AFFILIATED INSTITUTIONS

ANNA UNIVERSITY : : CHENNAI - 600 025.

R-2009

I TO IV SEMESTERS (FULL TIME) CURRICULUM and SYLLABI M.SC. ELECTRONIC SOFTWARE (2 YEARS)

SEMESTER I

| SI. No. | Course Code | Course Title | L | Т | Ρ | С |
|---------|-------------|--|---|---------------|----------|-----|
| THEOR | Y | | | | | |
| 1 | MA 9330 | Numerical Method in Electronics | 3 | 1 | 0 | 4 |
| 2 | EX 9311 | Microprocessors | 3 | 0 | 0 | 3 |
| 3 | EX9312 | 8051 Micro Controller and its Applications | 4 | 0 | 0 | 4 |
| 4 | EX 9313 | Basic VLSI Design | 3 | 0 | 0 | 3 |
| 5 | EX 9314 | Digital System Design using VHDL | 3 | 1 | 0 | 4 |
| 6 | E – I | Elective | 3 | 0 | 0 | 3 |
| PRACT | ICALS | | | | | |
| 7 | EX9316 | General Electronics & 8051 Microcontroller Lab | 0 | 0 | 3 | 2 |
| 8 | EX9317 | VLSI Lab I | 0 | 0 | 3 | 2 |
| | | | | Т | otal | =25 |
| | | SEMESTER II | | | | |
| SI. No. | Course Code | Course Title | L | Т | Ρ | С |
| THEOR | Y | | | | | |
| 1 | EX 9321 | Instrumentation and Control Systems | 3 | 0 | 0 | 3 |
| 2 | EX 9322 | MEMS and Power Electronics | 3 | 0 | 0 | 3 |
| 3 | EX 9323 | Signals and Systems | 3 | 0 | 0 | 3 |
| 4 | EX 9324 | Data Communication and Networks | 3 | 0 | 0 | 3 |
| _ | EV 0005 | Digital Circuit Analysis & Digital Signal | | 3 0 0 4 0 0 | | |
| 5 | EX 9325 | Processing | 4 | | 0 | 4 |
| 6 | E - II | Elective | 3 | 0 | 0 | 3 |
| PRACT | ICALS | | | | | |
| 7 | EX 9326 | Power Electronics Lab | 0 | 0 | 3 | 2 |
| 8 | EX 9327 | Communication Systems Lab | 0 | 0 | 3 | 2 |
| | | | | | Fotal | =23 |
| | | SEMESTER III | | | | |
| SI. No. | Course Code | Course Title | L | Т | Ρ | С |
| THEOR | Y | | | | | |
| 1. | | Embedded Systems and Real Time Operating | | ~ | <u>^</u> | |
| | EX 9331 | <u>Systems</u> | 4 | 0 | 0 | 4 |
| 2. | EX 9332 | Digital Image Processing | 3 | 0 | 0 | 3 |
| 3. | EX 9333 | Hardware - Software Co-Design | 3 | 0 | 0 | 3 |
| 4. | EX 9334 | Advanced Microprocessors and Microcontrollers | 3 | 0 | 0 | 3 |
| 5 | | Flootivo | 2 | 0 | 0 | 2 |

| SI. No. | Course Code | Course Title | L | Т | Ρ | С |
|------------|-------------|---|---|---|---|---|
| THEOR | THEORY | | | | | |
| 1. | EX 9331 | Embedded Systems and Real Time Operating Systems | 4 | 0 | 0 | 4 |
| 2. | EX 9332 | Digital Image Processing | 3 | 0 | 0 | 3 |
| 3. | EX 9333 | Hardware - Software Co-Design | 3 | 0 | 0 | 3 |
| 4. | EX 9334 | Advanced Microprocessors and Microcontrollers | 3 | 0 | 0 | 3 |
| 5. | E - III | Elective | 3 | 0 | 0 | 3 |
| 6. | E - IV | Elective | 3 | 0 | 0 | 3 |
| PRACT | PRACTICALS | | | | | |
| 7. | EX 9335 | DSP and DIP Laboratory | 0 | 0 | 3 | 2 |
| 8. | EX 9336 | Embedded Systems and Real Time Operating Systems | 0 | 0 | 3 | 2 |
| Total = 23 | | | | | | |

| SEMESTER IV | | | | | | | |
|-------------------|-------------|--------------------------------------|----------|---|--------|------|--|
| SI. No. | Course Code | Course Title | L | Т | Ρ | С | |
| 1. | EX9341 | Project Work | 0 | 0 | 16 | 32 | |
| | | | | Т | otal : | = 32 | |
| List of Electives | | | | | | | |
| SI. No. | Course Code | Course Title | L | • | Ρ | С | |
| 1. | EX 9001 | Telecommunication and Fiber Optics | 3 | 0 | 0 | 3 | |
| 2. | EX 9002 | Wireless Communications and Networks | 3 | 0 | 0 | 3 | |
| 3. | EX 9003 | VLSI Design and VHDL Programming | 3 | 0 | 0 | 3 | |
| 4. | EX 9004 | Nano Science and Technology | 3 | 0 | 0 | 3 | |
| 5. | EX 9005 | Neural Networks and its Applications | 3 | 0 | 0 | 3 | |

Planning & Management of Electronics industries

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VLSI Design using VERILOG

Analytical Instrumentation

Electronic Test Instruments

PC Based System Design

CMOS VLSI Design

ASIC Design

EX 9006

EX 9007

EX 9008

EX 9009

EX 9010 EX 9011

EX 9012

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MA9330 NUMERICAL METHOD IN ELECTRONICS

UNIT I ITERATIVE METHODS

Introduction, Beginning an iterative method, the method of successive bisection , the method of false position , Newton –Raphson iterative method, Scant method, comparison of iterative methods. Implementation strategies.

UNIT II SOLUTION OF SIMULTANEOUS EQUATIONS

Introduction, Existence of solution, solution by elimination, the Gauss elimination method, pivotal condensation, III condition equation, Gauss-Seidel iterative method, Gauss-Jorden method, Matrix method, Gauss-Jordan Matrix inversion, Implementation strategies.

UNIT III INTERPOLATION

Introduction, Linear interpolation, Polynomial interpolation, Lagrange interpolation, Newton interpolation, difference tables, truncation errors in interpolation, Implementation strategies.

UNIT IV NUMERICAL INTEGRATION

Introduction, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Gaussian quadrature, Implementation strategies.

UNIT V NUMERICAL DIFFERENTIATIONS AND SOLUTION OF DIFFERENTIAL EQUATIONS 10

Introduction, Differentiation by polynomial fit, higher order Derivative, errors in Numerical Differentiation, Implementation strategies. Introduction, Solution by Taylor's Series, Euler's Method, Modified Euler's Method, Predictor-Corrector Method, Runge-Kutta Method, Implementation strategies.

L: 45 T: 15 TOTAL: 60 PERIODS

Reference Books:

1. Introduction Methods of Numerical Analysis:

- S S Sastry, PHI Publications
- 2. Computer oriented Numerical Methods:
- V Rajaraman, PHI Publication.
- 3. Computer oriented Statistical and Numerical Methods:
- E Balagurusamy, Macmillan India Ltd T P C

EX9311

MICROPROCESSORS

LTPC 3003

UNIT I

Introduction – Comparison of Micro Computers, Mini Computers and Large Computers – The 8085 microprocessor – Architecture – Example of an 8085 based Microcomputer – Memory Interfacing.

UNIT II

The 8085 Programming Model – Instruction Classification – Formats – Instruction Set – Assembly Language Programming – Example Programs.

UNIT III

Interfacing Input/Output Devices. Interrupts – 8085 interrupts – Interrupt Controller – DMA Transfer – DMA Controller.

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UNIT IV

Programmable Interface Devices – 8255 DPI, 8279 Keyboard - Display Controller – Serial Input/Output and Data Communication – 8251 USART – 8253 Timer.

UNIT V

Applications – ADC/DAC Interface – Traffic Light Controller – Interfacing Keyboard and Server – Segment Displays – Bidirectional Transfer between two microcomputers Introduction to higher level processor and micro controllers.

TOTAL : 45 PERIODS

TEXT BOOK

1. Ramesh S.Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085", 4th Edition, Penram International Publishing (India) Pvt. Ltd., 1999.

REFERENCES

1. Douglas V. Hall "Microprocessors and Interfacing", Tata McGraw Hill, 1999.

2. Gilmore, "Microprocessor – Principles & Applications", Tata McGraw Hill, 2nd Edition, 1997.

EX9312 8051 MICRO CONTROLLER AND ITS APPLICATIONS L T P C 4 0 0 4

UNIT I MICROPROCESSOR AND MICROCONTROLLER

Introduction –Microprocessor and Microcontrollers – Microcontroller Survey –The 8051 Architecture –8051 Microcontroller hardware –Input/Output pins, Ports and Circuits – External memory –Counters and Timers –Serial Data input/Output Interrupts

UNIT II INSTRUCTION SET

Addressing Modes – Data Transfer Instruction – Logical Instruction – Arithmetic Instructions – Jump and Call Instructions.

UNIT III MICROCONTROLLER DESIGN

Microcontroller Design: External memory and memory spacing decoding –Reset and Clock circuits –Expanding I/O –Memory mapped I/O –Memory access time.Testing the Design: Crystal test –ROM test and RAM test –Timing Subroutines –Lookup tables for the 8051.

UNIT IV SERIAL COMMUNICATION AND INTERRUPT PROGRAMMING 12

Serial Communication: Basic serial communication -8051 Connection to RS232 - 8051 Serial Communication Programming.

Interrupt Programming: 8051 Interrupts – Programming Timer Interrupts – Programming Hardware External Interrupts – Programming the Serial Communication Interrupt – Interrupt Priority in the 8051.

UNIT V APPLICATIONS

Introduction –Keyboards –Displays –Pulse Measurements –D/A and A/D Conversion – Multiple Interrupts.

TOTAL : 60 PERIODS

BOOKS FOR STUDY:

1. Kenneth J.Ayala "The 8051 Microcontroller Architecture, Programming and Application", Second Edition, Penram International.[Unit I, II, IV & V]

2. Muhammad Ali Mazidi, Janice Gillispie Mazidi "The 8051 Microcontroller and Embedded Systems", TMH, Low Price Edition.

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UNIT I MOS AND BI-CMOS CIRCUIT DESIGN PROCESSES

MOS Layers –Stick Diagrams –Design Rules and Layout –General Observations on theDesign Rules –2um Double Metal, Double Poly. CMOS/Bicomos Rules –1.2um Single Metal,Single Poly. CMOS Rules –Layout Diagrams –A Brief Introduction –Symbolic Diagrams –Translation to Mask Form.

BASIC VLSI DESIGN

UNIT II BASIC CIRCUIT CONCEPTS

Sheet resistance (Rs) –Sheet resistance concept applied to MOS transistors and inverters –Area capacitances of layers –Standard unit of capacitance Cg –Standard unit of capacitances calculation –The delay unit –Inverter delays –Driving large capacitive loads – Propagation delay –Wiring capacitances.

UNIT III SCALING OF MOS CIRCUITS

Scaling models and scaling factors –Scaling factors for device parameters –Some discussion on and limitations of scaling.

UNIT IV SUBSYSTEM DESIGN AND LAYOUT

Some architectural issues –Switch logic –Gate (restoring) logic –Examples of structured design (combinational logic) –Some clocked sequential circuits –Other system considerations.

UNIT V ILLUSTRATION OF THE DESIGN PROCESS- COMPUTATIONAL ELEMENTS

Some observations on the design process –Regularity –Design of an ALU subsystem –A further consideration of adders –Multipliers.

TOTAL: 45 PERIODS

BOOKS FOR STUDY:

1. BASIC VLSI DESIGN "Douglas A. Punknell & Kamran Eshraghian" – Eastern Economy Edition, IIIrd Edition

EX9314 DIGITAL SYSTEM DESIGN USING VHDL L T P C 3 1 0 4

UNIT I

Specification of Combinational Systems Using VHDL, Introduction to VHDL, Basic Language Element of VHDL, Behavioral Modeling, Data Flow Modeling, Structural Modeling, Subprograms and Overloading, VHDL Description of Gates.

UNIT II

Description and Design of Sequential Circuits Using VHDL, Standard Combinational Modules, Design of a Serial Adder With Accumulator, State Graph for Control Network, Design of a Binary Multiplier, Multiplication of a Signed Binary Number, Design of Binary Divider.

UNIT III

Register –Transfer Level Systems, Execution Graph, Organization of System, Implementation of RTL Systems, Analysis of RTL Systems, and Design of RTL Systems

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UNIT IV

Data Subsystems, Storage Modules, Functional Modules, Data Path, Control Subsystems, Micro Programmed Controller, Structure of a Micro Programmed Controller, Micro Instruction Format, Micro Instruction Sequencing, Micro Instruction Timing, Basic Component of a Micro System, Memory Subsystem.

UNIT V

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I/O Subsystem, Processors, Operation of the Computer and Cycle Time. Binary Decoder, Binary Encoder, Multiplexers and Demultiplexers. Floating Point Arithmetic –Representation of Floating Point Number, Floating Point Multiplication.

TOTAL : 60 PERIODS

BOOK FOR STUDY:

1. J. Bhaskar, "A VHDL Primer", Addison Wesley, 1999.

REFERENCE BOOK:

2. C. H. Roth, "Digital System Design Using VHDL", PWS Publishing.

- 3. J. F. Wakerly, "Digital Design-Principles and Practices". PHL.
- 4. Z. Navabi,"VHDL-Analysis and Modeling of Digital Systems", MGH.

EX9316 GENERAL ELECTRONICS & 8051 MICROCONTROLLER LAB L T P C

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Any 15 Experiments

- 1. AM Modulation and Detection
- 2. FM Modulation and Detection
- 3. ASK Modulation and Detecting
- 4. PWM and PPM Modulation and Detection
- 5. PAM Modulation and Detection
- 6. DC to DC converter
- 7. DC Voltage Regulator Design
- 8. DC Chopper
- 9. Modular SMPS Design
- 10. Switching Regulators
- 11. Addition and subtraction of 8bit /16 bit data.
- 12. Multiplication of 8 and 16 bit data
- 13. Ascending and Descending order
- 14. Checksum/CRC error calculations programming
- 15. Keypad/Seven segment display interfacing
- 16. LCD Interfacing
- 17. Hardware and software time delay generation
- 18. UART Programming
- 19. ADC interfacing
- 20. DAC Interfacing

TOTAL: 45 PERIODS

Any 15 Experiments

- 1. Implementation of Logic gates
- 2. Sequential and combinational logic design
- 3. Encoder Design
- 4. Decoder Design
- 5. Half adder and full adder
- 6. Half Sub tractor
- 7. Latches and Flip flops
- 8. Parity Generator
- 9. Parity encoder
- 10. Hardware multiplier
- 11. Shift Register and Ring counter
- 12. ALU design
- 13. Keypad /Seven segment programming
- 14. LCD programming
- 15. Implementation of UART
- 16. Programmable clock generator
- 17. VGA Interface controller
- 18. SPI/ I2C Implementation
- 19. Graphical display controller design
- 20. RAM system design.

TOTAL : 45 PERIODS

| EX9321 | INSTRUMENTATION AND CONTROL SYSTEMS | LTPC |
|--------|-------------------------------------|------|
| | | 3003 |

OBJECTIVES :

After successful completion of the course, the students should have Understood Instrumentation, digital meters and measurements. Understood the concept of Control systems and its usage in Instrumentation. Learnt the compensation techniques in the Control systems

UNIT I DIGITAL INSTRUMENTS

Digital Multimeter – Digital frequency meter – Digital measurement of time – Digital measurement of mains frequency – Digital taco meter – Digital phase meter – Digital capacitance meter.

UNIT II TRANSDUCER AND MEASUREMENT

TRANSDUCER: Resistive transducer- Inductive transducer – Capacitive transducer – Load cell- Piezoelectric – Photo electric transducers – Temperature transducer. Measurement of Linear Displacement using LVDT – Measurement of rotary displacement using RVDT – Hall Effect Principle, operation and application – Optical encoders.

UNIT III CONCEPTS OF CONTROL SYSTEM

Introduction – Open and Closed Loop Systems – Examples – Elements of closed loop systems – Linear and Nonlinear system - Effect of feedback on Overall gain, Stability, Sensitivity and Noise – Analysis of Physical system: Electrical and Thermal system – Transfer function of closed loop system – Block diagram algebra and reduction – Signal flow graphs – Mason's gain formula – fuzzy logic- case study: washing machine control.

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UNIT IV TIME RESPONSE ANALYSIS & STABILITY IN TIME AND FREQUENCY DOMAIN 9

First order system: Impulse and Step input analysis – Second order system analysis – Study state error – Stability Analysis: Routh Hurwitz Criterion – Root locus method – Construction and Application - Nyquist Stability Criterion – Bode diagrams – Polar plot.

UNIT V COMPENSATION TECHNIQUES

Principles of PI, PD and PID compensation – Cascade and feedback compensation, lag, lead, laglead Compensation. Design of cascade compensators – Using Bodes's plot.

TOTAL : 45 PERIODS

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TEXT BOOKS

1. "Modern Control Engineering" Katsuhiko. Ogata. Pearson Education Asia, Fourth edition, 2002

2. "Automatic Control Systems" BENJAMIN C.KUO, PHI, 1995

3. "Automatic Control Systems" S.N.VERMA, Khanna Publisher, 1999

4. "Electronic Instrumentation "H.S.KALSI, TMH - 2nd Edition, 2002.

5. " A Course in Electrical and Electronic Measurements & Instrumentation "A.K.SAWHNEY, Dhanpat Rai Publication

| EX9322 | MEMS AND POWER ELECTRONICS | LTPC |
|--------|----------------------------|------|
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UNIT I OVERVIEW AND WORKING PRINCIPLES OF MEMS

MEMS and Microsystems – Typical MEMS and Microsystems products – Microsystems and Microelectronics – Miniaturization – Applications of Microsystems – Micro sensors, Microactuation, Micro grippers, Micro motors, Micro accelerometer.

UNIT II FABRICATION & MICROSYSTEM DESIGN

Ions and Ionization – Doping – Diffusion process – Scaling Laws for Electrical design – Substrate and wafers – Silicon as a substrate – Silicon compounds – Piezoresistors – Piezocrystals - Photolithography – Ion implantation – Diffusion – Oxidation – PVD – Etching – Surface micromaching – LIGA process - Microsystem Design Considerations – Use of CAD tool in Microsystems design.

UNIT III POWER ELECTRONIC DEVICES & CIRCUITS

Review of operations: SCR, TRIAC, DIAC, IGBT, Power Diodes, MOSFET and UJT. **Thyristor communication techniques:** Introduction – Natural commutation –Forced commutation – Self commutation – Impulse commutation – Response pulse commutation – External pulse commutation – complementary commutation. Controlled Rectifiers: Principle of Phase controlled converter – Single-Phase full converter – Single-phase semi converter – Principle of Three phase half wave converter.

UNIT IV AC VOLTAGE CONTROLLER AND DC CHOPPERS

AC Voltage Controller: Introduction – Principle of On / Off Control – Principle of Phase Control – Single Phase Bi-Directional Controllers with Resistive Loads - Cyclo Converters Single Phase Cyclo converters.

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DC Choppers: Introductions – Principles of Step down Operation – Step down With RL load – Principle of Step up Operation-Switch Mode Regulators: Buck Regulator – Boost Regulator – Buck Boost Regulator – Cuk Regulator.

UNIT V INVERTERS AND POWER SUPPLIES

Inverters: Introduction – Principle of Operation – Single Phase Bridge Inverter – Three Phase Inverter – PWM voltage control.

Power Supplies: Introduction – DC Power Supplies – Switched Mode DC Power Supplies (SMPS) – AC Power Supplies – UPS- AC & DC static switches –static circuit breaker - A.C & D.C Solid state relays.

TOTAL: 45 PERIODS

TEXT BOOKS

 "MEMS & Micro Systems Design and Manufacture" – Tai-Ran-Hsu, TMH, 2002 Edition.
"Power Electronics, Circuits, devices and Applications", MUHAMMED RASHID, Prentice Hall Edition, 2nd Edition, 1999.

3. "Power Electronics" by Bimbra, Anna University –Reference book.

| EX9323 | SIGNALS AND SYSTEMS | LTPC |
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UNIT I INTRODUCTION

Continuous Time (CT) and Discrete Time (DT) signals – classification of CT and DT signals – Basic CT and DT signals – Signal Operations – Representation of signals by impulses

UNIT II CONTINUES TIME & DISCRETE TIME SYSTEMS

Properties – Linear Time Invariant (LTI) system – Linear Shift Invariant(LSI) systems - Properties – Continuous and discrete convolution – CT systems representation by differential equations – DT systems representation by differential equations.

UNIT III FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS 9

Fourier series analysis of periodic signals – properties of Continuous Time Fourier series (CTFS)– Convergence of CTFS - Representation of periodic signals by Continuous time Fourier transform (CTFT) – properties of CTFT– Convergence of CTFT – Frequency response of systems characterized by differential equations.

UNIT IV FOURIER ANALYSIS OF DT SIGNALS AND SYSTEMS

Fourier series representation of DT periodic signals (DTFS) – Properties of DTFS - representation of aperiodic signals by DTFT – properties of the DTFT – Frequency response of systems characterized by differential equations.

UNIT V SAMPLING, LAPLACE TRANSFORM & Z TRANSFORMS

Sampling: Introduction – sampling theorem – reconstruction of a signal from its samples using interpolation – Aliasing – DT processing of a CT signal – sampling of DT signals **Laplace Transform**: Introduction – Laplace transform – region of convergence for LT –

Inverse Laplace Transform – properties of Laplace transform **7 Transform:** Introduction – z-transform – region of convergence for z-transform – Inverse

Z Transform: Introduction – z-transform – region of convergence for z-transform – Inverse z- Transform – properties of z-Transform

TOTAL: 45 PERIODS

TEXT BOOK

1. Alen V Oppenheim Alen S. Wilsky and Hamid Nawab S "Signals and Systems", second Edition, PHI, New Delhi, 1997

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REFERENCES

- 1. Michael J Roberts, "Signals and Systems Analysis using transform methods and MATLAB",
- 2. Tata McGraw- Hill, 2003
- 3. Haykin.S and Barry Van Veen, "Signals and Systems", John willy and Sons Inc., 2002
- 4. Samir S Soliman and Srinath MD, " Continuous and discrete signals and systems" Second
- 5. Edition, PHI, 2003
- 6. Lathi B.P., "Linear Systems and Signals". Oxford University Press Inc., 2003

EX9324 DATA COMMUNICATION AND NETWORKS L T P C 3 0 0 3

UNIT I DATA COMMUNICATION

Introduction – Basic terms and concepts – Line configurations – Topology – Transmission media – MODEM: Standard and types – Analog and Digital transmission: Encoding and modulating – Channel capacity - Base band and Broad band - Transmission impairments – Multiplexing – Error Detection and control :CRC.

UNIT II STANDARD ARCHITECTURE AND PROTOCOLS

Layered Architecture – OSI model –functions of layers – Data link control protocols – ARQStop and wait, Sliding window, Go back N and Selective repeat– Asynchronous protocol: X Modem, Y Modem, Kermit – Synchronous protocol: BSC, SDLC, HDLC- TCP/IP model, SMTP, HTTP and FTP.

UNIT III NETWORK STANDARDS

LAN: Standard, Protocol, IEEE 802 Standards – ETHERNET, LLC, MAC, CSMA/CD, Token Ring – Token bus – FDDI – ALOHA, Wireless LAN Technology, Hub, Bridge, Router,gateway, X.25.Protocols: SLIP, PPP, LCP – Optical network – SONET, WAN - MAN-Basic Concept and standards.

UNIT IV ISDN

Introduction: Services – IDN – Channels – User interfaces – ISDN layers –Broad band ISDN – Frame relay – ATM: concept and architecture – ISDN Protocol: Physical layer protocol, Dchannel Data link layer and layer 3 protocols, Network signaling systems, SS7 protocol.

UNIT V UPPER OSI LAYERS

Session layer protocols, Presentation layer – Encryption / Decryption, Data security, Encryption/ Decryption, Authentication, Data compression, Application Layer Protocols – MHS, File Transfer, Virtual Terminal, CMIP.

TOTAL : 45 PERIODS

TEXT BOOK

1. "Data Communication and Networking" Behrous. A.Forouzan, 2nd edition, Tata Mcgraw Hill, 2000.

REFERENCE BOOKS

- 1. "ISDN Concepts, Facilities and Services" GARY C. Kesslar and Peter Southwick, Mcgraw Hill, 3rd Edition, 1997.
- 2. "Data and computer communication" by William Stallings, 6th edition, Pearson education, 2000
- 3. "Computer Networks" Andrew S.Tanenbaum, 3rd edition, Prentice Hall of India, 1996.

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EX9325 DIGITAL CIRCUIT ANALYSIS & DIGITAL SIGNAL PROCESSING L T P C 4 0 0 4

UNIT I BOOLEAN ALGEBRA AND K-MAP

Postulates, identities, De-morgan's Theorem, Simplification of some logical expression using Boolean expression from given circuit, Literal, Minterm, Maxterm, Standard product of sum & sum of product . Three four & four to five variable K-map and simplification. Numericals POS & SOP obtaining logic systems K-map Arithmetic & code converters circuits.

UNIT II SEQUENTIAL & COMBINATIONAL LOGIC CIRCUIT

Different types of FFs, Designing of Synchronous & Asynchronous counters, Natural & trancated counters, regular & irregular counters, Design of counters using chips, Designing of Presettable counters, Serial to Parallel converter & Parallel to serial converter using registers, Multiplexer & Demultiplexer & their application.

UNIT III DIGITAL APPLICATIONS

Decimal counting, Multiplexed display, Dynamic display, Frequency measurement using counter, speed measurement. Digital voltmeter, sound recording & play back system.

Digital signal Processing

Advantage of DSP, application areas, Basics of DSP operations, convolutions, correlations, digital filtering, discrete transformation & modulation DSP chips, real world application of DSP, e.g. Audio application, telecommunication application, Biomedical application.

UNIT IV ANALOG INTERFACING USING DIGITAL SIGNAL PROCESSING 12

Block diagram of real time system, Sampling of low pass & high pass signals, Uniform & Nonuniform quantization and encoding, over sampling in A/D conversion, D/A conversion process, Anti-imaging filtering, over sampling in D/A conversion, limitation of real time signal processing with analog signals, Applications.

UNIT V DIGITAL SIGNAL PROCESSING APPLICATIONS

Digital Audio Mixing, Speech synthesis and recognition, Compact Disk Audio system, Digital cellular Mobile Telephone, Set-top box Television reception, Fetal EGC monitoring, DSP base closed controlled anesthesia.

TOTAL : 60 PERIODS

REFERENCE BOOKS:

1. Digital Signal Processing (IInd Ed): Emmanuel C. Ifeachor & Barriew.

2. Digital Electronics & Logic Design: N.G.Palan, Technova Publications.

3. Digital Design: M. Morris Mano, Pearson Publication.

4. Digital Electronics : D. C. Green, Pearson Education , Asia.

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- 1. V to I & I to V Converters
- 2. Load cell & Instrumentation amplifier
- 3. Displacement & Angular displacement measurement
- 4. Inductive & capacitive pick up measurement
- 5. Voltage/Current measurement using Hall effect sensors
- 6. Flow measurement
- 7. Frequency response of first order low pass filter
- 8. Frequency response of second order systems
- 9. Frequency response of Peaking amplifier
- 10. Thermistor control of quench oil temperature
- 11. Strip tension controller
- 12. Position control systems open loop closed loop
- 13. SCR, DIAC & TRIAC Characteristics
- 14. UJT characteristics & UJT as a saw tooth wave generator
- 15. Firing angle control using Thyristors
- 16. Commutation Techniques (any two)
- 17. Single phase inverter & converter (20W)
- 18. Switching Regulators

TOTAL: 45 PERIODS

EX9327 COMMUNICATION SYSTEMS LAB L T P C 0 0 3 2

1. LED Characteristics at 850 nm & 1300 nm

- 2. PIN diode & Laser Diode characteristics
- 3. Analog fiber optic transmitter & receiver
- 4. Digital fiber optic transmitter & receiver
- 5. Radiation pattern of Dipole & Yagi-Uda antennas
- 6. Radiation pattern of Loop & Array antennas
- 7. Generation and Detection of PAM & PWM
- 8. Generation and Detection of PCM
- 9. IR Transmitter & Receiver
- 10. ASK & FSK Transmitter and Receiver
- 11. PSK, QPSK & DPSK
- 12. Delta and Adaptive delta modulation
- 13. Study of GPS and GSM Modules
- 14. Impedance and power measurement by Smith chart
- 15. Radiation Pattern by Horn antenna
- 16. Alignment of Satellite receiver
- 17. Gunn Diode oscillator
- 18. Reflex Klystron characteristics using microwave bench

TOTAL: 45 PERIODS

EX9331 EMBEDDED SYSTEMS AND REAL TIME OPERATING SYSTEMS LTPC 4004

INTRODUCTION TO EMBEDDED SYSTEMS UNIT I

Definition and classification - Overview of microprocessor, Microcontroller, and DSP exemplary high performance processors - CISC and RISC architecture - hardware unit in an embedded system- software embedded into a system - exemplary applications embedded systems on a chip and in VLSI circuit

UNIT II PIC 16F87X MICROCONTROLLERS

Device overview – architecture – memory organization – status register – option register – INTCON register - PCON register - I/O ports - data EEPROM - instruction set: Byte oriented operations - Bit oriented operations - Literal and Control operations

UNIT III PERIPHERAL FEATURES OF 16F87X MICROCONTROLLERS 12 TIMER0 Module - TIMER1 Module - TIMER2 Module - Capture/Compare/PWM Modules -12 C transmission and reception - USART - ADC Module - Special features of the CPU:oscillator selection - power on reset - power up timer - oscillator start up timer - brown

UNIT IV **REAL TIME OPERATING SYSTEMS**

outreset - interrupts - watchdog timer - SLEEP

Definitions of process, tasks, and threads - Operating system services - goals - structureskernel – process management – memory management – device management – file system organization and implementation - I/O sub systems - interrupt routine handling in RTOS -RTOS task scheduling models - handling of task scheduling - latency - deadlines - round robin scheduling - cyclic scheduling - preemptive - critical session - static real time scheduling - IPC and synchronization - use of semaphore - priority inversion - deadlock -IPC using signals - mutexflag- message queues - mailboxes - pipes- virtual sockets remote procedure calls

UNIT V **RTOS PROGRAMMING TOOLS: MICRO C/OS-II AND VXWORKS** 12

Study of Micro C/OS-II - VxWorks - other popular RTOS - RTOS system level functions task service functions - time delay functions - memory allocation related functions semaphore related functions - mailbox related functions - queue related functions case studies of programming with RTOS - understanding case definition - multiple tasks and their functions - creating a list of tasks- functions and IPCs - exemplary coding steps

TOTAL: 45 PERIODS

TEXT BOOKS

- Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint, 2003.
- 2. PIC 16F87X data book, Microchip Technology Inc., 2001

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UNIT I DIGITAL IMAGE FUNDAMENTALS

Elements of a digital image processing system – structure of the human eye – image formation and contrast sensitivity – sampling and quantization – neighbors of pixel – distance measure – photographic film structure and exposure – film characteristics – linear scanner – video camera – image processing applications.

UNIT II IMAGE TRANSFORMS

Introduction to Fourier transform – DFT – properties of two-dimensional FT – separability, translation, periodicity, rotation, average value – FFT algorithm – Walsh transform – Hadamard transform – discrete cosine transform.

UNIT III IMAGE ENHANCEMENT

Definition – spatial domain methods – frequency domain methods – histogram – modification techniques – neighborhood averaging – median filtering – low pass filtering – averaging of multiple images – image sharpening by differentiation and high pass filtering.

UNIT IV IMAGE ENCODING

Objective and subjective fidelity criteria – basic encoding process – the mapping – the quantizer – the coder – differential – encoding – contour encoding – run length encoding - image encoding – relative to fidelity criterion – differential pulse code modulation.

UNIT V IMAGE ANALYSIS AND COMPUTER VISION

Typical computer vision system – image analysis techniques – spatial feature extraction – amplitude and histogram features - transforms features – edge detection – gradient operators – boundary extraction – edge linking – boundary representation – boundary matching – shape representation.

TOTAL: 45 PERIODS

TEXT BOOK

1. Rafael C. Gonzalez, Paul Wintz, "Digital Image Processing", Addison-Westley Publishing Company, 1987

2. Rafael C. Gonzalez, Richard E Woods "Digital Image Processing", Pearson, 2001

EX9333 HARDWARE - SOFTWARE CO-DESIGN L T P C 3 0 0 3

UNIT I SYSTEM SPECIFICATION AND MODELLING

Embedded Systems, Hardware/Software Co-Design, Co-Design for System Specification and Modelling, Co-Design for Heterogeneous Implementation - Processor Synthesis, Single-Processor Architectures with one ASIC, Single-Processor Architectures with many ASICs, Multi-Processor Architectures, Comparison of Co-Design Approaches, Models of Computation, Requirements for Embedded System Specification.

UNIT II HARDWARE/SOFTWARE PARTITIONING

The Hardware/Software Partitioning Problem, Hardware-Software Cost Estimation, Generation of the Partitioning Graph , Formulation of the HW/SW Partitioning Problem , Optimization , HW/SW Partitioning based on Heuristic Scheduling, HW/SW Partitioning based on Genetic Algorithms .

L T P C 3 0 0 3

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UNIT III HARDWARE/SOFTWARE CO-SYNTHESIS

The Co-Synthesis Problem, State-Transition Graph, Refinement and Controller Generation, **Distributed System Co-Synthesis**

PROTOTYPING AND EMULATION UNIT IV

Introduction, Prototyping and Emulation Techniques, Prototyping and Emulation Environments, Future Developments in Emulation and Prototyping, Target Architecture-Architecture Specialization Techniques ,System Communication Infrastructure, Target Architectures and Application System Classes, Architectures for Control-Dominated Systems, Architectures for Data-Dominated Systems, Mixed Systems and Less Specialized Systems

UNIT V DESIGN SPECIFICATION AND VERIFICATION

Concurrency, Coordinating Concurrent Computations, Interfacing Components, Verification, Languages for System-Level Specification and Design System-Level Specification ,Design Representation for System Level Synthesis, System Level Specification Languages, Heterogeneous Specification and Multi-Language Co-simulation

REFERENCES

- 1. Ralf Niemann, "Hardware/Software Co-Design for Data Flow Dominated Embedded Systems", Kluwer Academic Pub, 1998.
- 2. Jorgen Staunstrup, Wayne Wolf, "Hardware/Software Co-Design: Principles and Practice", Kluwer Academic Pub, 1997.
- 3. Giovanni De Micheli, Rolf Ernst Morgon," Reading in Hardware/Software Co-Design " Kaufmann Publishers, 2001.

EX9334 ADVANCED MICROPROCESSORS AND MICROCONTROLLERS LTPC 3003

UNIT I MICROPROCESSOR ARCHITECTURE

Instruction Set - Data formats -Addressing modes - Memory hierarchy -register file -Cache - Virtual memory and paging - Segmentation- pipelining -the instruction pipeline pipeline hazards - instruction level parallelism - reduced instruction set -Computer principles – RISC versus CISC.

HIGH PERFORMANCE CISC ARCHITECTURE – PENTIUM UNIT II

CPU Architecture- Bus Operations - Pipelining - Brach predication - floating point unit-Operating Modes - Paging - Multitasking - Exception and Interrupts - Instruction set addressing modes - Programming the Pentium processor.

UNIT III **HIGH PERFORMANCE RISC ARCHITECTURE – ARM**

Organization of CPU - Bus architecture - Memory management unit - ARM instruction set-Thumb Instruction set- addressing modes – Programming the ARM processor.

UNIT IV MOTOROLA 68HC11 MICROCONTROLLERS

Instruction set addressing modes - operating modes- Interrupt system- RTC-Serial Communication Interface – A/D Converter PWM and UART.

UNIT V PIC MICROCONTROLLER

CPU Architecture - Instruction set - interrupts- Timers- I²C Interfacing -UART- A/D Converter – PWM and introduction to C-Compilers.

TOTAL : 45 PERIODS

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TOTAL: 45 PERIODS

REFERENCES:

- 1. Daniel Tabak , " Advanced Microprocessors" McGraw Hill.Inc., 1995
- 2. James L. Antonakos, "The Pentium Microprocessor" Pearson Education, 1997.
- 3. Steve Furber , " ARM System On Chip architecture "Addision Wesley , 2000.
- 4. Gene .H.Miller ." Micro Computer Engineering ," Pearson Education , 2003.
- 5. John .B.Peatman , " Design with PIC Microcontroller , Prentice hall, 1997.
- 6. James L.Antonakos ," An Introduction to the Intel family of Microprocessors " Pearson Education 1999.
- 7. Barry.B.Breg," The Intel Microprocessors Architecture, Programming and Interfacing ", PHI,2002.
- 8. Valvano "Embedded Microcomputer Systems" Thomson Asia PVT LTD first reprint 2001. Readings: Web links <u>www.ocw.nit.edu</u> <u>www.arm.com</u>

EX9335

DSP AND DIP LABORATORY

LTPC 0032

USING TMS320C5X/TMS320C54XX/TMS320C67XX/MATLAB

- 1. Study of addressing Modes of DSP using simple examples
- 2. Arithmetic operations
- 3. DFT computations
- 4. FFT Computations
- 5. Convolution of two discrete signals
- 6. Correlation of two discrete signals
- 7. Quantization noise
- 8. Waveform generation
- 9. Solving differential equations
- 10. Solving z-transform
- 11. Voice storing & Retrieval
- 12. FIR Filter design
- 13. IIR filter design
- 14. Generation of signals
- 15. Amplitude Modulation & FFT response
- 16. Impulse, Step, Exponential & Ramp functions
- 17. Frequency sampling method
- 18. Image Sampling Zooming & Shrinking Operations
- 19. Basic Gray Level Transformations: Image Negative, Power law and log transforms
- 20. . 2-D Discrete Fourier Transform and Walsh Transform
- 21. Image Contrast Enhancement by Histogram Equalization Technique
- 22. . Spatial Image Filtering: Low pass and high pass filtering

TOTAL : 45 PERIODS

LABORATORY

- 1. Writing and testing programs involving arithmetic, logical and BIT oriented intr.
- 2. Programming using interrupts
- 3. Programs for measuring frequency using input capture and output compare mode
- 4. Square wave generation using ports
- 5. Key interfacing
- 6. LED Interfacing
- 7. Seven segment display interfacing
- 8. Solid state relay interfacing using interrupts
- 9. Traffic light control system
- 10. ADC interface
- 11. DAC interface
- 12. Stepper motor interface
- 13. Timer/Counter operation
- 14. Serial port interfacing using RS232C
- 15. Digital clock
- 16. Object counter
- 17. Water level controller
- 18. Flow measurement
- 19. Temperature measurement
- 20. DC motor driving via H bridge
- 21. LCD interface
- 22. PWM generation
- 23. PIC to PIC communication using I2 C bus
- 24. Semaphore & flag related functions
- 25. Queue & Mailbox related functions
- 26. Memory related functions
- 27. Embedded system for an adaptive cruise control system in a car
- 28. Embedded system for a smart card

TOTAL: 45 PERIODS

EX9001 TELECOMMUNICATION AND FIBER OPTICS L T P C

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UNIT I TELECOMMUNICATION AND TRANSMISSION SYSTEMS

Signal characteristics – elements of communication – switching system – criteria for design of telecommunication system – types and advantage of telecommunication standards – telephone system – Transmission Systems: simplex – half duplex – full duplex – four wire circuit – echo canceller/suppressor – characteristics and limiting factors of subscriber loop design – space division multiplexing – frequency division multiplexing – time division multiplexing – evaluation of PSTN – Basics Of Switching System: requirements and basic elements of switching system – simple manual exchange – strowger switching system – crossbar exchange – stored program control exchange – message switching – circuit switching – reed relays.

UNIT II DIGITAL SWITCHING SYSTEM

Evaluation of digital switching system – digital transmission and its advantages – digital signal encoding formats – asynchronous and synchronous transmission - space division switching – time division switching – analog TDS and Digital TDS – space & time switching – time & space switching – STS &TST switching.

UNIT III CALL PROCESSING & SIGNALING TECHNIQUES

Basic steps of call processing – hardware configuration of digital switching system – software organization – early electronic switching system (ESS) – Signaling Techniques: classification – in channel signaling: DC signaling – multi frequency AC signaling – voice frequency AC signaling – PCM signaling – common channel signaling – SS7 network architecture.

UNIT IV TELEPHONE AND TRANSMISSION NETWORK ORGANIZATION 9 Network planning – types of networks – numbering plan – asynchronous and synchronous time division multiplexing – wave length division multiplexing – dense WLDM – digital subscriber line technology – SONET/SDH: SONET network layers – frame format – SONET multiplexing – SONET topologies – SDH

UNIT V OPTICAL FIBER COMMUNICATION 9 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. "Telecommunication Switching and Networks" by P. Gnanasivam,PHI, 2004 2. Robert J Schoenbeck "ELECTRONIC COMMUNICATIONS MODULATION AND TRANSMISSION", PHI, 1999

EX9002 WIRELESS COMMUNICATIONS AND NETWORKS LTPC

UNIT I TECHNOLOGY AND SIGNAL ENCODING TECHNIQUES

Antennas: types – propagation modes – line of sight transmission – fading in the mobileenvironment – signal encoding techniques: criteria – ASK- FSK – BFSK – MFSK – PSK –BPSK – QPSK – multilevel PSK – AM modulation – Angle modulation – PCM - delta and adaptive delta modulation

UNIT II CODING AND ERROR CONTROL

Error detection – parity check – cyclic redundancy check – block error correction codes – hamming code – cyclic codes – BCH code – reed-Solomon codes – block interleaving – convolution codes – decoding – turbo coding – automatic repeat request – flow control – error control.

UNIT III SATELLITE COMMUNICATION

Satellite parameters and configurations – satellite orbits – GEO – MEO – LEO – frequency bands – transmission impairments – satellite footprint – atmospheric attenuation – satellite network – configuration – capacity allocation- Multiplexing : FDM – TDM.

UNIT IV CELLULAR WIRELESS NETWORKS

Principles of cellular networks: organization – frequency reuse – operation – mobile radio propagation effects – handoff – power control – traffic engineering – first generation analog – AMPS – second generation – TDMA – mobile wireless TDMA design consideration - CDMA – mobile wireless CDMA design considerations – soft hand off – IS-95 – third generation systems – wireless local loop.

TOTAL: 45 PERIODS

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UNIT V WIRELESS LANS

Over view: Wireless LAN applications – Wireless LAN requirements – Wireless LAN technology – Infrared LANs – Spread Spectrum LANs – Narrow band microwave LANs – IEEE 802 Architecture – IEEE 802.11 Architecture.

TOTAL: 45 PERIODS

TEXT BOOK

1. "Wireless Communications and Networks" by William Stallings –2002 – Pearson Education Asia

EX9003 VLSI DESIGN AND VHDL PROGRAMMING L T P C

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UNIT I INTRODUCTION AND BAISC CONCEPT OF VHDL

History of VHDL – capabilities of VHDL – hardware abstraction – basic terminology – entity declaration - architecture body declaration – Basic language elements – identifiers – Data objects– Data type operators.

UNIT II BEHAVIORAL MODELING TECHNIQUES OF VHDL 9 Behavioral modeling: Entity declaration – architecture declaration – process statements variable assignment statements – signal assignments statements – Wait statement – IF statement – Case statement – Null statement – Loop statement – Exit statement – Next statement Assertion statement – Report statements – More on signal assignment statement – multiple process – postponed process.

UNIT III DATA FLOW & STRUCTURAL MODELING TECHNIQUES OF VHDL 9 Data flow style of modeling: Concurrent signal assignment statement versus signal assignment – Delta delay revisited – Multiple drivers – Conditional signal assignment statement – Selected signal assignment statement – The unaffected value – Block statement- Concurrent assertion statement.

Structural modeling: Component declaration – Component instantiation – Resolving signal value – examples – Half adder – Full adder – Four to one multiplexers – Decoders and encoders.

UNIT IV ADVANCED FEATURES IN VHDL

Generics – configuration – configuration specification – Configuration declaration – Default rules – Conversion functions – Direct instantiation – Incremental binding – Sub programs – Sub program overloading - operator overloading - signatures – default value of parameters – package declaration - package body – design file – design libraries.

UNIT V DESIGN OF FPGA'S AND CPLD

State machine start – programmable logic arrays – programmable array logic devices – altera max 7000 CPLD'S – Xilinx interconnection – Xilinx logic – Xilinx 3000 series FPGA's – Altera complex programmable logic devices – CPLD'S.

TOTAL: 45 PERIODS

TEXT BOOKS

1. J.Bhasker,"VHDL PRIMER", Low price Edition, 2001 PHI 3.Charles H.Roth, Jr."DIGITAL SYSTEM DESIGN USING VHDL", Brooks/Cole Thomson Learning PWS Publishing,ISBN-981-240-052-4

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EX9004

UNIT I INTRODUCTION AND CLASSIFICATION

Classification of nanostructures, nanoscale architecture – Effects of the nanometre length scale – Changes to the system total energy, changes to the system structures, vacancies in nanocrystals, dislocations in nanocrystals – Effect of nanoscale dimensions on various properties – Structural, thermal, chemical, mechanical, magnetic, optical and electronic properties – effect of nanoscale dimensions on biological systems.

NANO SCIENCE AND TECHNOLOGY

UNIT II NANOMATERIALS AND CHARACTERIZATION

Fabrication methods – Top down processes – Milling, lithographics, machining process – Bottom-up process – Vapour phase deposition methods, plasma-assisted deposition process, MBE and MOVPE, liquid phase methods, colloidal and solgel methods – Methods for templating the growth of nanomaterials – Ordering of nanosystems, self-assembly and selforganisation – Preparation, safety and storage issues.

UNIT III GENERIC METHODOLOGIES FOR NANOTECHNOLOGY

Characterisation: General classification of characterisation methods – Analytical and imaging techniques – Microscopy techniques - Electron microscopy, scanning electron microscopy, transmission electron microscopy, STM, field ion microscopy, scanning tunnelling microscopy, atomic force microscopy.

UNIT IV NANOELECTRONICS AND INTEGRATED SYSTEMS

Basics of nanoelectronics – Single Electron Transistor – Quantum Computation – tools of micronanofabrication – nanolithography – quantum electronic devices – MEMS and NEMS – Dynamics of NEMS – limits of integrated electronics.

UNIT V NANODEVICES AND APPLICATIONS

Nanomagnetic materials – Particulate nanomagnets and geometrical nanomagnets – Magneto resistance – Probing nanomagnetic materials – Nanomagnetism in technology – Carbon nanotubes – fabrication- applications – Organic FET, organic LED's – Organic photovoltaics – Injection lasers, quantum cascade lasers, optical memories, electronic applications, colulomb blockade devices.

TOTAL: 45 PERIODS

REFERENCES:

1. Kelsall Robert W, Ian Hamley, Mark Geoghegan, "Nanoscale Science and Technology", Wiley Eastern, 2004.

2. Michael Kohler, Wolfgang, Fritzsche, "Nanotechnology: Introduction to Nanostructuring Techniques", 2004.

3. William Goddard, Donald W Brenner, "Handbook of Nano Science Engineering and Technology", CRC Press, 2004.

4. Bharat Bhushan, "Springer Handbook of Nanotechnology", 2004.

5. Charles P Poole, Frank J Owens, "Introduction to Nanotechnology", John Wiley and Sons, 2003.

6. Mark Ratner, Danial Ratner, "Nanotechnology: A Gentle Introduction to the Next Big Idea", Pearson, 2003.

7. Gregory Timp, "Nanotechnology", Springer-Verlag, 1999.

8. Jan Korvink & Andreas Greiner, Semiconductors for Micro and Nanotechnology – an introduction for Engineers, Weinheim Cambridge: Wiley-VCH (2001).

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EX9005 **NEURAL NETWORKS AND ITS APPLICATIONS** LTPC

INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS UNIT I

Neuro-physiology - General Processing Element - ADALINE - LMS learning rule -MADALINE - MR2 training algorithm.

UNIT II **BPN AND BAM**

Back Propagation Network - updating of output and hidden laver weights -application of BPN - associative memory - Bi-directional Associative Memory - Hopfield memory - traveling sales man problem.

UNIT III SIMULATED ANNEALING AND CPN

Annealing, Boltzmann machine - learning - application - Counter Propagation network architecture -training - Applications.

UNIT IV SOM AND ART

Self organizing map - learning algorithm - feature map classifier - applications - architecture of Adaptive Resonance Theory - pattern matching in ART network.

UNIT V NEOCOGNITRON

Architecture of Neocognitron - Data processing and performance of architecture of spacio temporal networks for speech recognition.

TOTAL: 45 PERIODS

REFERENCES:

1. J.A. Freeman and B.M.Skapura, "Neural Networks, Algorithms Applications and Programming Techniques", Addison-Wesely, 2003.

Laurene Fausett. "Fundamentals of Neural Networks: Architecture. Algorithms and Applications", Prentice Hall, 1994

EX9006 VLSI DESIGN USING VERILOG LTPC

UNIT I SAMPLE AND HOLD CIRCUITS

Sampling switches, Conventional open loop and closed loop sample and hold architecture, Open loop architecture with miller compensation, multiplexed input architectures, recycling architecture switched capacitor architecture.

UNIT II SWITCHED CAPACITOR CIRCUITS AND COMPARATORS

Switched-capacitor amplifiers, switched capacitor integrator, switched capacitor common mode feedback. Single stage amplifier as comparator, cascaded amplifier stages as comparator, latched comparators.

UNIT III DIGITAL TO ANALOG CONVERSION

Performance metrics, reference multiplication and division, switching and logic functions in DAC, Resistor ladder DAC architecture, current steering DAC architecture.

UNIT IV ANALOG TO DIGITAL CONVERSION

Performance metric, Flash architecture, Pipelined Architecture, Successive approximation architecture. Time interleaved architecture.

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UNIT V PRECISION TECHNIQUES

Comparator offset cancellation, Op Amp offset cancellation, Calibration techniques, range overlap and digital correction.

REFERENCES

TOTAL : 45 PERIODS

1. Behzad Razavi, "Principles of data conversion system design", S.Chand and company ltd, 2000.

EX9007

ASIC DESIGN

LTPC 3003

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UNIT I INTRODUCTION TO ASIC

ASIC Design – Introduction- ASIC Examples- Advantages – Types- Full custom ASIC, Semi – Custom ASIC – Standard cell – Based ASIC – GATE Array – based ASIC, -Channels gate array- Structured gate array – Field –Programmable Gate array- Programmable logic devices structure –PALs –PLDs – Programming of PALs – EPROM and EEPROM Technology – Plalsm- Programmable interconnect - Programmable Gate array – ASIC design flow

UNIT II PROGRAMMABLE ASICS, PROGRAMMABLE ASIC LOGIC CELLS AND PROGRAMMABLE ASIC I/O CELLS 9

Anti fuse- Static RAM- EPROM and EEPROM technology, PREP benchmarks- Actel ACT – Xillinx LCA – Altera FLEX – Design Systems- Logic synthesis – half gate ASIC schematic entry – Low level design language – PLA tools – ENDIF – CFI design representation.

UNIT III II PROGRAMMABLE ASIC INTERCONNECT, PROGRAMMABLE ASIC DESIGN SOFTWARE AND LOW LEVEL DESIGN ENTRY

Actel ACT – Xillinx LCA – Xilinx EPLD – Altera MAX 5000 and 7000 – Altera MAX 9000 – Altera FLEX – Design systems – logic Synthesis – half gate ASIC Schematic entry – Low level design language – PLA Tools – ENDIF – CFI Design representation.

UNIT IV ASIC CONSTRUCTION, FLOOR PLANNING, PLACEMENT AND ROUTING

System partition – FPGA partitioning – Partitioning methods – floor planning – placement – physical design flow – global routing – detailed routing – special routing – Circuit extraction – DRC

UNIT V BASICS OF MICRO WIND

Introduction to micro wind – features – Analog cells – Design of resisters- Capacitors- MOS capacitor – inter – Metal capacitor-Diode – Connected MOS –Simulation layout-Voltagereference using PMOS and NMOS device- Voltage reference –Current mirror – Amplifier design – Micro wind mexus : File, View,Edit ,Simulator- Compile, Analysis,Palette,Navigator window

TOTAL : 45 PERIODS

TEXT BOOKS:

1. M.J.S. Smith ," Application – Specific integrated circuit" – Addison – Wesley Longman Inc.1997

2. Andrew Brown, -"VLSI circuits and systems in silicon" Cc Graw Hill, 1991

3. S.D Brown, R.J.Francis, J.Rox , Z.G.Uransesic, "Field Programmable gate arrays" Khuever academic publisher, 1992

4. S.Y.Kung, H.J.Whilo House, T.Kailath, "VLSI and Modern Signal Processing" Prentice Hall, 1985

EX9008

UNIT I COLORIMETRY AND SPECTROPHOTOMETRY

Special methods of analysis- Beer-Lambert law-colorimeters - UV-ViS spectrophotometers-Single and double beam instruments-Sources and detectors-IR Spectrophotometers-Types*M*.Attenuated total reflectance flame photometers- Atomic absorption spectrophotometers-sources and detectors-FTIR spectrophotometers-Flame emission photometers.

ANALYTICAL INSTRUMENTATION

UNIT II CHROMOTOGRAPHY

Different techniques- Gas chromatography- Detectors- Liquid chromatographs- Applications-High pressure liquid chromatographs-Applications.

UNIT III INDUSTRIAL GAS ANALYZERS AND POLLUTION MONITORING INSTRUMENTS

Types of gas analyzers-Oxygen,NO2 and H2S types, IR analyzers, thermal conductivity analyzers, analysis based on ionization of gases. Air pollution due to carbon monoxide, hydrocarbons, nitrogen oxides, sulphur dioxide estimation-dust and smoke measurements.

UNIT IV pH METERS AND DISSOLVE COMPONENT ANALYZERS

Principle of pH measurement, glass electrodes, hydrogen electrodes, reference electrodes, selective ion electrodes, ammonia electrodes, biosensors, dissolved oxygen analyzer-sodium analyzer-silicon analyzer.

UNIT V RADIO CHEMICAL AND MAGNETIC RESONANCE TECHNIQUES 9

Nuclear radiations – Detectors - GM Counter - Proportional counter - Solid state detector - Gamma cameras - X-ray spectroscopy - Detectors- Diffractometers -Absorption meters - Detectors NMR-Basic principles-NMR spectrometer-Applications. Mass spectrometers - Different types - Applications.

TEXT BOOKS:

1.R.S.Khandpur,"Handbook of Analytical Instruments"Tata Mc Graw Hill publishing Co. Ltd.2003.

2.H.H.Willard, L.L.Merrit, J.A.Dean, F.A.Settle,"Instrumental methods of analysis" CBS publishing & distribution, 1995.

REFERENCES:

1.Robert D.Braun,"Introduction to Instrumental Analysis"Mc Graw Hill, Singapore,1987 2.G.W.Ewing,"Instrumental Methods of Analysis" Mc Graw Hill 1992.

3.DA Skoog and D.M.West,"Prinicples of Instrumental Analysis" Harper and Row publishers, 1974.

EX9009

UNIT I ANALOG METERS

D.C,A.C voltmeters, ammeters, multimeter,power meter,Q-meter,true RMS meter, vector impedance meter, vector voltmeter, component measuring instrument.

ELECTRONIC TEST INSTRUMENTS

UNIT II SIGNAL SOURCES

Sine wave generator-Frequency synthesized sine wave generator-Sweep frequency generator, pulse and square wave generator-Function generator-Wave analyzer-Applications-Harmonic distortion analyzer-Spectrum analyzer-Applications- Audio Frequency generator-Noise generator.

TOTAL : 45 PERIODS

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UNIT III **OSCILLOSCOPES**

General purpose oscilloscope-Screens for CRT graticules-Vertical & horizontal deflection systems- Time base operation, triggers - sweep control, z axis input - Delay line-Multiple trace-Dual beam & dual trace-Probes-Oscilloscope techniques-special oscilloscopes-Storage oscilloscope-sampling oscilloscope-digital CRO.

UNIT IV DIGITAL INSTRUMENTS

Digital method for measuring frequency, period, phase difference, pulse width, time interval, total count-Digital voltmeter-Types-Automatic polarity indication, automatic ranging, and auto zeroing-DMM-Microprocessor based DMM-DPM-swept - spectrum analyzer-network analyzerdischarge analyzer- logic probes-logic analyzer.

UNIT V DISPLAY AND RECORDING DEVICES

Bar graph display-Segmental and dot matrix display-X-Y recorders, magnetic tape recorders-Digital recording-Data loggers-Interference and screening-Electrostatic and electromagnetic interference & earth loops.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Albert D. Herlfrick & William D. Cooper, "Modern electronic Instrumentation & Measurement Techniques" Prentice Hall of India, 2002.

2.A.J.Bouwens,'Digital Instrumentation" Tata Mc Graw Hill, 1997.

3. RobertA. Witte, 'Electronic Test Instruments, Theory and applications' Prentice Hall, 1993.

REFERENCE BOOKS

1.B.M.Oliver and J.M.Cage,"Electronic Measurements & Instrumentation" Mc Graw Hill International Edition, 1975.

2. Joseph, J. Carr, "Elements of Electronic Instrumentation & Measurements" III edition, Pearson

Education.2003.

3.C.S.Rangan, G.R.sarma, V.S.V.Mani,"Instrumentation Devices & systems" Tata Mc Graw Hill. 2002

4.D.A.Bell, "Electronic Instrumentation and Measurements" Prentice Hall of India, 2002. 5.Rajendra Prasad,"Electronic Measurements and Instrumentation", Khanna Publishers, Delhi,2003.

6.B.R.Gupta,"Electronics and Instrumentation"S.Chand Co. (P)Ltd., Delhi,

EX9010 PC BASED SYSTEM DESIGN

MOTHER BOARD OF IBM PC UNIT I

Components Of IBM PC: System Unit -Monitor -Input Devices -Printers -Interfaces -I/O Buses -Parallel and Serial Bus -USB Motherboard Components: Introduction -Microprocessor -Support Chips -Memory - Support Functions -I/O Buses, System Resources: Interrupt Requests –DMA Channels –I/O Address –Utilization Of System Resources.

UNIT II DRIVERS

Introduction – Principles of Magnetic Storage: Medium for Magnetic Storage – Read/Write Operations – Data Encoding Format. FDD: Floppy Disk Drive – Construction – Floppy Disk Controller 8272A -FDC Interface. HDD: Drive Construction -HDD Interface. IDE Interface: Pins and Signals – Registers – Command Execution Protocol – Commands – Medium Organization -EIDE Interface. SCSI Interface: SCSI Configuration -Variations -Signals -Wiring Techniques – Cables and Connectors – Termination – Phase – Commands and Messages.

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UNIT III PERIPHERALS

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

UNIT IV I/O BUSES

Introduction-ISA Bus: Pins, Signals and Expansion Board Design of 8-Bit and 16 Bit ISA Bus-EISA Bus: Features –Pins And Signals, PCI Bus: Features –PCI System –Pins And Signals- PCI Expansion Boards –AGP.

UNIT V PARALLEL, SERIAL AND USB PORT

Parallel Port: Introduction –Parallel Port –SPP –EPP –ECP. Serial Port: Pins and Signals of Serial Port –The UART. USB Port: Introduction –Features –USB System –USB Transfer – USB Controller.

TEXT BOOKS

1. N.Mathivanan,"Microprocessor, PC Hardware and interfacing", PHI ISBN-81-203-2317-3 2. B.Govindarajulu, "IBM PC and Clones", TMH, ISBN-0-07-460136-9

EX9011

UNIT I INTRODUCTION TO CMOS CIRCUITS

MOS Transistors –MOS Transistor Switches –CMOS Logic –Circuit and System – Representations –MOS, Transistor Theory –Introduction –MOS Device Design Equations The Complementary CMOS Inverter –DC –Characteristics –Static Load MOS Inverters –The Differential Inverter –The Transmission Gate –The Tri State –Inverter –Bipolar Devices.

CMOS VLSI DESIGN

UNIT II CIRCUIT CHARACTERISATION AND PERFORMANCE ESTIMATION 9

Introduction –Resistance Estimation Capacitance Estimation –Inductance –Switching Characteristics CMOS –Gate –Transistor Sizing –Power Dissipation –Sizing Routing Conductors –Charge Sharing –Design Margining, Reliability.

UNIT III CMOS CIRCUIT AND LOGIC DESIGN

CMOS Logic Gate Design –Basic Physical Design of Simple Gate –CMOS Logic Structures –Clocking Strategies –I/O Structures –Low Power Design.

UNIT IV SYSTEMS DESIGN AND DESIGN METHOD

Design Strategies CMOS Chip Design Options –Design Methods –Design Capture Tools– Design Verification –Tools –Design Economics –Data Sheets –CMOS Testing – Manufacturing Test Principles –Design Strategies for Test –Chip Level Test Techniques System Level Test Techniques –Layout Design for Improved Testability.

UNIT V CMOS SUB SYSTEM DESIGN

Data Path Operations –Addition/Subtraction –Parity Generators – Comparators – Zero/One Detectors –Binary Counters –ALUs –Multiplication –Shifters –Memory Elements – Control FSM –Control Logic Implementation.

TOTAL : 45 PERIODS

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TOTAL: 45 PERIODS

LTPC 3003

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TEXT BOOKS

1. Nell H. E. Weste and Kamran Eshraghian, "Principles of CMOS VLSI Design", 2ndEdition, Addision Wesley, 1998.

2. Jacob Backer, Harry W. Li and David E. Boyce, "CMOS Circuit Design, Layout and Simulation ", Prentice Hall of India, 1998.

EX9012 PLANNING & MANAGEMENT OF ELECTRONICS INDUSTRIES LTPC 3003

DATA PROCESSING IN ELECTRONICS INDUSTRY UNIT I

Need & utility of market reaseach for the electronics products, Data types: Primary and secondary, Data collection methods: Dictated material, Questionnaire, observation & interview, Telephone messages, document, Sampling techniques, Data analysis techniques, Classifying information : alphabetically, Numerically, Chronologically, by subject, department or product.

UNIT II **PROJECT PLANNING**

Setting of new project, generation of alternative solutions, Evaluating the proposal, Feasibility report, Defining project plan, project report, registration procedure, Various catalyst organization, Raising finance, source of finance, finance proposal, assistance through SIDB, State government ,IDBI etc, Strategic planning ,system strategy, equipment acquisition, Developing the infrastructure, upgrading existing system.

PLANNING OF NEW ELECTRONICS INDUSTRY UNIT III

Management concepts, planning, organizing, staffing, direct, co-ordination, control as applied to electronics industry, Environmental effects. Financial crises & their remedies, sales crises & their remedies, report preparation, import ants of codification, Types of codes. Management report preparation, input & output forms, validation & data dictionary.

MARKETING STRATEGY AND MANAGEMENT UNIT IV

Marketing it's strategy, product, packaging and new product development and pricing methods, promotion through advertising, Sales promotion, personal selling, publicity, distribution network for industrial product, export planning & management of electronics products.

QUALITY MANAGEMENT IN ELECTRONICS INDUSTRY AND UNIT V **OPTIMIZATION TECHNIQUES**

ISO certification series, TQM, Kaizen, Modern concepts of quality management, Customer satisfaction, Productivity, etc. Assignment problems, Transportation problems, Optimal solutions, Simplex method, minimization & maximizations by simplex method, Criticle path method and PERT.

TOTAL: 45 PERIODS

REFERENCES

- 1. Principle and Practical of Management.
- 2. Entrepreneurship and small-scale industries.
- 3. Marketing Management
- 4. Research Methodology
- 5. operation research

12

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