M.Sc. Electronics **Prospectus No. 20131215**

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

विज्ञान विद्याशाखा
(FACULTY OF SCIENCE)

अभ्यासक्रमिका
विज्ञान पारंगत सत्र-१ व २ परिक्षा २०१२-१३
विज्ञान पारंगत सत्र ३ व ४ परिक्षा २०१३-१४

PROSPECTUS

OF
MASTER OF SCIENCE IN
ELECTRONICS
Semester -I, Winter 2012
Semester-II, Summer-2013
Semester-III, Winter-2013
Semester-IV, Summer-2014

2012

(Visit us at www.sgbau.ac.in)

Price Rs.12/-

PUBLISHED BY
Dineshkumar Joshi
Registrar
Sant Gadge Baba
Amravati University
Amravati-444602

INDEX

M.Sc. (Electronics) Prospectus No.20131215

Syllabus Prescribed for

M.Sc. Semester-I to IV (Electronics)

M.Sc. Electronics is divided into four semesters which include 16 theory papers, 7 practicals with internal assessment & project work.

Assessment of each theory course is done centrally in the University by the University.

Internal assessment for each practical will be carried out on the basis of (a) Practical record & viva-voce for Practical-I, III, V & VII, (b) *Seminar for Practicals-II, IV, VI & project work.

Internal Assessment for each seminar course will be carried out on the basis of minimum 4 (four) seminars, presented by the students in perodic manner with relevant technical coverage in each seminar, marks for seminar course will be awarded on the overall performance of the student.

The external examination shall consist of-

(a) Theory course ..... Written Examination.
(b) Pracitcal course ..... Practical Examination & viva-voce.
(c) Seminar course..... Oral presentation followed by the questions-answers.
(d) Project ..... Oral presentation followed by the questions-answers.

Distribution of Marks for Project shall be as under.

(i)	Project (Experimental)	:	60 Marks
(ii)	Guide Report	:	20 Marks
(iii)	Project Record	:	20 Marks
	Total		**100 Marks'**

- **Project :**

Executation and documentation of a project on a specific topic with one of the following aspects :

(i) Part of on-going research projects in the deptt.
(ii) Developmental work related to Industrial requirements.
(iii) Theoritical & experimental studies.
(iv) Technical writing & project documentation.

- **Seminars :**

Seminars on topic of current relevance covering following aspects:

(i) Collection of reference material.
(ii) Assimilation of concepts of preparing document.
(iii) Communication skills.
(iv) Presentation styles & use of modern teaching aids.
(v) Appraisal & evaluation of delivered seminars.

2) (a) Practical-I,III,V and VII
and
(b) Practical-II,IV & VI.

One Experiment	- 60 Marks
Practical Record	- 20 Marks
Viva-voce	- 20 Marks
Total	**- 100 Marks**

M.Sc. First Year Electronics
Semester-I

Paper-I	:	1ELE1-Fundamentals of Semiconductor Devices
Paper-II	:	1ELE2- Instrumentation and Measurement Techniques
Paper-III	:	1ELE3-Biomedical Instrumentation
Paper-IV	:	1ELE4: Optical Electronic Devices and Applications
Practical-I	:	Atleast 8 Experiments based on Paper-I & II
Practical-II	:	Atleast 8 Experiments based on Paper-III & IV

M.Sc. First Year Electronics
Semester-II

Paper-V	:	2ELE1-Analog Circuit Design And Analysis
Paper-VI	:	2ELE2-Microprocessor and Microcontroller
Paper-VII	:	2ELE3-Digital IC'S & Design
Paper-VIII	:	2ELE4- Mechatronics
Practical-III	:	Atleast 8 Experiments based on Paper-V & VI
Practical-IV	:	Atleast 8 Experiments based on Paper-VII & VIII

M.Sc. Second Year Electronics
Semester-III

Paper-IX	:	3ELE1- Antenna and Mobile Communications
Paper-X	:	3ELE2-Power Electronics

Paper-XI : 3 ELE 3-Advanced Microcontroller and Embedded system

Paper-XII : 3ELE4 - Computer Hardware and Interfacing

Practical V : Atleast 8 Experiments based on Paper-IX & X

Practical VI : Atleast 8 Experiments based on Paper-XI & XII

M.Sc. Second Year Electronics

Semester-IV

Paper-XIII : 4 ELE 1- VLSI Design and VHDL Programming

Paper-XIV : 4ELE2- Virtual Instrumentation

Paper-XV : 4ELE3- Numerical Methods and C Programming

Paper-XVI : 4ELE4- Fuzzy logic and Neural Networks

Practical-VII : Atleast 8 Experiments based on Paper-XIII, XIV, XV & XVI

Project Work : Practical-VIII

Sem-I/ paper -I

1ELE1-Fundamentals of Semiconductor Devices

Unit I : Conduction in semiconductor : semiconductors, brief idea about band theory of semiconductor, conduction mechanism, carrier concentration and mobility, effect of temperature on electrical conductivity , intrinsic semiconductors , carrier concentration in an intrinsic semiconductor , conduction and valance band , carrier concentration in terms of band gap ,electrical conductivity, generation and recombination of charges, extrinsic semiconductor- P type and N type , Hall effect

Unit II : Junction and Interface: p-n junction , linearly graded and abrupt junctions, diode equation , static I-V characteristics, break-down mechanisms in pn-junction , dynamic behaviour of pn -junction, effect of temperature on pn-junction diode.

Unit III : Special Semiconductor Devices : Gunn effect and diode, zener effect and zener diode, Tunnel diode, PIN diode, varactor diode schottky diode.

Unit IV : Bipolar and unipolar semiconductor devices: Bipolar junction transistor(BJT) , principle of operation , fabrication methods and doping profile , analysis of ideal and real transistor, static I-V characteristics in active region , charge

control equation .Junction and metal semiconductor field effect transistors, principle of operation , I-V characteristics, MOSFET -basic structure and operating principle,I-V characteristics, charge coupled devices, MESFET's.

Unit V : Semiconductor Technology & Measurements: semiconductor devices & integrated circuit technology, wafer preparation , doping , growth of dielectric layers, masuring and lithography , pattern definition , methods of isolation planner technology Semiconductor measurements : conductivity, resistivity, Hall effect measurements, drift mobility, minority carrier life time, diffusion length.

Recommended Books :

1) Sanjeev Gupta : Electronic Devices and Circuits

2) B. L . Thereja : Principles of EDC

3) Jacob Millman : Mmicroelecronics (2nd edition)

Sem -I/ PAPER II

1ELE2- Instrumentation and Measurement Techniques

Unit I : Display Devices and Printers

Digital display system and indicators , classification of displays , display devicesn, LED, LCD , touch screen displays, Printers : Classifiction , printer character set , Drum printer , Dot matrix printers, character at a time Dot matrix Impact printer, Non- Impact Dot matrix (NIDM) printer .

Unit II : Digital Instuments

Digital multimeters , Digital frequency meter , Digital Tachometer, Digital pH meter , Automation in Digital Instruments , Digital phase meter ,

Digital capacitance meter , Microprocessor based Instrumentation .

Unit III : General Electronic Test Equipment

Cathode -Ray oscilloscope, Digital voltmeter & multimeter , Electronic counters , AC milivoltmeter , wave analyzers and spectrum analyzer , signal generators ,lock in amplifiers , Frequency response analyzer.

Unit IV : Transducers and Signal conditioning

Electrical transducers, Resistive transducers , Strain Gauges , Thermister , LVDT , Piezo electric transducer, Temperature transducers , Mechanical transducers.

Itroduction of signal conditioning, block diagram of signal conditioning , Types of filters.

Unit V : Measurement set-up

Measurement of microwave frequencies , Resonant co-axial lines , cavity wavemeters , RF/UHF field srength meter , measurement of sensitivity, intermodulation method , measuring frequency response in Audio amplifires , measuring amplitude moduation using CRO .

Recommended Books :

1) H. S. Kalsi : Electronic Instrumentation
2) Malestat: Electronics Measurements.
3) G. R. Sarma Instrumentation devices & Systems (2nd edition)
4) E.B.Doblin : Measurement Systems,Application and Design
5) Villiam D. Cooper : Modern Electronic Instrumentation & Measurement techniques

Sem-I/ Paper III

1ELE3-Biomedical Instrumentation

Unit I : Fundamentals of Biomedical Instrumentation:

Basic medical instrumentation system , Performance requirements of Medical Instrumentation System , Intelligent Medical Instrumentation System, biometrics.

Unit II : Bioelectric Signals and Electrodes:

Origin of Bioelectric signals , Recording Electrodes , Silver-Silver Chloride Electrodes , Electrodes for ECG , EEG and EMG .

Unit III : Biomedical Recorders:

Electrocardiograph (ECG), vectorcardiograph (VCG) , Phonocardiograph (PCG), Electroencephalograph (EEG) , Electromyograph (EMG) ,cardiac pacemakers .

Unit IV: Magnetic Resonance Imaging System :

Principles of NMR Imaging System , Image Reconstruction Techniques , Basic NMR Components , Biological Effect of NMR Imaging , Advantages of NMR , Imaging System ,principle of MRI.

Unit V : Radio-therapy Equipment :

Use of high voltage X-ray Machines , Development of Betatron , Cobolt-60 Machine , Medical Linear Accelerator Machine , X-ray tomography, short wave , micro-wavand surgical diathermy.

Recommended Book:

1) R. S. Khandpur (2nd Addition) (McGrawHill publication) : Biomedical Instrumentation

Sem I / PAPER IV

1ELE4: OPTICAL ELECTRONIC DEVICES AND APPLICATIONS

Unit I : Introduction

Classification of optical fiber ,Principal of light transmission through fiber,Fabrication of optical fibers ,Material consideration ,Loss and band width limiting mechanism , Mechanical and thermal characteristics , Light sources for fiber optics , Photo detectors , Source coupling , Splices and connectors.

Unit II : Fundamental of Optics

Polarization ,diffraction , interference , dispersion holograms. Optical Sources: Light Emitting Diodes (LEDs) : Structure, Materials, Characteristics, Efficiency.

Liquid Crystal Display (LCD)

Unit III : Photo Detectors

Thermal detectors ,Photo detectors, Vacuum photo diode, Photo multiplier tube Photo conductive detector, LDR, PIN diode.

Unit IV : Optical Instruments

Optical pyrometer , Infrared thermometer , Polarimeter , Light intensity meter Spectro photo meter , Spectrum analyzer , X-ray fluoroscopic instruments,
Periscope, Optical filters ,Beam splitters.

Unit V : Lasers

Different types of lasers : Gas laser, Liquid lasers, Semiconductor lasers.

Use of Lasers : For measurement of distance , For measurement of velocity , For measurement of acceleration, For measurement of length.

Industrial Application of Laser : Laser heating, Laser melting, Laser welding.

RECOMMENDED BOOKS

1. Optical fiber Communication by John M Senior, Prentice Hall of India, New Delhi

2. Optical fiber Communication by J. Gower , Prentice Hall of India, New Delhi
3. Optical fiber Communication by ' Gerd Keiser, McGraw Hill International Editions
4. Optical Communications – Components and Systems by JH Franz and VK Jain, Narosa Publishing House, New Delhi
5. Optical fiber Communication Systems by GP Agrawal, John Wiley & Sons, New Delhi
6. Optical fiber Communication and its Applications by S C Gupta, Prentice Hall of India, New Delhi

Sem-II/ Paper V

2ELE1-Analog Circuit Design And Analysis

Unit I : **Operational Amplifiers :** Difference Amplifier, Op-amp- block diagram , schematic symbol , Characteristics of Op-amp , the ideal Op-amp ,equivalent circuit , open-loop Op-amp configurations.

Unit II : **Op-amp with Negative Feedback :**Block digram of feedback configurations , voltage-series feedback ampifier ,voltage-shunt feedback amplifier ,Differential amplifiers , output resistance and bandwidth of differential amplifires with feedback.

Unit III : **Frequency Responce and Linear applications of Op-amp :**

Open loop voltage gain as a function of frequency , closed loop frequency response ,circuit stability , slew rate ,DC and AC amplifiers , Differential I/P and O/P amplifier , voltage to current convertor with floating load and grounded load , current to voltage convertor , the Integrator , Diffrentiator , Adder and Subtractor .

Unit IV : **Active Filters, Comparators and convertors :**

Active filters , First and second order Low -passand High-pass Butterworth filter , Band-Pass filters , Basic comparator , Zero crossing detector , Schmitriger , comparator characteristics , limitations of comparator , window detector , voltage to frequency and frequency to voltage convertor , Clippers & Clampers, A to D convertor and D to A convertor.

Unit V : **Specialized IC Applications :**

The 555 timer as Monostable, Astable & Bistable multivibrator. PLL : operating principles, monolithic PLL , 565 PLL applications. Voltage Regulators : fixed voltage regulator , Switching regulators , Special regulators.

Recommended Books :

1) Ramakant Gaikwad : Linear Integreted Circuits
2) Analog & Digital techniques: Navneeth,Kale & Gokhale

Sem-II/ Paper VI

2ELE2-Microprocessor and Microcontroller

Unit I : Introduction: Features , Atchitecture of 8086 , Addressing modes : Register and Immidiate Modes, Addressing modes for Accessing data in Memory(Memory Modes) , Addressing Modes Accessing I/O Ports(I/O Modes) Relative Addressing Mode, Implied Addressing Mode,Instruction Set.

Unit II : System Configurations: Pin Diagram of 8086 , Minimum Mode : Pin definitions in minimum mode,Minimum Mode Configuration, Bus Timing for Minimum Mode, Maximum Mode: Pin Definitions in maximum mode,Maximum mode Configuration, Bus Timing For Maximum mode. Input/output Interfacing: I/O mapped I/o , memory mapped I/O.

Unit III : 8051 Microcontrollers: Microcontrollers and embedded processors, overview of the 8051 family, Inside 8051, 8051 flag bits and the PSW register, 8051 register banks and stack, the program counter and ROM space in the 8051, Data types and Directives.

Unit IV : I/O Port programming & Addressing Modes : Pin description of the 8051,Addressing modes: Immidiate & register addressing mode, Accessing Memory using various addressing modes , Bit Addresses for I/O and RAM,Introduction to 8051 Assembly programming, Assembling and running an 8051 program.

Unit V : JUMP,LOOP, and CALL Instructions: Loop and jump instructions, Call inctructions , Time delay for various 8051 chips. ARITHMATIC, LOGIC INSTRUCTIONS: Arithmatic instructions, signed number concepts and arithmatic operations, Logic and compare instructions, Rotate instruction and data serialization.

Recommended Books:

1) A.P. Godse : Microprocessor Techniques 8085 & 8086
2) B.Ram : Microprocessor 8085 & 8086
3) Muhammad Ali Mazidi : The 8051 Microcontroller and Embedded Systems

Sem-II/Paper VII

2ELE3-Digital IC'S & Design

UNIT-I : Combinational Logic Design:

Function of binary variables, Boolean Algebric theorems, standard form of logical functions, K-map up to five variables, Quine Mcclusky method, Don't care conditions and it's effects, Synthesis using AND - OR gates.

UNIT-II : Combinational logic design using 74/54 series MSI chip series concerning to multiplexers, demultiplexers, decoders, encoders, comparators, code converters, priority encoders parity generator/ checker & BCD-Seven segment decoder.

UNIT-III: Combinational logic design using ROM array, PLA, PAL, preliminary design concepts using FPGA's N-bit binary adder using 7480, Look-ahead carry adder construction.

UNIT–IV: Design of counter and sequential networks: Analysis of clocked sequential networks, General models of sequential machines, Equivalence and minimization networks, Deviation of state graph and tables, reduction of state assignments, S.M.Chart.

UNIT-V : Analysis of asynchronous sequential networks, derivation and reduction of primitive flow tables, state assignments and realization of flow tables, hazards, asynchronous sequential network design.

Recommended Books:

1. Charles H. Roth : "Fundamental of Logic Design" , 4th ed. Jaico Publication.
2. Lee S.C. : "Digital Circuit and Logic Design", Prentice Hall of India Pvt. Ltd., New Delhi
3. Jain R.P. : "Modern Digital Electronics Circuits and Systems", Macmillan Press, London
1. Fleatcher : An Engineering approach to Digital System Design ", PHI
2. Morris N.M. : "Digital Electronics Circuits & Systems", Mac millan Press, London
3. Digital IC reference data manual
4. Texas Instru. Incorporated : Designing with TTL IC's.
5. Parag K. Lala : Fault Tolerant and Fault Testable Hardware Design, B.S. Publication, Hydrabad

Sem-II / Paper -VIII

2ELE4- Mechatronics

Unit I : Mechatronics:

What is mechatronics , design process, systems, measurement systems, control systems, Programmable logic controller.

Unit II : Closed loop Controllers:

continuous and discrete control processes , Terminology , Two step mode , Proportional mode , Derivative control , Integral control , PID controller , Digital controllers , Controller tuning , velocity control, Adaptive control.

Unit III : Programmable Logic Controller :

Programmable logic controller , basic PLC structure , I/P- O/P Processing , Ladder programming , Instruction lists ,latching and integral relays , sequencing , timers and Counters, Shift registers, Master and jump controls, data handling.

Unit IV : Communication Systems :

Digital communications , Centralised , Hierarchical and Distributed control, Networks, Protocols, open systems Interconnection communication model, Serial Communication interfaces, Parallel Communication Interfaces, Wireless protocols

Unit V : Fault Finding :

Fault - detection Techniques , Watchdog timer , Parity and error coding checks, Common hardware faults, Microprocessor Systems, Emulation and simulation, PLC systems.

Recommended Book:

1) W. Bolton (4th edition) : Mechatronics

SEM –III/paper IX

3ELE1- Antenna and Mobile Communications

Unit I : Antennas

Theory and design of antennas, Antenna parameters - radiation, current elements, radiation resistance, antenna gain, directivity, effective length, antenna aperture; reciprocity theorem

Unit II : Antenna types

Short dipole antenna, antenna arrays: two-element arrays, broadside and end fire arrays, linear arrays, binomial arrays, folded dipole, Yagi-Uda array; traveling wave antenna, rhombic antenna, V-antenna; Horn Antennae, parabolic reflectors, helical antenna, lens antenna, micro-strip and antenna; antenna measurements such as impedance, radiation pattern, gain, antennas for mobile communication

Unit III : Mobile Communications

Cellular concepts: Introduction to cellular mobile systems, frequency reuse, channel assignment and land off strategy, elements of cellular radio system design, switching and traffic, data links and microwaves, system evaluation

Unit IV : Mobile Radio Environment

Causes of propagation loss, causes of fading; modulation techniques – BPSK, QPSK, QAM and GMSK; fundamentals of equalization, space polarization, frequency and time diversity techniques, channel coding

Unit V : Multiple access Techniques

Introduction to digital system, digital cellular system, GSM & CDMA systems- service features, GSM architecture, GSM channel types, GSM frame structure, intelligent cell concept and applications; Features of handset, SMS, security; Interfacing of mobile with computer, application of mobile handset as modem, data storage device, multimedia device; Measurement of signal strength.

Recommended Books:

1. Mobile Cellular Telecommunication: William C. Y. Lee (MGH Inc., 1995)
2. Mobile communication : Jochen Schiller (2nd edition, Pearson Education, 2004)
3. Electromagnetic waves and radiation systems: E. C. Jordan and K.E. Balmain
4. Antennas; J. D. Krauss (2nd edition, TMH, New Delhi, 1999)
5. Handbook of Antenna: Jasik
6. Wireless Communications and networking : Jon W. Mark & Weihua Zhuang
7. Antennas and Radiowave Propagation: R. E. Collin (MGH, International Edition)
8. Wireless Digital Communications: Modulation and Spread Spectrum Applications: Dr. Kamilo Feher (PHI, New Delhi, 1999)

9. Antenna Theory: Analysis and Design : Balanis (2nd edition, Wiley Eastern India

Sem-III/Paper X

3ELE2-Power Electronics

Unit-I : Power Electronic Systems

Introduction-History, Applications and Interdisciplinary Nature.

Power Electronic Systems Block Diagram , Types of Converter Circuits, Peripheral Effects ,Thermal Management and Design Aspects.

Performance Parameter such as Efficiency, Total Harmonic Distortion, Power Factor and Reliability.

Unit-II : Power Devices :

Ideal Requirements For Power Electonic Devices.

Construction, Principle of Operation , I-V Characteristics ,Specifications and Ratings, Selection Criteria and Applications , Turn On and Turn Off Methods .

i) Power Diodes-PIN DIODE, SHOTTKEY DIODE,
ii) Thyristor Devices-SCR,TRIAC,GTO,
iii) Power Transistor Devices-POWER BJT,POWER MOSFET,IGBT

Camparison Of all Power Devices

Unit-III : Rectifiers ,AC Controllers and Resonant Converter

Rectifiers: Performance Parameters, Single Phase Bridge Rectifier with R and RL Load,Three Phase Bridge Rectifier with R and RL Load, Three Phase Fully Controlled Bridge Rectifier with R and RL Load,Camparison of all Rectifier Circuits.

AC Controllers : Principle of on-of and Phase Control,Single Phase Bidirectional Controller with R and RL Load, Three Phase Bidirectional Controller ,Cycloconverter.

Resonant Converter: Need of Resonant Converters, their Advantages and Disadvantages, Comparison between PWM and Resonant Coverters, Zero Current Switching Converters(ZCS) , Zero Voltage Switching Converter (ZVS),Camparision beween ZCS and ZVS Converters.

Unit-IV : Choppers and Inverters

Choppers : Principle of Operation-Step Up and Step Down Choppers, Performance Parameter, Step Down Converter with

RL Load , Step Up Converter with RL Load ,Converter Classification and Operation, Chopper Circuit Design

Inverters : Principle Of Operation, Performance Parameter, Single Phase Inverter ,Three Phase Inverter, Modulation Technique for Inverters, Inverter Circuit Design

Unit-V : Applications

I) **Power Supplies:** DC Power Supplies- i)Switching Regulators–Buck,Boost and Buck-Boost Regulators , ii)SMPS-Flyback, Push-Pull, Bridge Converter. AC Power Supplies- UPS-Online, Offline and Interactive.

II) **Motor Drives**- Camparison Of Motors,Types of Motor Drives,Equvalent Circuits,Mathematical Equations,Principle of Operation,Torque-Speed Characteristics,Selection Criteria,Performance Parameter.

i) AC Motor Drives-Squirrel-Cage induction motor.

ii) Dc Motor Drives(chopper drives)- Separately Excited Dc Motor, PMDC.

iii) Synchronous Motor (PWM Inverter)Drives – BLDC,PMSM.

Recommended Books :

1) M.H.Rashid:Power Electronics-Circuits,Devices and Applications

2) P.C.Sen: Power Electronics

3) Ned Mohan : Power Electronics-Converters,Applications and Design

Sem III/Paper XI

3 ELE 3-Advanced Microcontroller and Embedded system

Unit –I : PIC Microcontroller & Interfacing:

Introduction, architecture (PIC 16C6X), registers, instruction set, addressing modes, timers, interrupt timing, i/o port expansion-serial peripheral interface, LCD display, I2C bus operation, serial EPROM, DAC, Temp. Sensors, ADC, UART, oscillator configuration, low power operation, serial programming & parallel slave port.

Unit-II : ARM & AVR Processors:

RISC, ARM design philosophy, ARM fundamentals, instruction sets, thumb instruction sets, exception & interrupt handling, efficient C programming, optimizing ARM assembly code, AVR architecture,

instruction set, hardware interfacing, communication links & design issues.

Unit-III : Introduction to Embedded Systems:

Introduction to Embedded system, features of embedded system, components of embedded system, processor selection, device drivers,interrupt servicing mechanism.

examples of embedded system application.

UNIT IV: Embedded system Hardware:

Interfacing: I/O devices (LCD, Keyboard, ADC, DAC, Stepper motor, PWM etc), Data converters, DMA, UART, SPI, PWM, WDT, Memories, serial, parallel Asynchronous and synchronous communication.

Communication standards: – RS 232, I2C, USB, SPI, CAN, PCMCIA, IrDA.

UNIT V : Development tools for embedded systems:

Software development tools- Editor, Assembler, linker, simulator, compiler Hardware development tools: programmer (EPROM programmer, microcontroller programmer, universal programmer), Logic analyzer, General purpose evaluation Boards.

Hardware and Software combination Tools-

1. In circuit emulator 2. Debugger.

Recommende Books:

1) Mazidi & Mazidi, " 8051 Microcontroller & Embedded Systems". Pearson education. (Latest edition)

2) Keneth H. Ayala, "The 8051 Microcontroller", Penram International

3) Rajkaml, "Embedded System-architecture, Programming And Design",TMH Publications, edition 2003

4) David Simon, "An Embedded Software Primer", Pearson education, Asia

5) John Peatman, "Design With PIC Microcontroller", Pearson education, Asia

6) Jonarttan W. Valvano, Brooks, Cole "Embedded Microcomputer Systems-Realtime Interfacing", Thomson Learning

SEM III/XII

3ELE4 - COMPUTER HARDWARE AND INTERFACING

UNIT-I : CPU AND MEMORY

CPU essentials – processor modes – modern CPU concepts – Architectural performance features – the Intel's CPU , Essential memory concepts – memory organizations – memory packages – modules logical memory organizations – memory considerations – memory types – memory techniques – selecting and installing memory.

UNIT II : MOTHERBOARDS

Active motherboards – sockets and slots – Intel D850GB – Pentium4 mother board – expansion slots – form factor – upgrading a mother board – chipsets , CMOS – CMOS optimization tactics – configuring the standard CMOS setup – motherboard BIOS – POST – BIOS features – BIOS and Boot sequences – BIOS shortcomings and compatibility issues – power supplies and power management – concepts of switching regulation – potential power problems – power management.

UNIT III: STORAGE DEVICES

The floppy drive – magnetic storage – magnetic recording principles – data and disk organization – floppy drive – hard drive – data organization and hard drive – sector layout – IDE drive standard and features – Hard drive electronics – CD-ROM drive – construction – CDROM electronics – DVD-ROM – DVD media – DVD drive and decoder.

UNIT IV: I/O PERIPHERALS

Parallel port – signals and timing diagram – IEEE1284 modes – asynchronous communication - serial port signals – video adapters – graphic accelerators – 3D graphics accelerator issues – DirectX – mice – modems – keyboards – sound boards – audio bench marks.

UNIT V : BUS ARCHITECTURE

Buses – Industry standard architecture (ISA), peripheral component Interconnect (PCI) – Accelerated Graphics port (AGP) – plug-and-play devices – SCSI concepts – USB architecture.

TEXT BOOK :

1. Stephen J.Bigelow, "Trouble Shooting, maintaining and Repairing PCs", Tata McGraw-Hill, New Delhi, 2001.
2. Mike Meyers, "Introduction to PC Hardware and Trouble shooting", Tata McGraw-Hill, New Delhi, 2003.
3. B.Govindarajulu, "IBM PC and Clones hardware trouble shooting and maintenance", Tata McGraw-Hill, New Delhi, 2002.

Sem IV/ Paper XIII

4 ELE 1- VLSI Design and VHDL Programming

UNIT-1 : Introduction to CMOS / VLSI Circuits, MOS transistor switch, Realization of universal gates and compound gates using MOS transistors, Fundamentals of circuit characterization and performance estimation, Basics of R, L and C estimation, CMOS circuits and Logic design, Transistor sizing, basic physical design of simple logic gates.

UNIT2 : CMOS system design And Design Methods, CMOS testing, CMOS subsystem design, Floorplanning, Placement ,Physical design flow, Information Formats, Global Routing, Detailed Routing, Special Routing.

UNIT 3 : ASIC construction And CMOS Design:-Physical design, CAD tools, System Partitioning, Estimating ASIC size, Power dissipation, FPGA partitioning methods,

UNIT-4: Introduction to VHDL, Behavioral Modeling, sequential Processing, data types, attributes, configurations, synthesis and synthesis issues, RTL simulation, place and route. Introduction to VERILOG.

UNIT-5 : Design of combinational blocks such as multibit address, ALU, MUX, DEMUX , encoders, decoders, Design of Sequential circuits, asynchronous and synchronous design Issues

Recommended Books :

1) Neil Weste - K. Eshraghian : Principle of CMOS / VLSI Design (Person Education).
2) J. Bhaskar : "VHDL Primer", (Person Education)
3) Douglas L. Perry : VHDL (3rd Ed.) , McGraw Hill.
4) Application Specific IC"Michael John Sebastiab Smith Addison Wesley Publication.

Sem-IV/Paper XIV

4ELE2- Virtual Instrumentation

Unit I : Virtual Instrumentation

Traditional bench top instruments, general functional description of a digital instrument, block diagram of a virtual instrument, user interface, advantages of virtual instrument over conventional instruments, architecture of a virtual instrument & its relation to the operating system, data flow techniques, other virtual programming environments

Unit II : Virtual Instrument Programming Techniques

VIs and sub VIs, loops and charts, arrays, clusters and graphs, case and sequence structures, formula nodes, local and global variables, string and file I/O, instrument drivers.

Unit III : Data Acquisition Basics

Introduction to data acquisition on PC, concepts of data acquisition and terminology, sampling fundamentals, I/O techniques and buses, ADC, DAC, digital I/O, counters and timers, DMA, buffered I/O, real time data acquisition, calibration, resolution, data acquisition interface requirements

Unit IV : Virtual Instrument Chassis Requirements

Common instrument interface: Current loop, RS232/RS485, GPIB systems basics; interface basics: USB, PCMCIA, VXI, SCXI, PXI, Firewire; PXI system controllers; Ethernet control of PXI;

Unit V : Virtual Instrument Analysis Toolsets

Distributed I/O modules, Applications of VI, Instrument control, simulations of systems, Fourier Transform, power spectrum, correlation methods, windowing & filtering, P, PI, and PID module handling, virtual system design in temperature, pressure, humidity, image acquisition and processing, motion control, database programming.

Recommended Books:

1. Virtual Instrumentation using Lab VIEW : Sanjay Gupta and Joseph John (TMH, New Delhi, 1st edition, 2005)
2. Virtual Instrumentation using Lab VIEW : Jovitha Jerome (PHI Learning Pvt. Ltd., New Delhi, 2007)
3. Lab VIEW for Everyone: Lisa K. Wells & Jeffrey Travis (Prentice Hall, New Jersey, 1997)

4. Lab VIEW Graphical Programming: Gary Johnson (Second edition MGH, New York, 1997)
5. Lab VIEW for Data Acquisition: Bruce Mihura (PHI, New Delhi)
6. PC Based Instrumentation: Concepts & Practice: N. Mathivanan (PHI, New Delhi, 2007)

Sem-IV/Paper XV

4ELE3- Numerical Methods and C Programming

Unit I : Basic structure of C programme, programming style, executing c prgramme, constants, variables & data types, operators, I/P and O/P operations, Branching & looping.

Unit II : Arrays : One diamentional, two diamentional , multidiamentional , their declaration & initialization. Character & Strings : Declaring & initializing string variables , reading & writing of string variables, arithmatic operations on characters, comparison of strings.

Userdefind function : Need, defination, return values & their types, function calls, declaration, nesting of functions, passing arrays & string to function .

Unit III : Structures : Defination , declaration initialization , copying and comparing structure variable ,arrays of structure, sructures and functions, size of structures.

Pointers : Introduction , accessing the address of variables , initialization of pointer variables , chain of pointer, pointer expression , pointers & arrays , pointers & character strings , pointer to function & structure File management in C .

Unit IV : Roots of Nonlinear equation : Introduction , method of solution , Interative method , false position method, Newton Rapson method.

Direct solution & Linear equation : Need and scope, existance of solution, solution by elimination , Basic Gauss elimination method with pivoting, Jacobis Iteration method, Gauss seidel method .

Unit V : Curve fitting : Interpolation: introduction, polynomial, forms , linear interpolation , spline interpolation .

Regration : Introduction, fitting linear equation, fitting transdental equation, fitting a polynomial function.

Numerical Differential Integration : Need & Scope, Dofferentiating, continuous function, Differentiating

Tabulated function, Trapezoidal Rull, Taylors series method, Eulers method.

Recommended Books :

1) E. Balguruswami : ANCII C
2) E. Balguruswami : Numerical Methods
3) Shastri : Numerical Methods

Sem-IV/Paper XVI

4ELE4- Fuzzy logic and Neural Networks

Unit I : Introduction: Utility of Fuzzy systems, uncertainty and information, fuzzy sets and Membership, chance versus fuzziness.

Classical set and fuzzy sets: Classical set, operation on classical set, properties of classical set, fuzzy set, fuzzy set operation, properties of fuzzy sets, non interactive fuzzy sets.

Classical Relation and Fuzzy relation: Cartesian product, crisp relation, operation on crisp relation, properties of crisp relations, operation on fuzzy relations, properties of fuzzy relation.

Unit II : Properties of membership function, Fuzzification & Defuzzification: Features of the membership function, fuzzification, defuzzification to crisp set.

Logic & Fuzzy Systems: Classical Logic, Fuzzy Logic, Fuzzy(rule-based) systems, graphical techniques of inference.

Development of membership function: Membership value assignment, membership function generation.

Unit III : Fuzzy Systems simulation: introduction, fuzzy relational equations, non-linear simulation using fuzzy systems, Fuzzy Associative Memories (FAMs).

Rule-Base reduction methods: Fuzzy systems theory and rule reduction methods.

Decision making with fuzzy information: introduction, fuzzy synthetic evaluation, fuzzy ordering, non transitive ranking, preferences and consensus, multiobjective decision making, fuzzy Bayesian decision making, decision making under fuzzy states and fuzzy actions.

Unit IV : Neural and Fuzzy machine Intelligence: Neural and fuzzy systems as function estimators, neural network as trainable dynamical system.

Neural network Theory: Neurons as functions, signal monotonicity, biological activation & signals, Neuron fields, neuronal dynamical system, additive neural dynamics, additive neural feedback, additive activation model, additive Bivalent model.

UNIT V : Unsupervised learning in Neural Networks: Four unsupervised learning laws, probability spaces and random processes, stochastic unsupervised learning and stochastic equilibrium, signal Hebbian learning, competitive learning, differential Hebbian learning.

Recommended Books:

1. Fuzzy Logic with Engineering Applications, 2e. Timothy Ross, Wiley India. (ISBN: 978-81-265-1337-3)
2. Fuzzy sets and Fuzzy Logic Theory and Applications, George J. Klir, Bo Yuan, PHI (ISBN: 978-81-203-11367)
3. Neural Networks and Fuzzy systems, Bart Kosko, PHI(ISBN: 81-203-0868-9)

*****