M.Sc. ELECTRONICS

RULES & REGULATIONS AND SYLLABUS

(To come into effect from the academic year 2015-2016)

Prof. N.Veeraiah
Chairmen, BOS.

Department of Elec.&Inst.Tech.
Acharya Nagarjuna University
Nagarjuna Nagar,
GUNTUR, INDIA
Web: www.nagarjunauniversity.ac.in
Phone: 0863.2293009 Ext 196

Acharya Nagarjuna University, Nagarjuna Nagar
M.Sc. (ELECTRONICS)-Revised Syllabus
(W.e.f 2015 – 2016 academic year onwards)
First Year

I SEMESTER	(External)	(Internal)	Total	
101 Analog and Digital Circuits	70	30	100	
102 Microwaves, Radars and Satellite Communications	70	30	100	
103 Linear and Digital IC Applications	70	30	100	
104 C Programming and data structures	70	30	100	
105 Mathematical methods of Signals and System Analysis.	70	30	100	
Laboratories: Lab1.1-Computer Simulation (with P-Spice or Mat lab)	70	30	100	Experiments
Lab 1.2 -Linear and digital IC lab	70	30	100	

II SEMESTER				
201 Advanced Communication Systems	70	30	100	
202 Microcontrollers and interfacing	70	30	100	
203 Opto Electronic Devices and Applications	70	30	100	
204 Control Systems	70	30	100	
205 Test and Measuring Instruments	70	30	100	
Laboratories: - Lab 2.1- Communication Lab.	70	30	100	
Lab2.2 - Microcontroller lab	70	30	100	

Second Year

III SEMESTER				
301 Digital Signal Processing	70	30	100	
302 Embedded Systems	70	30	100	
303 Fiber Optic Communications	70	30	100	
304 PC Architecture and Interfacing	70	30	100	
305 Sensors and Signal Conditioners	70	30	100	
Laboratories: - Lab3.1- Instrumentation Lab	70	30	100	
Lab 3.2 - PC Interfacing Lab.	70	30	100	

IV SEMESTER				
401 VLSI Design (Verilog HDL)	70	30	100	
402 Networking Technology	70	30	100	
Lab: Lab 4.1-VlSI Lab	70	30	100	

Project work: - External / Internal Projects **(Minimum -3 months or more.)**   400 Marks

(300 Marks for Dissertation and 100 Marks for viva-voce by both external and Internals)

Total Marks: 2800 Marks

Paper –101:   Analog and Digital Circuits

UNIT-1 : ELECTRONIC DEVICES

(a) Introduction to Semiconductors (b) General Semiconductor Devices - Diode, Transistor, Field Effect Transistor(FET), MOSFET, Zener Diode (c) Special Semiconductor Devices - Tunnel diode, Varactor diode, UJT, SCR, Diac, Triac, Thyristor

UNIT-2 : POWER SUPPLIES AND REGULATION (D.C & A.C)

Design of D.C voltage and Current regulated Power Supply using IC 723 regulator. Design of Switch Mode Regulated Power Supplies (SMPS).

UNIT-3 : AMPLIFIERS AND NEGATIVE FEEDBACK

Design of a two stage cascaded transistor and FET amplifier and determination of it's frequency response with and without feedback.
Design of Complementary- Symmetry Power Amplifiers using transistors and MOS power FET's.

UNIT-4 : OSCILLATORS

Design and analysis of a
  (a) Wein-bridge and RC Phase shift oscillators.
  (b) Hartley and Colpitt's oscillator..
  (c) Crystal Controlled Oscillators

UNIT -5. TTL & CMOS I.C's.
Decade Counter, Seven segment decoder driver, CMOS crystal oscillator, Digital Phase meter, Digital Comparator.

BOOKS FOR STUDY AND REFERENCE

1. Op-Amps and Linear Integrated Circuit Technology Ramakant A, Gayakwad (EEE)
2. Electronic Devices and Circuit Theory Nishalisky and Robert Boylestad
3. Integrated Electronics –Millman and Halkias, Mc.Graw Hill company
4. Fundamentals of Electronic devices - David A.Bell
5. Integrated Circuits – Botkar K.R - Khanna Publishers, New Delhi
6. Digital Integrated Circuits Learning by Experimenting: BPB publications.
7. CMOS Integrated Circuits Learning by Experimenting: BPB publications.

Paper -102 Microwaves, Radars and Satellite Communications

Unit -1. Microwave Devices:

Klystrons, Magnetrons and traveling wave tubes. Velocity modulation basic principles of two cavity klystron and reflex klystron, principles of operation of magnetron. Helix traveling tubes. Wave modes. Effect, principles of operation, modes of operation. Read diode, IMPATT diode, Gunn, TRAPATT diode.

Unit -2. Microwave Diodes & Measurements:

Mixers – non-linear – linear – Balanced Mixer – Detector square law   characteristic, parametric Amplifiers –Up converter – down converter. Microwave measurement – Guide wavelength, standing wave ratio, measurement of impedance, Q and attenuation.

Unit -3. Microwave communications:

Introduction, advantages and disadvantages of Microwave Radio - FM Microwave Radio systems – Repeaters – Repeater station.

Unit -4. Radar Systems:

Basic principle – Fundamentals. Radar performance   factors, pulsed systems – Basic pulsed Radar systems, antennas and scanning, display methods, pulsed radar systems, moving target indications (MTI), Radar Beacons. Other Radar Systems – C.W Doppler Radar, Frequency – Modulated CW Radar, phased array Radars, Planer array Radars. Synthetic Aperture Radar (SAR) and MST Radar.

Unit -5. Satellite communications:

Introduction Kepler's Laws satellite orbits, Geosynchronous satellites. Satellite classification, spacing and frequency allocation. Satellite link equations and link Budget.

TEXT BOOKS:

1. S.Y.LIAO Microwave Devices and circuits (PHI)
2. KENNEDY ' Electronic Communication Systems'.
3. W.TOMASI 'Advanced Electronic Communication Systems.

REFERENCE BOOKS:

1. R.E.COLLIN 'Foundation of Microwave Eng. (Mc.Grew Hill)
2. SKOLNIC: Introduction to Radar Systems.

Paper- 103. Linear And Digital Ic's And Applications.

Unit – I
Integrated circuit fabrication: Introduction & fundamentals of Monolithic IC technology – Basic planar processes – Fabrication of a circuit – Active & passive components & ICs – diodes – resistors – capacitors – Monolithic transistors – Fabrication of FET, Thin & Thick film technology.
Unit – II
Digital IC families: RTL, DTL, (Modified Integrated Circuit) – HTL, TTL, ECL, Logic families – characteristics – I2l (TSL). CMOS logic – CMOS device driving TLL circuits, TTL device driving CMOS Gates.
Unit – III
Operational Amplifier: Frequency response of inverting and non – inverting amplifier with external frequency compensation – applications – subtraction – Integration – Differentiation amplifier – Instrumentation amplifier.
Unit – IV
Window Comparator application in A.C stabilizers. Servo motor control, Under and Over voltage protection.– sample & hold circuit, log and antilog amplifiers, AC amplifier, V to I and I to V converter- regenerative comparator (Schmitt triggers) Astable multivibrator - Monostable – Triangular wave generator – sine wave generator.
Unit – V
PLL and Timers: basic principles – phase detector comparator voltage controlled oscillator – phase lock loop – PLL applications – frequency multiplication / division – frequency translation 555 timer – Astable -Monostable, 8038 function generator.
Reference Books
1. Integrated Circuits – Botkar K.R - Khanna Publishers, New Delhi (Unit I).
2. Linear Integrated circuits - D. Roy choudary Sahil Jain – (Unit II, III, IV, V)
3. Op-amps & Linear integrated Circuits – Ramakant, A. Gayakwood- PHI

Paper -104. C Programming and Data Structures

Unit – 1:

Algorithm, flowchart, Program development steps, basic structures of C language, C tokens, data types, declaration of variables, assigning values, arithmetic, relational and logical operator, increment and decrement operator, control operator, bit-wise operator, expressions, evaluation, input-output operators, IF and SWTTCH statement, WHILE, DO-WHILE and FOR statements, C programs covering all the above aspects.

Unit – 2 :

One dimensional and two dimensional arrays, initialization, string variables-declaration, reading, writing, sting handle function, user-defined functions, variables and storage classes, example C-Programs.

Unit – 3:

Structure definition, initializing, assigning values, passing of structures arguments, unions, declaring and initializing of pointers, pointer based expressions, arrays, functions and structures, C Program examples, file management in C, opening and Closing, I-O operations on files. File control specifications r,w,a,r+,w+,a+. The fopen(),fclose(), fgetc(), fputc(), feof(), fgets(), fputs(), fscanf(), fprintf(), fread() and fwrite() functions. rewind() function. getch();(wait for any key to be pressed)

Unit – 4:

Introduction to data structures, representing stacks and queues in C, Infix, Postfix and Prefix programs, Queue and its sequential representation, circular queue, Single linked list, Double linked list, Circular list.

Unit – 5:

Input, Output commands and programming. I/O addresses are accessed in Turbo C/C++ environment by using following Library functions

i)   Inport

ii)   Inportb

iii) Outport

iv)   Outportb

Practical application examples like, Flashing LED, Reading Switch Position and displaying on the screen and storing in memory are to be discussed.

TEXT BOOKS:

l. "C" Programming and Data Structures by E.Balaguruswamy.

REFERENCE BOOKS:

1. C Programming & Data Structures by P.Padmanabham (B.S.P)
2. The C Programming Language - Brain W.Kernighan & Dennis M.Ritchie, PHI
3. Data Structures using C and C++ Yadidyah & Moshe J.Augenstein and Aaran M.Tenenbanm PHI.

PAPER –105: Mathematical Methods of Signal and System Analysis

UNIT-**1. Functions of Complex Variables:**
introduction - complex numbers and conjugates. Analytic functions - conditions for regular, Cauchey - Reimann Equations. Harmonic functions. Cauchy's theorem and Cauchy's integral formula. Taylor's series - Laurent's series - Singularities, residue at a finite pole. Residue theorem. Integration around the unit circle infinite semi circle, indented semi circle. (Text Book 1)

UNIT-**2.   Laplace Transforms:**
Definition, properties of Laplace transforms. Different methods of finding Laplace transforms - inverse transforms - Convolution theorem, Laplace Transform of periodic functions and special functions. Solutions of ordinary linear differential equations with constant coefficients using Laplace transforms. (Text Book 2)

UNIT-**3.   Fourier Transforms:**
Fourier series - complex form of Fourier series - Fourier Integral theorem -Fourier Transform - properties - convolution theorem - Inverse transforms -Fourier Transform of periodic functions spectrum envelope for a recurring pulse. Fourier Transform involving Impulse function -square of rectangular pulse. (Text Book 2)

UNIT-**4.   The Z -Transforms:**
Introduction to Z- Transforms - Inverse Z- Transform   - properties of Z-Transform. Analysis and characterisation of LTI systems using Z-Transfoi m. (Text Book 3 Chapter 10,10,1,10.2, 10.3, 10.5, 10.7)

UNIT- **5. Random variables** and **processes:**
introduction to probability - mutually exclusive events - Joint probability of related and independent events, statistical independence, Random variables, cumulative distribution function, probability density function. Relation between probability and probability density, Gaussian probability density - correlation between random variables - central limit theorem. Random processes - correlation function -Auto and cross correlations and their properties.
(Text Book 4 Chapter 2, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.14, 2.19, 2.20,and Text Book 5)

TEXT BOOKS:
1. Introduction to Mathematical Physics by Charlie Harper (PHI).
2. Higher Engineering Mathematics by-B.S.Grewal (Khanna)
3. Singals and systems by A. V.Oppenheim, AS.Willsky, I.T. Young (PHI)
4. Principles of Electronic communications by Taub and PBSchilling. (TMH)
5. R.P.Singh and S.D.Spare communication system Analog and Digital

REFERENCE BOOKS:

Engineering Circuit Analysis by Willium H.Hayt, Jr. & Jack E. Kemmerly. McGraw Hill.

Paper -201. Advanced Communication Systems

Unit -1. Digital Modulations: Introduction - Review of orthogonal Signal (FSK, PSK), MSK, M-ary coding and QAM. Differential phase shift keying Trelli's code Modulation. Probability of error and bit error rate. Bit error performance

Unit -2. Spread Spectrum modulations: PN sequence. Direct sequence spread spectrum. Frequency hopping systems, performance of DSSS, CDMAS synchronization of speed spectrum: Applications of spread spectrum techniques in cellular PCS and mobile communications. Acquisition and tracking.

Unit -3. Mobile Communication: Introduction - Evaluation systems - standards -Mobile personal computers - speech coding for wireless systems. - Applications concept of frequency reuse, co-channel interference cell splitting. Diversity techniques for mobile radio systems: Concept of diversity branch and signal paths combing and switching methods, corrier to noise and corrier to interference ratio performance improvements.

Unit -4. Cellular Systems: Introduction. Analog and Digital cellular systems. Access methods TDMA - FDMA - CDMA. Personal communication systems (PCS). Global systems for mobile communications (GSM) - Personal communication satellite systems (PCSS).

Unit -5. **Satellite systems, Indian satellites and applications**- Types of satellite systems, Characteristics of satellite systems, Satellite system infrastructures, Call setup, Global Positioning systems, INSAT satellites, Small Earth stations in India, IRS satellite program, Satellite applications- Different areas, Satellite Television, Telephone services, Data Communication Services, Satellites for Earth observations, Weather forecast, Scientific studies.

TEXT BOOKS:

1.   Dr.Kamilo Feher 'Wireless Digital Communications' modulation and
     spread Spectrum applications (PHI) 1999.
2.   W.Tomasi advance electronic communications systems (low priced
     edition) 2004.
3.   Dr. D.C. Agrawal "Satellite communications", 5/e, Khanna Publishers, 2002.
     (UNIT-V)

REFERENCE BOOKS:

1.   W.C.Y.LEE Mobile cellular telecom communication. Mc.Graw Hill
2.   M.Richharia, "Satellite Communications Systems", 2/e, Macmillan Press
Ltd.,   1999.
3.   Partt, Bostian and Allnutt, "Satellite Communications", 2/e, John Wiley   &
Sons, 2003.

Paper 202: MICROCONTROLLERS AND INTERFACING

UNIT - 1
Introduction to Microcontrollers- Microcontrollers and Microprocessors, Embedded versus External Memory Devices, 8-bit and 16-bit Microcontrollers, CISC & RISC processors.
8051 Microcontrollers– MCS-51 architecture, Registers in MCS-51, 8051 pin description, pin connections, Parallel I/O ports and Memory organization.

UNIT – 2
8051 addressing modes, instructions and programming- 8051 addressing modes, Instruction Set, Assembly language Programming tools, Development Systems and Tools.
MCS—51 Interrupts, Timer/Counters, and Serial communications- Interrupts in MCS-51, Timers and Counters, Serial Communication.

UNIT - 3
Design with Atmel Microcontrollers- Atmel Microcontrollers, Architectural overview of Atmel 89C51 and Atmel 89C2051, Pin description of 89C51, and 89C2051, Using Flash Memory devices ATMEL 89CXX and 89C20XX, Power saving options.
Applications- Waveform generation- Sine, Square, Pulse, Ramp, Staircase, Pulse Width Measurement, Frequency Counter.

UNIT - 4
PIC Microcontrollers- Overview and features, PIC 16C6X/7X, PIC reset actions, Oscillator connection, Memory organization, PIC 16C6X/7X instructions, Addressing modes, I/O ports, Interrupts, PIC 16C61/71 timer and A/D converter.
PIC 16F8XX Flash Microcontrollers- Pin diagram of 16F8XX, STATUS Register, OPTION_REG Register, Power Control Register, PIC 16F8XX program memory, data memory, Data EEPROM and Flash Program EEPROM, Interrupts in 16F877, I/O ports and Timers.

UNIT – 5
Interfacing and Industrial Applications of Microcontrollers- Interfacing of Keyboard, 7-segment LED, LCD, ADC, and DAC, Optical Rotary shaft encoder, LVDT, Angular speed measurement, Digital thermometer, Load cell.
Automation and Control applications- Digital PID controller, Stepper motor.

Books for Study:

1.   Ajay V. Deshmukh, "Microcontrollers: Theory and Applications", Tata Mc Graw-Hill, New Delhi, 2005.
2.   M.A. Mazidi and J.G. Mazidi, "The 8051 Microcontrollers and Embedded Systems", Pearson Education, Inc., 2002.

Reference Books:

1.   K.J. Ayala, "The 8051 Microcontroller Architecture, Programming & Applications", 2/e, Penram International Publishing (India) Pvt. Ltd.,1996.
2.   John B. Peatman, "Designing with PIC Microcontrollers", Pearson Education, Inc., 1998.
3.   Myke Predko, "Programming and Customizing the 8051 Microcontroller", TMH, 1999.

PAPER -203.   Optoelectronic Devices and Applications

UNIT -1
FUNDAMENTALS OF LASERS

The nature of light, Emission and Absorption, Spontaneous emission, Stimulated emission, Optical Cavity,   Population Inversion, conditions for coherence, Time coherence, Space coherence, General Principles: Optical Cavity, Mirrors, . Semiconductor lasers

UNIT – 2
Modulation of light: - Electro optic modulation - Kerr modulators
Laser diode modulation

UNIT -3
Electro optic devices:
Theory of LED, White LED. Photo detectors - vacuum photo-diode - photo multipliers, Noise in photo multipliers. Photoconductive detectors - noise in photoconductive detectors - characteristics of particular - photo conductive materials. Silicon Photodiodes, Spectral response and sensitivity.

UNIT -4
OPTICAL FIBRES AND APPLICATIONS

  Optical fibers and their types, Numerical aperture, bandwidth, transmission losses, step index and graded index fibers. Construction of fiber cables, splices, connectors and opto - couplers. Light sources and receivers for fiber optic communications.

UNIT -5.

  Application of Infrared detector used for TV and other remote controllers. Optical shaft encoders. Opto-isolator applications for speed control of motors with slotted wheels. Light intensity (LUX) meter.

TEXT BOOKS:
   1.William J & Hawkes.FB. Opto electronics: an introduction (PH)
   2.Verdeyen JT.Laser electronics (PH)
   3. Lasers and non-linear optic by B.B.Laud (WE)
   4. EFY Project Books.

PAPER 204: CONTROL SYSTEMS

UNIT-1: INTRODUCTION TO CONTROL SYSTEMS
(a)   Basic Components of a control system. Open –loop and closed- loop Control systems and their differences

(b)   Classifications of control systems- Linear & non-linear, time-invariant & time-varying , continuous & sampled data and digital.

(c)   Effects of feedback on-overall gain, stability, sensitivity, bandwidth and noise.

UNIT-2: MATHEMATICAL MODELLING OF PHYSICAL SYSTEMS
(a)   Differential Equation approach to the electrical circuits and components.

(b)   Transfer function approach to physical systems.

(c)   Block diagram algebra.

(d)   Signal flow-graphs.

UNIT-3:TIME RESPONSE ANALYSIS AND STABILITY CRITERIA
(a)   Standard test signals. Time response of first and second order systems-transient and steady state response. Time domain specifications steady state errors and error coefficients.

(b)   Basic control action. Proportional (P), proportional derivative (PD), proportional integral (PI) and proportional integral derivative (PID) controllers.

(c)   Concept of stability. Necessary condition for stability. Hurwitz stability criterion. Routh stability criterion. Relative stability analysis.

    Ref: Nagrath and Gopal (Ch 2,4,5,6)
              Kuo (Ch 3,4,7,8)
              Ogata.

UNIT-4: FREQUENCY RESPONSE ANALYSIS AND STABILITY CRITERIA
Frequency domain specifications. Bode diagrams. Determination of frequency domain specifications from Bode diagram. Finding the transfer function from the Bode diagram. Phase margin and margins. Stability analysis from Bode plots. Polar plots. Nyquist plot. Applications of Nyquist criterion to find the stability. Effects of adding poles and zeros to G(s)H(s) on the shape of Nyquist diagram. Lead compensation, lag compensation, lead lag compensation based on frequency response approach.

Ref: Nagrath and Gopal (Ch8,9)
       Ogata

UNIT-5: ROOT-LOCUS TECHNIQUE
Root-Locus concept. Construction of root-loci. Rules for constructing root-loci. Root-locus analysis of control systems. Determination of roots from root-locus. Sensitivity of the roots of the characteristic equation.

Ref: Nagrath and Gopal (Ch.12)
       Kuo(Ch.5)

TEXT BOOKS:
1. Control Systems Engineering --Nagrath ,LJ., and Gopal ,M(Welly-Eastern)
2. Automatic Control Systems--Benjamin C.Kuo (Prentice hall of India)
3. Modern Control Systems Engineering--Ogata (Prentice Hall of India)

PAPER 205: TEST & MEASURING INSTRUMENTATION.

UNIT-1: BASIC INSTRUMENTS
Analog Multimeter: Sensitivity, Loading, Measurement of D.C. Current, Voltage, Resistance, A.C. Voltage and currents; power and energy meters,.

UNIT-2: CATHODE RAY OSCILLOSCOPES:
Introduction to special purpose CRO's - Dual trace, storage, and sampling CRO's Digital memory scopes.

UNIT-3: ELECTRONIC MULTIMETER

Working principle of Integrating type DVM Introduction to ICL 7106/7107 DVM I.C, Measurement of voltage and current (D.C& A.C) and resistance. Applications of DVM- Conversion of a DVM to measure Temperature, frequency, Capacitance.

UNIT-4: Function Generators and Wave Form Analyzers Basic waveform generator circuits - Function generator using ICL 8038,
Digital Frequency Meter - Measurement of frequency Basic circuit, time base, start and step gates. Introduction to frequency counters ICs 74 HC 926 and ICM 7216.Basic circuit to measure up to 10 MHz and high frequency measurement Ratio and time interval measurement.

UNIT-6: Signal Recovery - Lock- in amplifier- - Theory, block diagram, working principle and applications.

TEXT BOOKS:
   1   IC data manuals and application notes.
   2   Electronic Instrumentation and Measurement Techniques - William David Copper and Albert D.Helfriek
   3   A Course in Electrical and Electronic Measurements and Instrumentation- A.K. Sawhney

301 - DIGITAL SIGNAL PROCESSING

1.Introduction: Introduction to Digital Signal Processing. Discrete time signals & sequences, linear shift invariant systems, stability and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

2. Fourier & Z -Transforms:

Discrete Fourier series: Properties of discrete Fourier series, DFS representation of periodic sequences.   Discrete Fourier Transforms Properties of DFT, linear convolution of sequences using DFT.   Computation of DFT: Fast Fourier Transforms (FFT) - Radix -2 decimation in time and decimation in frequency FFT Algorithms. Inverse FFT.

Z - **Transforms** Applications of z-transforms, solution of difference equations of digital filters.   System function, stability criterion, frequency response of stable systems. Realization of digital filters - direct, canonic, cascade & parallel forms.

3.DIGITAL FILTERS:

IIR FILTERS: Analog filters approximations - Butterworth and Chebyshev. Design of IIR Digital filters from analog filters - Bilinear transformation method, step & impulse invariance techniques. Spectral Transformations.

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques. Comparison of IIR & FIR filters.

4.APPLICATIONS OF DSP:

Applications of FFT in spectrum analysis and filtering. Application of DSP to speech processing & Radar signal processing.

5. INTRODUCTION TO DSP PROCESSORS:

Difference between DSP and other Microprocessor architectures, their comparison, need for special DSP's RISC vs CISC. Overview of various DSP architectures.

TEXT BOOKS:

1.   Digital Signal Processing - Oppenheim & Sehaffer (PHI)
2.   Digital signal processing - S.K.Mitra (TMH)
3.   Digital Signal Processing - D.Ramesh Babu (Scietiech)

REFERENCE BOOKS

1.   C.Marven & G. Ewers. " A Simple approach to digital Signal Processing",
         Willy Interscience 1996.
2.   K.K.Parhi & John Willy, "VLSI DSP Systems (1999).

Paper -302. Embedded Systems

UNIT – I
A First Look at Embedded Systems – Examples of Embedded Systems, Typical Hardware. Hardware Fundamentals for the Software Engineer – Terminology, Gates, other Basic Considerations, Timing Diagrams, Memory.Advanced Hardware Fundamentals – Microprocessors, Buses, Direct Memory Access, Interrupts, Other Common Parts, Built – Ins on the Microprocessor.

UNIT – II
Interrupts – Microprocessor Architecture, Interrupts Basics, The Shared – Data Problem, Interrupt latency. Survey of Software Architecture – Round Robin, Round Robin with Interrupts, Function – Queue – Scheduling Architecture, Real – Time Operating System Architecture, Selecting an Architecture.

UNIT – III
Introduction to Real–Time Operating Systems – Tasks and Task states, Tasks and Data, Semaphores and Shared Data. More Operating System Services – Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines an RTOS Environment.

UNIT – IV
Basic Design using a Real–Time operating systems-- Overview, Principles, an Example, Encapsulating semaphores and Queues, Hard Real – Time Scheduling Considerations, Saving Memory Space, Saving Power.

UNIT – V
Embedded Software Development Tools – Host and Target Machines, Linker/ Locators for Embedded Software, Getting Embedded Software into the Target System. Debugging Techniques – Testing on your Host Machine, Instruction set simulators, The Assert macro, Using Laboratory Tools.

TEXT BOOK:
An Embedded Software Primer, by David E Siman – Pearson Education, Asia.

REFERENCE BOOK:
D.Gakski, F.Vahid, S.Narayana, J.Goug, by specification and design of Embedded systems – Prentice Hall.

Paper 303. FIBER OPTIC COMMUNICATIONS

Unit -1 Fiber optical wave guides: Introduction, total internal reflection, planar dielectric wave guide, optical fiber wave guides - step index fibers, inter-modal dispersion, single mode fibers, graded index fibers, low dispersion fibers. (Chapter 8: Textbook 1)

Unit -2 Signal Degradation in optical fibers: Fiber materials **and** fabrication methods, Attenuation units, Absorption, scattering losses, Radioactive losses, core and cladding losses, signal distortion in optical wave guides, Information capacity determination, Group delay Material dispersion, Wave guide dispersion.
(Chapters 2&3 of Text book 2)

Unit – 3 Power Launching and coupling:
Source to Fiber power launching - source output pattern, power - coupling calculation, power launching verses wavelength, equilibrium Numerical Aperture Lensing schemes for coupling improvement Nonimaging Microsphere. Laser diode - to - fiber coupling, Fiber-to-fiber joints, Mechanical Misalignment, Fiber-related losses, Fiber end face preparation, Fiber splicing, optical fiber connectors. (Chapter 5 Text book 2)

Unit -4. Transmission link Analysis:
Point-to-point links, System consideration, link power budget, rise time budget, Transmission distance for single mode links, wavelength division multiplexing (WDM), Passive Components - The 2x2 fiber coupler, the 2x2 wave guide coupler, star coupler, local area network.. (Text Book 1 & 2)

Unit -5. Measurements:
Attenuation Measurements - The cutback technique, Insertion loss method, optical time domain reflecto meter. Dispersion measurements-Intermodal Dispersion, time domain intermodal dispersion measurements, Frequency domain intermodal dispersion measurements. OTDR Field Applications - OTDR Trace, Attenuation Measurements, Fiber fault location. (Chapter 13, Text Book 2)

TEXT BOOKS:

1. Willam J & Hawkes F.B opto electronics: An introduction. (PHI)
2. Gerd Keiser optical fiber communications (3rd Edition McGrawHill).

Reference Books:

1. A. Selvarajan, S. Kar, and T.Srinivas, "Fibre Optic Communications", Tata Mc-Graw Hill, 2002
2. N.Sharma, "Fibre Optics in Telecommunications", Tata Mc-Graw Hill.
3. D.C.Agarwal, "Fibre Optic Communications", Wheeler Publishing, 1993.
4.optical fiber communications- Subirkumar Sarkar, S.Chand company

Paper 304. PC Architecture and Interfacing

UNIT - I
Hardware Organization of IBM PC: Introduction, Components of IBM PC, Interfaces, Software Support.
Advanced Microprocessors: Introduction, Protected Mode Operation, The 80286 Microprocessor, The 80386 Microprocessor, The 80486 Microprocessor, The Pentium Microprocessor, The Pentium-MMX Microprocessor, The Pentium-Pro Microprocessor, The Pentium-II Microprocessor, Specifications of Intel Processors.

UNIT – II
The Motherboard of IBM PC: Introduction, Motherboard Components; Microprocessor, Support Chips, Memory, Support Functions, I/O Buses, System Resources; Interrupt Requests, DMA Channels, I/O Addresses, Utilization of System Resources, ROM BIOS Services.

UNIT – III
Drives: Introduction, Principles of Magnetic Storage, Floppy Disk Drive, Hard Disk Drive, IDE Interface, SCSI Interface, CD-ROM Drive, BIOS Disk Drive Services.

UNIT – IV
PERIPHERALS: Introduction, Video Display System, Keyboard, Mouse, Printer.

UNIT – V
I/O BUSES: ISA Bus, MCA Bus, EISA Bus, Local Buses, VL Bus, PCI Bus, AGP, Parallel and Serial Ports, Universal Serial Bus.

TEXT BOOK:
Microprocessors, PC Hardware and Interfacing – N. Mathivanan (Private Ltd.)

Reference Books:

1. Scott Mueller, Upgrading and Repairing PC's PHI, New Delhi, 1995.
2. B.Govindarajulu, IBM PC and Clones + Hardware, Trouble Shooting and Maintenance.
3. Robert C.Brenner "IBM PC Troubleshotting and repaid guide" BPB publications.
    George W Gorsline "Computer Organization, Hareware/Software" II edition PHI.

PAPER 305: SENSORS, SIGNAL CONDITIONERS.

Unit -1: GENERAL INTRODUCTION TO SENSORS/ TRANSDUCERS

Definition of a transducer/ sensor .Role of a transducer in a generalized measurement system classification of transducers. Characteristics of transducers. Significant parameters of a transducers .non-linearity in the response of transducers and methods of linearization. Signal conditioning of various transducers and measurement of various physical parameters.

Unit -2 : TEMPERATURE SENSORS
Temperature scales - Mechanical temperature sensors. Resistance type temperature senors. Platinum resistance theromometer. Thermistors. Thermocouples. Solid state sensors. Quartz thermometer. Radiation type senors – optical pyrometers. Calibration of thermometers. Digital thermometer.

Unit -3: MEASUREMENT OF DISPLACEMENT, ACCELERATION,VIBRATION
Accelerometer- Displacement transducers- variable resistance , inductance and capacitance. Liner voltage differential transformer(LVDT) . Strain –definition . principle of working of strain gauges. Gauge factor. Types of strain gauges. Materials for strain gauges temperature compensation. Applications. Piezo- Electric Transducer. Mechanical type vibration instruments- Sesmic instrument as an accelerometer and vibrometer – Calibration of vibration pickups.-

Unit -4; PRESSURE TRANSDUCER

Units of Pressure- Manometers- Elastic transducers – diaphragms, bellows , bourdon or helical tubes . Electrical pressure transducers- Piezoelectric pressure transducer. Vibrating element pressure sensors. - Measurement of vacuum-McLeod gauge-thermal conductivity gauge-Ionization gauge- Testing and calibration of pressure gauges.

Unit -5: MEASUREMENT OF FORCE TORQUE, VELOCITY, FLOW, LEVEL
Different types of load cells- different types of torque measurement, regular twist speed measurement-revolution counter- D.C and A.C tacho generators-stroboscope- Different methods of flow measurements.

Text Books:
1. Instrumentation measurement and analysis Nakra and Chaudhry. Tata McGraw Hill.
2. Instrumentation – devices and systems Rangan , Mani and Sharma
3. A course in electrical and electronic measurements and instrumentation ; A.K.Sawhney. Dhanaraj and Sons, New Delhi.

Reference Books:
1. Measurement of Systems Applications and Design,Ernest O.Doeblin. McGraw Hill.
2. Machanical and Industrial Measurements. R.K.Jain. Khanna Publishers, New Delhi.
3. Principles of Industrial Instrumentation - Patranabis. D. Tata McGraw Hill.
4. Experimental Methods for Engineers, P.Holman. International Students Edition, McGraw Hill.

PAPER 401. VLSI DESIGN (Verilog HDL)

1 .Overview of Digital Design with Verilog HDL, Hierarchical Modeling concepts, Basic concepts - Lexical conventions, Number Specifications, strings, Identifiers and keywords, Escaped Identifiers, Data Types, System tasks and compiler Directives, Modules and Ports. (CH.l to4)

2.Gate Level Modeling - Gate Types, Gate flow Modeling continuous Assignments, Delays, Expressions, Operators and Operands, Operator types, Examples, Behavioral Modeling - Structured Procedure, Procedural Assignments, Timing controls, conditional statement, multiway branching, loops, sequential and parallel Blocks, examples, (CH.5 to 7)

3.Tasks and functions - Difference between tasks and functions, tasks, functions, useful Modeling Techniques - Procedural continuous assignments, overriding parameters, conditional compilation and Execution, Time scales, useful system tasks. (CH 8&9)

4.Timing and Delays - Types of delay models, path delay modeling, timing checks, delay back, annotation, switch - level modeling, switch-modeling elements, examples, (CH-10&11)

5.User - Defined primitive - UDP basis, Combinational UDPs, sequential UDPs, UDP table shorthand symbols, guidelines for UDP Design, Programming. Language Interface - Uses of PLI, Linking and Invocation of PLI tasks, Internal Data representation, PLI library routines. (CH 14)

TEXT BOOKS:

Verilog HDL, A guide to digital design and synthesis - Samir Palintkar REFERENCE

BOOKS:

1   A Verilog HDL Primer - J.Bhasker.
2. Digital design and synthesis with Verilog HDL, E.Sternbein, Rajvir Singh, Rajeev Madhavan, Yatin Trivedi - Automata Publishing Company, CA, 1993.
3.The Verilog Hardware Description Language - Kluwer Academic Publishers, MA, 1994. 4. Verilog HDL 2.0 Language Reference Guide - Stuart Sutherland -
    Sutherland consulting, 10,1993.

Paper 402. Networking Technology.

UNIT – I   Fundamentals of Networking
Data Communication: Components, Representation & Flow. Networks, Working on a Networked Environment, Network Topology, LAN, WAN, MAN. Concept of Email, uses of Internet. **Network node components** – Hubs, Bridges, Routers, Gateways and switches. ISDN – Transmission Technology, Communication Protocols and Standards.

UNIT – 2   Packet Switched Networks:
OSI Model, Layers in the OSI MODEL, TCP/IP Protocol site. **IEEE Standards**- Ethernet (802.3), Token Ring (IEEE 802.5). FDDI, DQDB,Frame Relay, SMDS – Internetworking with SMDS.

UNIR – 3   Internet and TCP/IP Networks:
Overview – Internet Protocol, TCP and UDP, Performance of TCP/ IP networks. **Circuit switched networks**: SONET, DWDM, Fiber to home, DSL, Intelligent networks, CATV.

UNIT – 4   ATM and Wireless Networks:
Main features of ATM – addressing, signaling and Routing. ATM cell header structure-Adaptation layer, Management and Control. BISDN, Interworking with ATM, Wireless Channel, link level design, Channel access. Network design and wireless networks.

UNIT – 5   Optical Networks and Switching:
 Optical Links – WDM Systems, Cross – Connects, Optical LAN's, optical Paths and Networks. **Circuit switches** – TDS and SDS, Modular switch designs, Packet Switches. Distributed, shared, input and output buffers.

TEST BOOKS:
1. Mani Subramanian , "Network Management Principles and Practice".Addision Wisely, New York, 2000.

2. Guide to Networking Essentials, Fourth Edition (0619215321) Greg Tomsho, Ed Tittel, Greg Johnson, ISBN: 0-619-21532-1© 2004.

3. Networking Concepts and Technology: A Designer's Resource By John Berger Distributed by: Prentice Hall.

4. Jaiswal.S., Networking Technologies, Galgotia Publication, 1997.

REFERENCE:
1. Jean Warland and Pravin Varaiya, High Performance Communication networks, 2nd Edition, Harcourt and Morgan Kauffman, London, 2000.

2. Sumit Kasera, Pankaj Sethi, ATM Networks, Tata McGraw Hill, New Delhi, 2000.

3. Behrouz a. Forouzan, Data Communication and Networking, Tata Mc Graw Hill, New Delhi, 2000.

4. Lakshmi G Raman, "Fundamentals of Telecommunication Network Management", Eastern Economy Edition IEEE Press, New Delhi, 1999.