **UNIT 7: PRINTERS**

Printer Technologies: Impact Printers, Inkjet Printers, Dye-Sublimation Printers, Thermal Printers, Laser Printers, Critical Components of the Laser Printer, Printer Languages, Printer Connectivity, The Laser Printing Process: The Physical Side, The Electronic Side of the Process, Installing a Printer in Windows: Setting Up Printers  
Troubleshooting Printers: General Troubleshooting Issues, Troubleshooting Inkjet Printers, Troubleshooting Laser Printers, DOT4.

## **UNIT 8: NETWORKING**

Networking Technologies: Packets/Frames and NICs, Coaxial Ethernet, UTP Ethernet (10 Base T), Fiber Optic Ethernet, Token Ring, Parallel/Serial, Network Operating System: Network Organization, Protocols, Client Software, Server Software, Installing and Configuring a Wired Network: Installing a NIC, Configuring a Network Client, Configuring Simple Protocols, Configuring TCP/IP, Sharing and Security, Installing and Configuring a Wireless Network: Wireless Networking Components, Wireless Networking Software, Wireless Network Modes, Wireless Networking Security, Speed and Range Issues, Wireless Networking Standards, Configuring Wireless Networking, Connecting to the Internet: Dial-up, Digital Subscriber Line (DSL), Cable, LAN Wireless, Satellite, Troubleshooting Networks: Verify the Symptom, When Did It Happen?, What Has Changed?, Check the Environment, Reproducing the Problem, Isolating the Symptom, Separating Hardware from Software, Research, Make the Fix and Test, Mike's Four-Layer Model, Bluetooth.

### Recommended-Book:

1. "PC Hardware" by Michael Meyers, Scott Jernigan. TMH Edition.

### Reference-Book

1. "Troubleshooting, Maintaining and Repairing PCs" by Stephen J. Bigelow, TMH
2. "PC Upgrade and Maintenance Guide", Minasi, BPB publication.
3. "Upgrading and Repairing PCs" by Mueller, PHI
4. "Hardware Bible" by W. L. Rosch, Techmedia Publication.

# **PAPER 16: MICROWAVE ELECTRONICS (OPTIONAL I)**

## **UNIT 1:**

Introduction, definition of microwave, characteristic features, application of microwave

## **UNIT 2:**

Generation of microwave by vacuum tube - limitation of conventional tubes klytron amplifier-reflex klystron oscillator, magnetrons-traveling wave tubes

## **UNIT 3:**

Generation of microwave by solid state devices, bipolar transistor field effect transistors, gunn oscillator, avalanche diode, oscillator, IMPATT & TRPATT mode of operation parametric amplifiers.

## **UNIT 4:**

Microwave integrated circuit design, introduction, hybrid microwave integrated circuits (HMIC), monolithic microwave integrated circuit (MMIC), MIC materials, substrate material, conductor material, dielectric materials, resistive films, types of mics, microwave monolithic integrated circuits (MMIC'S).

## **UNIT 5:**

Waveguide and waveguide component, concept of waveguide, advantage of hollow wave guide, reflection from a metal surface, field pattern obtained by oblique reflection, higher order modes, waveguide dimensions, impedance matching elements, waveguide short circuit, tees and magic tee, phase shiftless, attenuators, matched terminators, waveguide slotted section, PIN diodes, PIN diode switches

## **UNIT 6:**

Microwave measurement techniques, standing wave measurements, impedance measurement, cavity resonator, cavity  $\sigma$ . frequency measurements and calibration techniques, dielectric measurements.

## **RECOMMENDED BOOKS:**

### **1. MICROWAVE DEVICES AND CIRCUITS**

S. Y. LIAO, PHI

### **2. INTRODUCTION TO MICROWAVE THEORY AND MEASUREMENTS**

L.A. LANCE TMH

### **3. RADIO FREQUENCY AND MICROWAVE ELECTRONICS**

M.M. RADMANESH PEARSON



## **PAPER 16: POWR ELECTRONICS (OPTIONAL II)**

### **UNIT 1 : POWER DEVICES :**

- BJT Power transistors:
- Power MOSFETS
- SITs, IGBTs, series and parallel operators.
- di/dt and dv/dt limitation, Isolation of Base drivers.
- Typical IGBT component: HGTIS6N4OE1 / HGDT6N4OEIS/  
HGDT6NSLE1/ HGDT6NSOELS.
- 6A 400V and SOOv N-Channel IGBT.
- General description Package type, terminal diagram, test circuit.

### **REFERENCE:**

1. Power electronics: Circuits, devices and application.  
By : Muhammed H. Rashid, PHI, Second Edition.
2. MCT/IGBTs/DEVICES/ (Data Manual)  
Harris Semiconductor, 1995.

### **Unit 2: advance circuits :**

- Inverters, choppers, dual Converters, cycloconverter.

### **UNIT 3: Thyristor control circuits:**

Temperature Control, illumination Control, Application of TRIAC AS A three - Position static switch, Light activated turn off circuit using DIAC-TRIAC and LDR, OFF at dark circuit Automatic Street lighting circuit using LDR and SCR, emergency Light using SCR, Automatic Water level indicator using SCR, automatic battery chargers using SCR, Light operated SCR alarm, burglar alarm circuit using SCR, Direct current circuit breaker using SCR, battery operated inverter circuit using power transistor, SCR-UJT operated time circuit.

### **REFERENCE:**

1. Industrial electronics and control.  
By : Bhattacharya, Chatterjee, TMH, New Delhi.

# **PAPER 16: BIOMEDICAL INSTRUMENTATION (OPTIONAL PAPER III)**

## **UNIT I: HUMAN BODY**

The cell - body fluids - musculoskeletal system - respiratory system - Gastrointestinal system - nerves system -- endocrine system - the circulatory system - the body as a control system

### **ELECTRODES, SENSER AND TRANSDUCERS**

Electrodes for biophysical sensing - medical surface electrodes - micro electrodes

### **BIOELECTRIC AMPLIFIERS**

Bioelectric amplifiers - basic amplifiers configuration -- multiple input circuits- differential amplifiers-isolation amplifiers

## **UNIT 2: ELECTROCARDIOGRAPHY**

The heart as potential source - the ECG waveform - the standard lead system - other ECG signals - the ECG preamplifier - ECG readout devices ECG machine maintenance and troubleshooting

### **PRESSURE MEASUREMENTS**

Blood pressure measurements - blood flow measurement phonocardiography – defibrillator circuit - pacemaker

## **UNIT 3: BRAIN FUNCTION MEASUREMENT**

Brain scan - electro encephalograph - ECG block diagram - preamplifier and ECG system specifications

## **UNIT 4: MEDICAL LABORATORY INSTRUMENTS**

Blood - blood tests - colorimeter - flame photometer- blood cell counter pH/ blood gas analyzer - chromatography - hem dialysis and machine

## **UNIT 5: MEDICAL ULTRASONOGRAPHY**

What is ultra sound -- physics of sound and waves - reflection - refraction, diffraction and scattering - specular reflection - diffuse reflection and scattering - ultra sound transducers -absorption and attenuation of ultrasound energy - scan modes and scanning systems - electronically scan phase array transducers.

## **RECOMMENDED BOOKS**

1. INTRODUCTION TO BIOMEDICAL EQUIPMENT TECHNOLOGY

BY JOSPH J. CARR AND JOHN M. BROWN

PEARSON EDUCATION ASIA PUBLICATION 4th EDITION

## **REFERENCE BOOK:**

1. BIOMEDICAL INSTRUMENTATION BY KHANDPUR TMH PUBLICATION

## **PAPER 16: ROBOTICS (OPTIONAL PAPER IV)**

### **UNIT 1. INTRODUCTION:**

Robotics and programmable automation, historical background, laws of robotics, robot definition, robot anatomy and systems, human systems and robotics. specification of robotics

### **UNIT 2. ROBOT KINEMATICS**

Introduction, forward and reverse kinematics of three degree of freedom robot arm, forward and reverse transformation of a four degrees of freedom manipulator in 3-D, homogeneous transformations kinematic equation using homogeneous transformations.

### **UNIT 3. ROBOT DRIVES, ACTUATORS AND CONTROL**

Function of drive systems, general types of fluids, pump classification, pneumatic system, electrical drives, DC: motors, stepper motor and drives mechanisms

### **UNIT 4 ROBOT END-EFFECTORS**

Classification of end-effectors, drive system for grippers, mechanical, magnetic, vacuum and adhesive grippers, hooks, scoops and others devices, active and passive. Grippers

### **UNIT 5 SENSORS AND INTELLIGENT ROBOTS**

Artificial intelligence and automated manufacturing, AI and robotics, need for sensing systems, sensory devices, types of sensors, robot vision systems

### **UNIT 6 ROBOT LANGUAGES AND PROGRAMMING**

Different languages, classification of robot languages, computer control and robot software, VAL systems and languages

#### **RECOMMENDED BOOKS:**

1. ROBOTICS TECHNOLOGY AND FLEXIBLE AUTOMATION BY S.R. DEB  
FROM TATA Mc GRAW HILL

#### **REFERENCE BOOKS:**

1. ROBOTICS PRINCIPLES AND PRACTICE

BY DR. K.C. JAIN AND DR. L.N. AGGARWAL FROM KHANNA PUBLISHERS

2. INTRODUCTION TO ROBOTICS, MECHANICS AND CONTROL

BY JOHN J. CRAIG FROM ADDISON WESLEY;

## **LIST OF EXPERIMENTS FOR SEMESTER IV**

1. Study of fiber optics kit (if available).
2. PSpice practice on DC circuits.
3. PSpice practice on Diode and BJT circuits.
4. PSpice practice on FET and Op-Amp circuits.
5. PSpice practice on Digital circuits.
6. PSpice practice on Mix circuit.
7. Study of printer.
8. Study of Networking.
9. Study of Client-server Installation.
10. Study of typical Wireless Network.
11. Experiment on microwave application.
12. Study of IGBTs.
13. Study of Diac, Triac, and SCR.
14. To construct an Robot using robotic kit.