

BHARATHIAR UNIVERSITY, COIMBATORE
M.SC. ELECTRONICS AND COMMUNICATION SYSTEMS
WITH COMPULSORY DIPLOMA

Scheme of Examination (CBCS PATTERN)

For candidates admitted during the Academic Year 2009-2010 and onwards

SEM	Subject and Paper	Instruction Hrs./Week	Examination duration Hrs.	University Examination			Credit
				CIA	Uni. Exam	Total	
I	Paper I : Instrumentation and Control Systems	5	3	25	75	100	5
	Paper II : MEMS and Power Electronics	5	3	25	75	100	5
	Paper III: 8051 Micro Controller with C Programming	5	3	25	75	100	5
	Paper IV : Telecommunication and Fibre Optics	4	3	25	75	100	5
	Prac I : Electronics and Communication Systems Lab	4	-	-	-	-	-
	Prac II : Embedded Systems and Real Time Operarting Systems Lab	4	-	-	-	-	-
	Elective Diploma : Paper I	3	3	25	75	100	3
II	Paper V : Signals and Systems	5	3	25	75	100	5
	Paper VI : Wireless Communications and Networks	5	3	25	75	100	5
	Paper VII: Embedded Systems and Real Time Operarting Systems	5	3	25	75	100	5
	Paper VIII : Computer Communication and Networks	4	3	25	75	100	5
	Prac I : Electronics and Communication Systems Lab	4	4	40	60	100	4
	Prac II : Embedded Systems and Real Time Operarting Systems Lab	4	4	40	60	100	4
	Elective Diploma : Paper II	3	3	25	75	100	3
III	Paper IX : Digital Signal Processing	5	3	25	75	100	5
	Paper X : Digital Image Processing	5	3	25	75	100	5
	Paper XI : VLSI Design and VHDL Programming	5	3	25	75	100	5
	Paper XII : Nano Science and Technology	4	3	25	75	100	5
	Prac III : DSP Lab	4	4	40	60	100	2
	Prac IV :VLSI Lab	4	4	40	60	100	2
	Elective Diploma : Paper III	3	3	25	75	100	3
IV	Project Work	10	-	-	-	200*	6
	Elective Diploma : Practical	3	3	40	60	100	3

List of Group Elective/Diploma papers (Colleges can choose any one of the Group/Diploma papers as electives)

	GROUP A DIPLOMA IN INFORMATION TECHNOLOGY	GROUP B DIPLOMA IN ELECTRONIC INSTRUMENTATION	GROUP C DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION
Paper I/ Sem I	Web Technologies	Electronic Test Instruments	Analog and Digital Circuit Design and Analysis
Paper II/ Sem II	Relational Data Base Management Systems	Analytical Instrumentation	PCB Designing and Product Development Tools
Paper III/ Sem III	Programming with .NET	Virtual Instrumentation	Signal Processing Implementation and Simulation
Paper IV/ Sem IV	RDBMS and .NET Lab	Instrumentation Lab	EDA Tools : Design, Analysis and Simulation lab

SEM – I

Core Paper – I

INSTRUMENTATION AND CONTROL SYSTEMS

Subject Description: This course presents the concept of Instrumentation and basic principles involved in the control systems. It contains the different types of transducers and digital instruments.

Goals : To enable the students to learn the fundamentals of Instrumentation and control systems and its application scenarios.

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

Contents :

UNIT I DIGITAL INSTRUMENTS

Digital Multimeter – Digital frequency meter – Digital measurement of time - Digital measurement of mains frequency – Digital tacometer – 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: 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.

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

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, lag-lead Compensation. Design of cascade compensators – Using Bodes’s plot.

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

SEM – I

Core Paper – II

MEMS AND POWER ELECTRONICS

Subject Description: This course presents the overview and working principles of MEMS, fabrication and Microsystems design, AC voltage controller, D.C choppers, Inverters and Power supplies.

Goals : To enable the students to learn the techniques and working principles of microsystems and to study the different types of Power electronic circuits and their applications.

Objectives : After successful completion of the course, the students should have
Understood the concept of Microsystem fabrication & design
Understood Power electronic devices, circuits and its applications.

Contents :

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 commutation 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.

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.

TEXT BOOKS

1. “MEMS & Micro Systems Design and Manufacture” – Tai-Ran-Hsu, TMH, 2002 Edition.
2. “Power Electronics, Circuits, devices and Applications”, MUHAMMED RASHID, Prentice Hall Edition, 2nd Edition, 1999.
3. “Power Electronics” by Bimbira, Anna University –Reference book.

SEM – I

Core Paper – III

8051 MICROCONTROLLER WITH C PROGRAMMING

Subject Description : This subject presents the architecture, Programming in ALP & C and real world applications of the 8051 microcontroller.

Goals : To enable the students to learn the instruction set, programming, and interfacing concepts of microcontroller.

Objectives : On successful completion of the course the students should have :
Developed the programming skills in 8051ALP & C
Understood the concept of 8051microcontroller based system design

Contents :

UNIT I : OVERVIEW AND INSTRUCTION SET

Microcontrollers and embedded processors – microcontrollers for embedded systems – over view of 8051 family – 8051 instruction set and registers

UNIT II : ASSEMBLY PROGRAMMING ADDRESSING MODES

8051 assembly programming – program counter – ROM – data types – directives – flag bits – PSW registers – register bank – stack – loop and jump instructions – I/O port programming – addressing modes

UNIT III : ARITHMETIC AND LOGICAL OPERATIONS IN ALP & C

Arithmetic instructions and programs – unsigned addition and subtraction – unsigned multiplication and division – logic instructions and programs – single bit instructions and programming

Programming with C : Data types – time delay programming – I/O programming – logic operations – arithmetic operations

UNIT IV : 8051 INTERRUPTS & PERIPHERALS

Basic registers of timer – programming of 8051 timer – counter programming – 8051 serial communication – 8051 connection to RS232 – 8051 serial communication programming – programming timer interrupts – 8051 interrupts – programming external hardware interrupts – programming with serial communication interrupts – peripheral and interrupt programming in C

UNIT V : REAL WORLD APPLICATIONS

LCD Interfacing – keyboard interfacing – parallel and serial ADC interfacing – DAC interfacing – sensor interfacing and signal conditioning – RTC interfacing – relays and optoisolator interfacing – stepper motor interfacing - DC motor interfacing and PWM

TEXT BOOK

1. “THE 8051 MICROCONTROLLER AND EMBEDDED SYSTEMS USING ASSEMBLY AND C ” by Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, PHI, 2nd edition 2006

SEM – I

Core Paper – IV

TELECOMMUNICATION AND FIBER OPTICS

Subject Description: This course presents the telecommunication transmission system, digital switching system, transmission networks, and fiber optic communications.

Goals : To enable the students to learn telecommunication switching systems and fiber optic communication systems.

Objectives : After successful completion of the course ,the students should have
Understood the concept of telecommunication switching system
Understood the concept of optical fiber communication systems.

Contents :

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

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

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

SEM – II

Core Paper –V

SIGNALS AND SYSTEMS

Subject Description: This course presents the basic principles of signals & systems, transforms and its properties, sampling of CT and DT signals.

Goals : To enable the students to learn the basic principles, operations and concepts of signals and systems.

Objectives : After successful completion of the course ,the students should have Understood the concept of signals and systems.

Learnt the applications of transforms and its properties.

Learnt the Sampling of CT and DT signals.

Contents :

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

UNI 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

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

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

TEXT BOOK

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

REFERENCES:

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

SEM – II

Core Paper – VI

WIRELESS COMMUNICATIONS AND NETWORKS

Subject Description: This course presents the encoding techniques, coding methods, satellite communication, cellular communication and wireless LANs.

Goals : To enable the students to learn the technology of wireless communication and networks.

Objectives : After successful completion of the course ,the students should have
Understood the concept of encoding techniques.
Understood the concept of satellite and cellular networks.
Learnt wireless LAN technology.

Contents :

UNIT I: TECHNOLOGY AND SIGNAL ENCODING TECHNIQUES

Antennas: types – propagation modes – line of sight transmission – fading in the mobile environment – 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.

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.

TEXT BOOKS

1. “WIRELESS COMMUNICATIONS AND NETWORKS” by WILLIAM STALLINGS – 2002 – PEARSON EDUCATION ASIA

SEM – II

Core Paper – VII

EMBEDDED SYSTEMS AND REAL TIME OPERATING SYSTEMS

Subject Description : This subject presents the architecture & Programming of PIC16F877 microcontroller, and Micro C/OS-II RTOS functions.

Goals : To enable the students to learn the instruction set, programming, and interfacing concepts of PIC16F877 microcontroller and RTOS based system design.

Objectives :

On successful completion of the course the students should have :

Developed the programming skills in PIC16F877 microcontroller.

Understood the concept the RTOS.

Understood the concept embedded system design

Contents :

UNIT I: INTRODUCTION TO EMBEDDED SYSTEMS

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

TIMER0 Module – TIMER1 Module – TIMER2 Module – Capture/Compare/PWM Modules – I2 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 out reset – interrupts – watchdog timer – SLEEP

UNIT IV: REAL TIME OPERATING SYSTEMS

Definitions of process, tasks, and threads – Operating system services – goals – structures- kernel – 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 – mutex- flag- message queues – mailboxes – pipes- virtual sockets – remote procedure calls

UNIT V: RTOS Programming Tools: Micro C/OS-II and Vxworks

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

TEXT BOOKS

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint, 2003.

2. PIC 16F87X data book, Microchip Technology Inc., 2001

SEM – II

Core Paper – VIII

COMPUTER COMMUNICATION AND NETWORKS

Subject Description: This subject presents data communication, various standards in networks with architectures and protocols.

Goals : To enable the students to learn the computer networks for today's needs.

Objectives : After successful completion of the course ,the students should have
Understood the concept of data communication
Developed their skills in networking

Contents :

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 – ARQ- Stop 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, D-channel 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.

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.

Core Practical – I

PRACTICAL – I

ELECTRONICS & COMMUNICATION SYSTEMS LABORATORY

ELECTRONICS LAB (ANY 10 EXPERIMENTS)

INSTRUMENTATION LAB

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

CONTROL SYSTEMS LAB

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

POWER ELECTRONICS LAB

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

COMMUNICATION SYSTEMS LAB (ANY 10 EXPERIMENTS)

RF & OPTICAL FIBER COMMUNICATION SYSTEMS

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

DIGITAL COMMUNICATION SYSTEMS

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

MICRO WAVE & SATELLITE COMMUNICATION SYSTEMS

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

Core Practical – II

PRACTICAL – II

EMBEDDED SYSTEMS AND REAL TIME OPERATING SYSTEMS LABORATORY

8051 BASED EMBEDDED SYSTEMS (ANY 10 EXPERIMENTS)

1. Arithmetic and Logic programs
2. Square wave generation using ports
3. Key interfacing
4. LED Interfacing
5. Seven segment display interfacing
6. Solid state relay interfacing using interrupts
7. Traffic light control system
8. ADC interface
9. DAC interface
10. Stepper miter interface
11. Timer/Counter operation
12. Serial port interfacing using RS232C
13. Digital clock
14. LCD interface
15. Object counter
16. Water level controller
17. Flow measurement
18. Temperature measurement

PIC 16F87X BASED EMBEDDED SYSTEMS & RTOS (ANY 10 EXPERIMENTS)

1. Arithmetic and Logical programs
2. Square wave generation using ports
3. Key & LED interfacing
4. Single digit timer using seven segment display
5. DC motor driving via H bridge
6. DAC interface
7. ADC INTERFACE
8. LCD interface
9. Stepper motor control
10. PWM generation
11. Compare and capture operation program
12. Serial communication using RS232C
13. PIC to PIC communication using I2 C bus

PROGRAMMING WITH RTOS

14. Semaphore & flag related functions
15. Queue & Mailbox related functions
16. Memory related functions
17. Embedded system for an adaptive cruise control system in a car
18. Embedded system for a smart card

SEM – III

Core Paper – IX

DIGITAL SIGNAL PROCESSING

Subject Description: This course presents the basic principles of processing of digital signals and its applications, design of discrete filters and its concepts.

Goals : To develop the students to learn the new techniques, solutions and a demand for knowledgeable communication professionals who have a firm grasp of the background theory and technologies.

Objectives : After successful completion of the course ,the students should have
Understood essential grounding in signal processing
Learnt the uses of DSP in satellite and communication technologies.
Recognized the future trends in DSP

Contents :

UNIT I: STRUCTURES FOR DISCRETE TIME SYSTEMS

Introduction – block diagram and signal flow graph representation of Linear co-efficient difference equation – basic structure for IIR system – basic network structures for FIR systems – Lattice structures – zero input cycles in fixed point realization of IIR digital filters

UNIT II: COMPUTATION OF DISCRETE FOURIER TRANSFORM

Introduction – efficient computation of DFT – Decimation in Time FFT algorithms – Decimation in Frequency algorithms – implementation of FFT algorithms – FFT algorithms for composite N

UNIT III: FILTER DESIGN TECHNIQUES

Introduction – design of discrete time IIR filters from continuous time filters – frequency transformation of low pass IIR filters – design of FIR filters by windowing – comments on IIR and FIR digital filters

UNIT IV: ANALYSIS OF FINITE WORD LENGTH EFFECTS

Introduction – quantization process and errors – analysis of co-efficient quantization effects – analysis of co-efficient quantization effects in FIR filters – A/D conversion noise analysis – low sensitivity digital filters – limit cycle in IIR filters – round of errors in FFT algorithms

UNIT V: DIGITAL SIGNAL PROCESSOR

TMS320C50 family overview – key features – architectural overview – functional block diagram – internal memory organization – CALU – system control – PLU – interrupts – addressing modes – Instruction set

TEXT BOOKS

1. Oppenheim A. V and Schaffer RW, Buck C “Discrete Time Signal Processing”, PHI, 1999
2. Sanjith K Mitra, “Digital Signal Processing – A Computer based approach”, Tata McGraw Hill, 1997
3. TMS 320C5X users guide, Texas instruments, 1993
4. www.ti.com/in - TMS320C5X user manual

SEM – III

Core Paper – X

DIGITAL IMAGE PROCESSING

Subject Description: This course presents the fundamentals of Digital Image Processing and image transforms, image enhancement and image encoding, analysis and computer version.

Goals : To enable the students to learn the basic principles of Image processing and analysis and computer vision of image.

Objectives : After successful completion of the course ,the students should have Understood essential grounding in “Image processing”
Learnt the uses and wide range of application scenarios.

Contents :

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.

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

SEM – III

Core Paper – XI

VLSI DESIGN AND VHDL PROGRAMMING

Subject Description: This course presents the fundamentals of IC fabrication and VHDL Programming.

Goals : To develop the students to learn the basic steps involved in the IC fabrication and modeling techniques using VHDL.

Objectives : After successful completion of the course ,the students should have
.Understood the concept of IC fabrication technology.
Developed the programming skills in VHDL
Learnt the Design of FPGA’s and CPLD.

Contents :

UNIT I: CMOS CIRCUITS & PROCESSING TECHNOLOGY

MOS TRANSISTOR – Switches – CMOS Logics – Inverter – Combinational logic – NAND gate – NOR gate Compound gates – Multiplexer – Physical design of NAND, NOR gates – SI semiconductor technology overview – wafer processing – oxidation – epitaxy deposition – Ion Implantation – Diffusion – SI gate insulator process – CMOS technology - n-well process – p-well process – Twin-Tub process – silicon on insulator – CMOS process enhancements

UNIT II: 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 III: MODELING TECHNIQUES OF VHDL

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 – 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 – Value of the signal.

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 – order of analysis – implicit visibility – explicit visibility – attributes in VHDL.

UNIT V: DESIGN OF FPGA'S AND CPLD

State machine start – programmable logic arrays – programmable array logic devices – altera max 7000 CPLD'S – Xilinx-xc 4000structures – Xilinx interconnection – Xilinx logic – Xilinx 3000 series FPGA's – Altera complex programmable logic devices – Altera flex 10k series CPLD'S

TEXT BOOKS

1. Neil H.E. Westw kamanan eshraghin, " PRINCIPLES OF CMOS VLSI DESIGN"
2. 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

SEM – III

Core Paper – XII

NANO SCIENCE AND TECHNOLOGY

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.

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 self-organisation – 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 micro-nanofabrication – 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.

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).

SEM – III

Core Practical – III

PRACTICAL – III

DIGITAL SIGNAL PROCESSING LABORATORY (ANY 10 EXPERIMENTS)

USING TMS320C5X/TMS320C54XX/TMS320C67XX

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. Waveform generation
8. Solving differential equations
9. Solving z-transform
10. Voice storing & Retrieval
11. FIR Filter design
12. IIR filter design

SIMULATION USING MATLAB

13. Generation of signals
14. Amplitude Modulation & FFT response
15. Impulse, Step, Exponential & Ramp functions
16. Frequency sampling method
17. Design of FIR filter
18. Design of IIR filter

SEM – III

Core Practical – IV

PRACTICAL – IV **VLSI LABORATORY** (ANY 10 EXPERIMENTS)

1. Study of simulation using tools
2. Study of synthesis tools
3. Place and root and back annotation for FPGAs
4. Study of development tool for schematic entry
5. Design and simulation of logic gates
6. Design and simulation of half adder & full adder
7. Design and simulation of half subtractor & full subtractor
8. Design and simulation of Encoder & decoder
9. Design and simulation of 4 bit & 8 bit multiplexer
10. Design and simulation of flip flops
11. Design and simulation of up/down counters
12. Design and simulation of shift register
13. Design and simulation of ALU
14. Design and simulation of Programmable Logic Array
15. Design and simulation of Traffic light Controller
16. Design and simulation of Real time clock
17. USART Implementation
18. State machine – Eg. Moore model

GROUP A DIPLOMA IN INFORMATION TECHNOLOGY

SEM - I

PAPER I : WEB TECHNOLOGIES

Subject Description: This course presents the concept of internet, web technology and security issues.

Goals : To enable the students to learn web technology for information management.

Objectives : After successful completion of the course ,the students should have
Understood the concept of internet
Understood the concept of web technologies.
Developed the skills for information management.

Contents :

UNIT I

Internetworking concepts – Devices: Repeaters – Bridges – Routers – Gateways – Internet topology Internal Architecture of an ISP – IP Address – Basics of TCP – Features of TCP – UDP.

UNIT II

DNS – Email – FTP – HTTP – TELNET- Electronic commerce and Web technology – Aspects – Types – E-procurement models – Solutions – Supply chain management – Customer Relationship Management – Features Required for enabling e-commerce –Tiers – Concepts of a Tier

UNIT III

Web page – Static Web pages – Dynamic Web pages – DHTML – CGI – Basics of ASP technology – Active Web pages - User Sessions: Sessions and session Management – Maintaining state information - Transaction Management: Transaction Processing monitors – object Request Brokers – Component transaction – monitor – Enterprise Java Beans.

UNIT IV

Security issues: Basic concepts – cryptography – Digital signature – Digital certificates – Security Socket Layer (SSL) – Credit card Processing Models – Secure Electronic Transaction – 3D Secure Protocol – Electronic money. Electronic Data Interchange: Overview of EDI – Data Exchange Standards – EDI Architecture – EDI and the Internet

UNIT V

Extensible Markup Language (XML) – Basics of XML – XML Parsers – Need for a standard – Limitations of Mobile Devices – WAP Architecture – WAP stack – Object Technology.

TEXT BOOK

1. Achyat.S.Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill Pub. Co, Delhi, 2006.

REFERENCES

1. Ellote Rusty Harold, "Java Network Programming", O'Reilly Publications, 1997.
2. Jason Hunter, William Crawford, "Java Servlet Programming", O'Reilly Publications, 1998.

GROUP A DIPLOMA IN INFORMATION TECHNOLOGY SEM - II

PAPER II : RELATIONAL DATA BASE MANAGEMENT SYSTEMS

Subject Description: This course presents the background of SQL, object relational Databases, and application of RDBMS.

Goals : To enable the students to learn the concept of Database management, Information systems, and its and applications.

Objectives : After successful completion of the course ,the students should have
Understood the concept of RDBMS
Developed the skills in Database management

Contents :

UNIT I : INTRODUCTION

Purpose of Database systems- View of Data-Data Models-Database Languages-Transaction Management-Storage Management Database Administrator- Database Users-System Structure.

ENTITY Relationship Model: Basic concepts-keys-Entity Relationship Diagram, Weak Entity sets,E-R Features. Specialization, Generalization.

RELATIONAL MODEL: Structure of Relational Databases-Relational Algebra-Views.

UNIT II : SQL:BACKGROUND

Basic Structure- Set Operations- Aggregate Functions-Null values- Nested Sub Queries-Derived Relations- Views- Modification of the database- Joined Relations- Data Definition Language- Embedded SQL Features.

UNIT III : INTEGRITY CONSTRAINTS

:Domain Constraints: Domain Constraints-Referential Integrity-Assertions-Triggers-Functional Dependencies. RELATIONAL DATABASE DESIGN: Pitfalls-Normalization.

OBJECT ORIENTED DATABASES: New Database Applications-Object Oriented Data Model-Object Oriented Languages-Persistent Programming Languages.

UNIT IV : OBJECT RELATIONAL DATABASES

:Nested Relations-Complex Types and Object Orientation-Querying with Complex Data types- Creation of Complex values and Objects-Comparison of Objects Oriented Relational Databases.

UNIT V : APPLICATIONS

Decision Support Systems-Data Analysis-Data Mining-Data Warehousing- Spatial and Geographic Databases-Multimedia Databases-Mobility and Personal Databases-Information-Retrieval Systems-Distributed Information Systems-The World Wide Web.

TEXT BOOK

Abraham Silberschatz, Henry F.Korth,S.Sudharson, "Database Concepts", Tata McGraw Hill International Editions-1997.

Reference Books:

- 1.Alexis Leon and Mathews Leon,"Database Management Systems"Vikas pub
- 2.Elmasri Navathw,"Fundamentals of Database Systems", Pearson Education pub, 3rd Edition 2001

GROUP A DIPLOMA IN INFORMATION TECHNOLOGY SEM - III

PAPER III : PROGRAMMING WITH .NET

Subject Description: This course presents the advanced tools and programming steps in VB.NET and ASP.NET

Goals : To enable the students to learn information system handling using .NET environment.

Objectives : After successful completion of the course, the students should have
Understood the programming concept of VB.NET and ASP.NET
Developed designing skills to manage various information systems.

Contents :

UNIT I

VB.NET: Introduction – Programming steps – Running VB.Net applications – Working with tool box controls: DateTimePicker control – Input control – LinkLabel control - Menus and Dialog boxes: MainMenu Control – Menu commands – Dialog box controls – VB.Net Variables and operators.

UNIT II

Decision structures: Conditional Expressions – if...then and Select Case Decision structures - Loops and Timers: for...next and do Loops – Timer control - Debugging VB.Net programs – Using modules and Procedures: Standard Modules, Public variables – Function Procedures and Sub Procedures - Adding graphics and Animation Effects.

UNIT III

ASP.NET: Introduction - .NET Framework – ASP – operating systems – servers – ASP objects – ADO and ADO. Net objects – ASP Components – RDBMS and other Data sources – Developing distributed Online applications – Client / Server or Tiered Applications – Built in ASP.Net objects and Interconnectivity- The ASP server object.

UNIT IV

Web forms and ASP.Net: Programming web forms – web forms capabilities – web forms processing – web forms and events – Creating web forms – Event Handlers – Building Interactive applications with VS.Net – Solutions and project in VS.Net – Solution Explorer – Creating a Web form.

UNIT V

ASP.Net configuration, Scope and State – ASP application – ASP.Net applications - ASP.Net and State – The application object – ASP sessions – The session object. ASP.Net objects and components: The Scripting object Model – Active Server Components and controls – More active server components.

TEXT BOOK:

1. Michael Halvorson, “Microsoft Visual Basic.NET step by step”, PHI Ltd, 2003.
2. Dave Mercer, “ASP.Net: A Beginner’s Guide”, Tata McGraw Hill Publishing Company Ltd, Edition 2002.

REFERENCE BOOK:

1. A J Williams, Kim Barber, “ASP Solutions”, Cream Tech Press, 2000.

GROUP A DIPLOMA IN INFORMATION TECHNOLOGY SEM - IV

PRACTICAL : RDBMS AND .NET LABORATORY

RDBMS LABORATORY(ANY 8 EXPERIMENTS)

1. Creating Tables and writing simple Queries using
 - a) Comparision Operators, b) Logical Operators, c) Set Operators, d) Sorting and Grouping

2. Creation of Reports using Column format
3. Writing Queries using built in functions
4. Updating and Altering tables usinf SQL.
5. Creation of Students Information table and write PL/SQL Block find the Total, Average marks and Results.
6. Write a PL/SQL block to prepare the Electricity Bill.
7. Spliting the table: Write a PL/SQL block to split the students information table into two, one with the Passed
and other failed.
8. Joining the Tables-Write a PL/SQL Block to join two tables,First table contain Roll Number, Name, Total and
Second Table contains the RollNo and Address.
- 9.Create a Database Trigger to check the data validity of Record.
10. Recursive Functions write a Recursive Function to find
a) Factorial of N b).Fibonacci Series with N terms.
11. Write a Recursive function to create as sequence of Roll nos using sequence.
12. Write a Database Trigger to implement the Master Detail Relationship.
13. Front and tools.
14. High level programming language extension
15. Menu Design.
16. data definition, Manipulation of base tables and views.

.NET LABORATORY(ANY 8 EXPERIMENTS)

1. Write a program to check whether the given number is Armstrong number or not.
2. Write a program to find the greatest number in text box. If the number is same, show an error message and clear the corresponding text boxes.
3. Write a program to check whether the given number is mirror no. or not.
4. Write a program to check whether the given number is prime no. or not.
5. Write a program to find the sum of digits of a given number.

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 analyzer-discharge 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.

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,

GROUP B DIPLOMA IN ELECTRONIC INSTRUMENTATION SEM – II

PAPER II : ANALYTICAL INSTRUMENTATION

Unit 1: 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-Attenuated total reflectance flame photometers- Atomic absorption spectrophotometers-sources and detectors-FTIR spectrophotometers-Flame emission photometers.

Unit 2: Chromotography

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

Unit 3: 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 4: 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 5: Radio Chemical and Magnetic Resonance Techniques

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.Meritt, 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.

GROUP B DIPLOMA IN ELECTRONIC INSTRUMENTATION SEM – III

PAPER III : VIRTUAL INSTRUMENTATION

UNIT I : INTRODUCTION

General functional description of a digital instrument - Block diagram of a Virtual Instrument - Physical quantities and Analog interfaces - Hardware and Software - User interfaces - Advantages of Virtual instruments over conventional instruments - Architecture of a Virtual instrument and its relation to the operating system

UNIT II : SOFTWARE OVERVIEW

LabVIEW - Graphical user interfaces - Controls and Indicators - 'G' programming - Labels and Text - Shape, Size and Color - Owned and free labels - Data type, Format, Precision and representation - Data types - Data flow programming - Editing - Debugging and Running a Virtual instrument - Graphical programming palettes and tools - Front panel objects - Functions and Libraries.

UNIT III : PROGRAMMING STRUCTURE

FOR loops, WHILE loops, CASE structure, formula nodes, Sequence structures - Arrays and Clusters - Array operations - Bundle - Bundle/Unbundle by name, graphs and charts - String and file I/O - High level and Low level file I/O's - Attribute modes Local and Global variables.
OPERATING SYSTEM AND HARDWARE OVERVIEW: PC architecture, current trends, Operating system requirements, Drivers – Interface Buses – PCI Bus – Interface cards – specification – Analog and Digital interfaces – Power, Speed and timing considerations.

UNIT IV : HARDWARE ASPECTS

Installing hardware, Installing drivers - Configuring the hardware - Addressing the hardware in LabVIEW - Digital and Analog I/O function - Data Acquisition - Buffered I/O - Real time Data Acquisition.

UNIT V : LABVIEW APPLICATIONS

IMAQ - Motion Control: General Applications - Feedback devices, Motor Drives - Instrument Connectivity - GPIB, Serial Communication - General, GPIB Hardware & Software specifications - PX1 / PC1: Controller and Chassis Configuration and Installation.

TEXT BOOKS:

1. Garry M Johnson, "Labview Graphical Programming", Tata McGraw Hill, New Delhi, 2nd Edition, 1996.
2. Robert H. Bishop, "Learning with Lab-View" Prentice Hall, 2003.
3. Labview : Basics I & II Manual, National Instruments, 2005.

REFERENCES :

1. Lisa K Wells, "Labview for Everyone", Prentice Hall of India, New Delhi, 1996.
2. Barry Paron, "Sensor, Transducers and Labview", Prentice Hall, New Delhi, 2000.

GROUP B DIPLOMA IN ELECTRONIC INSTRUMENTATION

SEM – IV

PRACTICAL : INSTRUMENTATION LAB

Any Five of the following

1. Simple fault finding of pH meters and Identification different type pH electrodes.
2. Displacement measurement using LVDT
3. Design of V-F and F-V converter
4. Instrumentation amplifier
5. Study of Strain gauges.
6. Thermocouple Compensation.
7. Thermistor Linearization transmitter design.
8. Pressure Calibration.
9. Signal conditioning circuit for any resistive / pressure transducer.
10. Signal conditioning circuit for optical encoder.

Any Five of the following using Lab View

1. Creating a simple VI to place a Digital Control
2. Navigation and Editing
3. VI to make a Degree C to Degree F Converter
4. Converting VI in to Sub VI
5. Write a programme to count Modulus 32 and display the values in decimal, octal decimal and Binary.
6. Built a VI using *while loop* that displays random numbers in to three wave form charts. (Strip, scope & Sweep)
7. Data Acquisition using Lab VIEW
8. Development of Temperature Measurement using Lab VIEW
9. Development of Virtual Instrument for Function Generator using Lab VIEW
10. Development of Virtual Instrument for Audio Signal Spectrum Analyser using Lab VIEW

GROUP C

DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION SEM – I

PAPER I ANALOG AND DIGITAL CIRCUIT DESIGN AND ANALYSIS

Unit I : TINA TI

TINA and Design Suite- TINA TI- Features-Tina Design suit v7- Schematic editing using mouse:- using Right and Left mouse-Measurement units- Basic Screen format.

Unit II : TINA TI

Placing the circuit components- Creating and editing Circuit schematic-Analyzing the circuit- Testing the circuit with virtual instruments-analysis of SMPS Circuit-Creating sub circuits from SPICE circuit-

UNIT III : TINA TI COMPONENTS AND PROPERTIES

Basics-Switches- meters-Sources-Semiconductors- Manufacturers Model-Opto Electronics- Gates-A/D and D/A –Flip flops-Logic IC's- RF- analog control and special devices.

UNIT IV : 5SPICE ANALYSIS

Getting Started: Introduction – Notations- Using 5Spice as a beginner-Allowed Resistance range-Simulator software and circuit design:- Modeling your circuit for simulation-Working effectively-Working with Schematic. Drawing/Editing/Panning/Zooming/Subscripts

UNIT V : 5SPICE ANALYSIS

Working with Analyses-Working with graphs- Working with the Library-Guidelines-Error Messages-Project default. Sample circuit design and simulation

Referance Books/Materials

1. Tina TI Quick Start Manual V7 distributed by Texas Instruments
2. User Guide from 5Spice Analysis

GROUP C
DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION
SEM – II

PAPER II PCB DESIGNING AND PRODUCT DEVELOPMENT TOOLS

Unit-I

Feature highlights-Making electronic design easier-Tips for design capture-Component model and library management-Multi channel design concepts net connectivity and navigation.

Unit-II

Working with simulation waveforms-Design up data and Ecos –Managing DXP panel-PCB design rules and resolving violation-Impedance controlled routing-Generating outputs.

Unit-III

Design capture simulator and layout-Creating components-Integrated circuits-Customizing component reports-Multi channel designs- Board shapes and sheets.

Unit-IV

Editing multiple objects- Signal integrity getting started with FPGA- VHDL and schematic capture- Attributes for FPGA-DXP and xilinx interface

Unit V

LabVIEW : SOFTWARE OVERVIEW - Graphical user interfaces - Controls and Indicators - 'G' programming - Labels and Text - Shape, Size and Color - Owned and free labels - Data type, Format, Precision and representation - Data types - Data flow programming - Editing - Debugging and Running a Virtual instrument - Graphical programming palettes and tools - Front panel objects - Functions and Libraries.

Reference:

1. Online help system-Learning guides articles and tutorial from design explorer DXP from Attributes.
2. Garry M Johnson, "Labview Graphical Programming", Tata McGraw Hill, New Delhi, 2nd Edition, 1996.

GROUP C

DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION SEM – III

PAPER III SIGNAL PROCESSING IMPLEMENTATION AND SIMULATION

UNIT I : GETTING A SIGNAL INTO A LABVIEW

Conventional Digital Receiver- SubSampling Digital Receiver- Choosing a sampling rate- Subsampling- SNR- Subsampling signal Placement- Other sampling methods:- Digital Oscilloscope – RF Spectrum Analyzer-Analog sampling card- Soundcard.

UNIT II: LABVIEW SPECTRAL ANALYSIS

Low Frequency domain function:- Simple FFY and Improved FFT. Analysing the DFT Results- Spectral Leakage – Sampling window shape- high level spectral functions.

Generating signals with labview: Basic functions- sinusoids-generating Channel Models- Generating symbols.

UNIT III: LAB VIEW DIGITAL FILTER DESIGN

Filter types- FIR Filter- IIR Filter- Comparing IIR and FIR filters- Pulse shaping filter- Multi rate signal processing:- up sampling, down sampling and resembing of filters.

UNIT IV : GRAPHICS AND PROGRAMMING USING MATLAB

Matrices and Arrays- Graphics:-overview-Editing- use of Plotting tools- Graphs for presentations-Basic plotting functions- mesh and surface plots-plotting image data – printing graph.

Programming : Flow control- Data structures- Scripts and functions- object oriented programming. General and Specific commands on signal processing.

Unit V : TOOLS

Data Analysis-Preprocessing, Summarizing and visualizing and modeling of data – Signal Processing tools box- Filter design and Analysis tools (fdatools, fvtool. win tools etc).

Reference books

1. Labview Digital Signal Processing and digital communication by Corry L.Clark-Tata Mc Graw Hill Edition
2. MATLAB Getting Started guide.

GROUP C
DIPLOMA IN ELECTRONIC DESIGNING AND AUTOMATION
SEM – IV

PRACTICAL : EDA TOOLS : DESIGN, ANALYSIS AND SIMULATION LAB
(ANY 10 EXPERIMENTS)

SCHEMATIC DESIGN AND ANALYSIS USING TINA TI

1. Analysis of Individual circuit components
2. Audio Circuits
3. Comparators
4. Control loop
5. Current Measurements
6. Single Supply
7. Circuit Design and simulation using 5spice simulator

DESIGN BASED ON ALTIUM DESIGN EXPLORER

1. Component creation
2. Single layer PCB Design
3. Multi Layer PCB Design
4. Circuit simulation – 555 Astable Multivibrator
5. Circuit Simulation- Basic Power supply
6. Circuit Simulation – Differential Amplifier
7. Study of Net list and Gerber Files

MATLAB EXPERIMENTS

1. Signal Generation
2. Convolution and Correlation
3. Digital filter design and analysis using FDTOOL of MATLAB
4. FIR and IIR Filter design
5. Generation and Study of Digital Filter Coefficients
6. Circuit Design and simulation using LAB view