BHARATHIAR UNIVERSITY, COIMBATORE
Modified Scheme of Examination (CBCS PATTERN)
M.Sc., Electronics and Communication System
(Effective from the academic Year 2016-2017)

Sem.	Study Components	Course Title	Ins.hrs.	Exam.				Credit
				Dur.hrs.	CIA	Uni.Exam.	Total	
I	Paper-I	Microwave and Fiber Optics Communication	4	3	25	75	100	4
	Paper-II	8051 Micro Controller With C Programming	4	3	25	75	100	4
	Paper-III	Power Electronics and Control Systems	4	3	25	75	100	4
	Paper-IV	Linear ICs and its Applications	4	3	25	75	100	4
	Practical-I	General Electronics and Electronics Communication Lab	5	-	-	-	-	-
	Practical-II	Embedded Systems Lab	5	-	-	-	-	-
	Elective Paper-I		4	3	25	75	100	4
II	Paper-V	PIC Microcontroller and Its Applications	4	3	25	75	100	4
	Paper-VI	Computer Communication and Networks	4	3	25	75	100	4
	Paper-VII	Signals and Systems	4	3	25	75	100	4
	Paper-VIII	Virtual Instrumentation	4	3	25	75	100	4
	Practical-I	General Electronics and Electronics Communication Lab	5	4	40	60	100	4
	Practical-II	Embedded Systems Lab	5	4	40	60	100	4
	Elective Paper-II		4	3	25	75	100	4
III	Paper-IX	ARM Core Processor	4	3	25	75	100	4
	Paper-X	VLSI Design And VHDL Programming	4	3	25	75	100	4
	Paper-XI	Digital Signal Processing	4	3	25	75	100	4
	Paper-XII	MATLAB programming	4	3	25	75	100	4
	Practical-III	DSP and MATLAB Programming Lab	5	4	40	60	100	4
	Practical-IV	Virtual Instrumentation and VLSI	5	4	40	60	100	4

		Design Lab						
	Elective Paper-III		4	3	25	75	100	4
IV	**Elective * Practical/ Paper**		**4 ------ 4**	**4 ---- 3**			**100***	**4**
		PROJECT&VIVAVOCE	5	-	-	250	250	10
						Total	2250	90
Project 200 Marks Viva-Voce 50 Marks								

*** If opted Practical internal 40 marks and external 60 marks**
Paper internal 25 marks and external 75 marks

ELECTIVE:

S. No	Group A Information Technology	Group B Network Communication	Group C Electronic Media
1	WEB Technology	Satellite And Network Communication	Principles of Acoustics and Sound Engineering
2	Relational Data Base Management System	Wireless Sensors Networks	Applied Electronics for Electronic Media
3	LINUX and Shell Programming	Advanced Network Techniques	Advanced Digital image processing
4	RDBMS and LINUX Lab	RF System Design	Electronic media Lab

Note: In semester II Practical I Electronics and Electronics Communication Lab name changed as **General Electronics and Electronics Communication Lab** and in Semester IV Elective be treated as Practical/paper.

SEM-I

Paper-I

MICROWAVE AND FIBER OPTICS COMMUNICATION

GOAL:

To introduce the various Wave guides and Antennas and to study the basic concepts of Optical fibers, Optical sensors and its Applications.

OBJECTIVES:

- To learn the basic elements of Wave Guides
- To learn the Fundamentals of Electromagnetic Waves
- To know the Concepts of Optical Fibers
- To familiarize the principles of Optical sensors and its Applications.

CONTENTS:

UNIT- I : MICROWAVE AND ELECTROMAGNETIC WAVES

Introduction to microwaves - Advantages - Applications – Electro Magnetic wave principles - Maxwell's Equations: Amperes Law - Faraday's Law - Gauss's Law – Wave Equations – TEM/TE/TM/HE wave definitions.

UNIT- II :WAVE GUIDES AND ANTENNAS

Introduction – Types of Wave guides – Propagation of waves in Rectangular Wave guides – Propagation of TEM waves - Propagation of TM waves in Rectangular waveguide – Propagation of TE waves in Rectangular wave guide.

Microwave Antennas- Horn Antenna - Parabolic Reflectors Antenna- Lens Antenna – Slot Antennas -Micro strip Antennas

UNIT- III: OPTICAL FIBERS AND THEIR PROPERTIES

Introduction to Optical Fiber – Basic Structure of Optical Fiber – Conditions for Total Internal Reflection - Principles of light propagation through an Optical fiber- Types of fibers: Step Index & Graded Index fibers.

Modes of Propagation: Single and Multimode Calculation of Acceptance Angle and - Numerical Aperture – Advantage and Application

UNIT- IV : LIGHT SOURCES & PHOTO DETECTORS

Light Sources: LED - FIBRE LED Coupling – LASERS – Operation types, Spatial Emission, current v/s output characteristics.

Photo Detectors: Characteristics of Photo Detector - Photo Emissive Type – Photo Conductive – Photo Voltaic Devices - PIN Photo diode - Avalanche Photo Diode

UNIT – V: FIBER OPTIC SENSOR & APPLICATIONS

Fiber Optic Sensors: Introduction - Intensity Modulated Sensors – Liquid level type Hybrid Sensor – Fabry - Perot Fiber Optic sensor - Interferometric Pressure Sensor - Interferometric Temperature Sensor –-Community Antenna Television (CATV) - Special Applications: Digital Video Transmission Using Optical Fibers networks

TEXT BOOKS:

1. M.Kulkarni, "Microwave and Radar Engineering", Umesh Publications, II Edition, 2009.
2. Subir Kumar Sarkar, "Optical Fibers and Fiber Optic Communication Systems", S. Chand Publication, II Edition 2001.

REFERENCE BOOK:

1. Annapurna Das. Sisr Das, "Microwave Engineering", Tata McGraw Hill Publications

Paper-II

8051 MICRO CONTROLLER WITH C PROGRAMMING

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

Objectives :

- To study the Architecture of 8051
- To study the Instruction set & addressing modes of 8051
- To develop skill in simple program writing
- To introduce the need & use of Interrupts structure
- To introduce commonly used peripheral – To simple applications

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 : 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
2. Kenneth J. Ayala,"The 8051 microcontroller" Cengage Learning, 3rd Edition

Paper-III POWER ELECTRONICS AND CONTROL SYSTEMS

GOAL:

To enable the students to understand the basic concepts of power controlled circuits and to learn various parameter in control system engineering

OBJECTIVES

- To get an overview of different types of power semi-conductor devices and their Switching characteristics.
- To understand the concept of Control system and emphasis the knowledge on time domain performance

CONTENTS:

UNIT - I: POWER SEMICONDUCTORS

Construction and Operations of SCR, UJT and TRIAC – Thyristor Communication Techniques: Introduction – Natural Commutation – Forced Commutation – Self Commutation – Impulse Commutation – Response Pulse Commutation – External Pulse Commutation – Load Side and Line Side Commutation – Complementary Commutation.

UNIT - II: CHOPPERS

DC Choppers: Introduction – Principle of Step Down Operation – Step Down with RL Load – Principle of Step Up Operation. Switch Mode Regulators: Buck Regulators – Boost Regulators – Buck/Boost Regulators – CUK Regulation – SMPS.

UNIT - III: INVERTORS AND SWITCHES

Invertors: Introduction – Principle of Operations – Single Phase Bridge Invertors – Three Phase Invertors.AC Voltage Controller: Introduction – Principle of ON/OFF Control – Principle of Phase Control. Static Switches: Introduction – Single Phase and Three Phases AC Switches – DC Switches – Solid State Relays.

UNIT - IV: CONTROL SYSTEM AND FEEDBACK CHARACTERISTICS

Open Loop and Closed Loop System – Classification of Control System – Transfer Functions - Block Diagram Reduction Rules – Signal Flow Graph – Manson's Gain Formula – Advantages and disadvantages of Open loop System.

UNIT - V: TIME DOMAIN PERFORMANCE

Zero Order, First Order and Second Order System – Unit Step Response and Ramp Response of First Order – Steady State Error for Ramp Response of Second Order – Hurwitz Roughs Stability Criterion – Procedure in Roughs Stability.

TEXT BOOKS:

1. Muhammad Rashid, "Power Electronics Circuits, Devices and Applications", PHI II Edition, 1999
2. Katshiko Ogata, "Modern Control Engineering", Eastern Economy III Edition -1998.

REFERENCE BOOK:

1. Sen, "Power Electronics", McGraw Hill International, VI Edition 1993
2. Power Elecrtonics: M.D.Singh,K.B.Khanchanani.

Paper-IV

LINEAR ICs AND APPLICATIONS

UNIT-I Operational amplifiers:

Ideal Op.Amps.-Practical Op.Amps., Internal structure, Open loop behavior, Op.Amp. parameters, DC performance, AC performance, Interpretation of data sheets, Inverting, non-inverting, DC, AC, differential amplifiers, Instrumentation amplifier, Bridge Amplifiers: Strain gage, bridge circuits for Measurement of small resistance changes and temperature, differentiators, integrators**.**

UNIT-II

Comparators, Voltage level detectors, Schmitt Triggers, linear half-wave rectifiers, precision rectifiers, peak detectors, Sample and Hold circuits, AC to DC converters, dead-zone circuits, Clippers, Clampers. Filters: Design of I, II and higher order filters. Butterworth, Chebyshev, Low pass, High pass, Band pass, Wide band, Narrow band, notch filters, Universal filters.

UNIT-III

Waveform generation: Sine wave generation - Wein bridge, phase shift oscillators; Multivibrators, triangular wave generators, sawtooth wave generators, voltage to frequency and frequency to voltage converters, voltage controlled oscillators. Multiplier: Analog multipliers, Applications of multipliers - Division, Square, square root, frequency doubler, rectifier and Phase shift detector circuits; Amplitude, Frequency, Pulse width modulation circuits, Demodulation**.**

UNIT-IV

PLL: Operating principles, functional blocks of PLL, stability analysis, Lock and Capture ranges, Applications of PLL - PLL as FM detector, FSK demodulator, AM detector, Frequency translator, Phase shifter, Tracking filter, Signal synchronizer, Frequency Synthesizer. 555 Timer: Functional block diagram, terminals, modes of operation, and applications.

UNIT-V

DAC: Principles – weighted-resistor network, R-2R ladder network, Current output DAC, MDAC, Specifications, ADC: Single slope, Dual slope Integration type ADC, Successive approximation ADCs, Flash converters. IC voltage regulators: Different types

Textbooks:

1. Coughlin, Driscoll "Operational amplifiers and Linear integrated circuits" -IVEd., PHI, 1992.
2. Ramakant A.Gayakwad "Op-Amps and Linear Integrated Circuits", II Ed., PHI, 1991.
3. Millman & Halkias "Integrated Electronics", Prentice Hall, 1999.
4. A. P. Malvino & D. P. Leach " Digital Principles & Applications," TMH, IV Ed. 2002.

Reference books:

1. K.R.Botkar "Integrated Circuits" - Khannan Publishers, 1991.
2. Sidney Soclof "Applications of Analog ICs" -PHI, 1990.
3. Roy Choudhry "Linear integrated circuits" –,New Age International, 1998.

SEM-II

Paper-V PIC Microcontroller and Its Applications

GOAL:

To introduce to the functional building blocks of an embedded system for developing a real time system application.

OBJECTIVE:

- Introduction to features that build an embedded system.
- To understanding the interaction of the various components within an embedded system.
- Techniques of interfacing between processor & peripheral devices related to embedded processing.
- To enable writing of efficient programs on any dedicated processor.

CONTENTS:

UNIT-I: INTRODUCTION TO EMBEDDED SYSTEMS

Definition and Classification-Overview of micro processor, Micro Controller and DSP - Exemplary High performance processor – CISC and RISC architecture-Hardware Unit in an Embedded system - Software unit in Embedded system –Exemplary application

UNIT – II: ARCHITECTURE AND INSTRUCTION SET

Overview and features of PIC16F877A microcontroller – Architecture of PIC16F877A - Harvard Architecture and Pipe lining – pic micro controller architecture - Program memory Considerations – Register File Structures and Addressing Modes - CPU Registers - Instruction set: Byte Oriented operation - Bit oriented operations – literal and control operations.

UNIT-III: EXTERNAL INTERRUPTS AND TIMERS

RB0/INT External interrupt - Timer0 – Compare Mode - Capture Mode – Timer1 External Event Counter - PWM module – PortB - Change interrupts

UNIT-IV: I/O PORTS AND SERIAL PORT INTERFACE

I/O Ports – Synchronous serial Port Module - Serial Peripheral Interface – I2C Bus Interface-ADC Converter-USART

UNIT-V: SPECIAL FEATURES

Configuration Word- Oscillator Configurations – Reset Alternatives – Low power Operation- Low Voltage Serial Programming – Parallel Slave Port .

TEXT BOOKS

1. Rajkamal, ”Embedded Systems Architecture, Programming and Design”, TATA McGRaw-Hill,Ist Edititon
2. John B.PEatman,” Design with PIC Microcontrollers”, Pearson Education, Low price Education.

REFERENCE BOOK

1. PIC 16F87X Data book,Microchip Technlogy Inc,2001

Paper-VI COMPUTER COMMUNICATION AND NETWORKS

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,

Paper- VII SIGNALS AND SYSTEMS

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-1 CLASSIFICATION OF SIGNALS AND SYSTEMS

Continuous Time Signals (CT Signals)- Discrete Time Signals (DT Signals)- Step- Ramp- Pulse-Impulse- Exponential- Classification of CT and DT Signals- Periodic and A periodic- Random Signals- CT Systems and DT Systems-Classification of System- Linear Time Invariant System.

UNIT-2 ANALYSIS OF CT SIGNALS

Fourier series Analysis-Spectrum of CT Signals- Fourier Transform and Laplace Transform in Signal Analysis.

UNIT -3 LTI-CT SYSTEMS

Differential Equation- Block Diagram Representation- Impulse Response- Convolution integral-Frequency Response- Fourier Methods and Laplace Transforms in Analysis- State Equation and Matrix.

UNIT -4 ANALYSIS OF DT SIGNALS

Spectrum of DT Signals- Discrete Time Fourier Transform (DTFT) - Discrete Fourier Transform (DFT)-Properties of Z-Transform in signal Analysis.

UNIT-5 LTI-DT SYSTEMS

Difference Equation-Block Diagram Representation- Impulse Response-Convolution Sum-Frequency Response FFT and Z-Transform analysis-State Variable and Matrix.

REFERENCES:

1. J.JEBASTINE and J.VENU GOPALA KRISHNAN, “Signals and Systems”, SRI Krishna Publications, Chennai.
2. Alen V Oppenheim Alen S. Wilsky and Hamid Nawab S “Signals and Systems”, second Edition,PHI, New Delhi, 19.
3. Michael J Roberts, “ Signals and Systems Analysis using transform methods and MATLAB”, Tata McGraw-Hill, 2003
4. Haykin.S and Barry Van Veen, “Signals and Systems”, John willy and Sons Inc., 2002.
5. Samir S Soliman and Srinath MD, “ Continuous and discrete signals and systems” Second Edition, PHI, 2003.
6.. Lathi B.P., “Linear Systems and Signals”. Oxford University Press Inc., 2003.

Paper-VIII VIRTUAL INSTRUMENTATION

GOAL:

To enable the students to under the concepts of virtual Instruments and enhance programming skills LABVIEW.

OBJECTIVE:

- To study the basic concepts of virtual Instrumentation
- To study about the LAB VIEW Programming.
- To learn the concepts of Data Acquisition, signal Processing and Manipulation

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

Lab VIEW - 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.

Practical-I GENERAL ELECTRONICS AND ELECTRONICS COMMUNICATION LAB

General Electronics Lab

1. Summing and differential Amplifier using Op-Amp.
2. Inverting and Non-Inverting Amplifier using Op-Amp.
3. Instrumentation Amplifier.
4. Frequency response of LPF and HPF using Op-Amp.
5. Frequency response of narrow Band-Pass and Wide-Band-Pass filter using Op-Amp.
6. Frequency response of Notch Filter using Op-Amp.
7. Frequency response of Integrator using Op-Amp.
8. Frequency response of Differentiator using Op-Amp.
9. Zero-Crossing detector and schmittriger.
10. Phase Shift and Wien Bridge Oscillator using Op-Amp.
11. Astable ,Monostable and Bistable Multivibrators using Timer.
12. Low and high Voltage regulator using IC LM723.
13. Characteristics of SCR.
14. Characteristics of DIAC and TRIAC.
15. Characteristics of UJT and Relaxation Oscillator.
16. Switching circuit of TRIAC and DIAC.
17. Half wave Power Control using Thyristor(SCR).
18. Commutation Technique (Any Two).
19. Single Phase Inverter and Converter.
20. Switching Regulators.

Electronics Communication Lab

1. Generation and Detection of AM.
2. Generation and Detection of FM.
3. Generation and Detection of PAM.
4. Generation and Detection of PWM.
5. Generation and detection of PCM.
6. Generation of ASK, FSK and PSK.
7. Generation of PSK, QPSK and DPSK.
8. Delta and Adaptive Delta Modulation.
9. Radiation Pattern of Antennas.
10. IR transmitter and Receiver.
11. PIN and Laser Diode Characteristics.
12. Reflex Klystron characteristics using microwave bench.
13. Gunn Diode Oscillator.
14. Digital fiber optic Tx and Rx.
15. Analog fiber optic Tx and Rx.

Practical-II EMBEDDED SYSTEMS LAB

8051 Microcontroller

1. Arithmetic and Logic Operations
2. Data transfer with parallel port
3. Delay based on software and hardware timer
4. Object Counter

5. Interfacing Matrix Keypad
6. LCD interface
7. ADC interface
8. DAC interface
9. Seven Segment display interface
10. Traffic light controller
11. Water level controller
12. Stepper Motor Interface
13. Programmable timer
14. Serial interface
15. Digital clock

PIC Microcontroller

1.Parallel port interface
2.Delay generation using hardware timer
3.External event counter using timer 1
4.Internal ADC programming
5.Speed control of DC motor using PWM module
6.Interfacing RTC using I^2C bus
7.Interfacing serial EEPROM
8.UART interface
9.LCD interface
10.Temperature monitoring and control
11.DAC interface
12.Traffic Light controller
13.Water level controller
14.RTOS Multitasking
15.RTOS ISR

SEM-III

Paper-IX ARM CORE PROCESSOR

GOAL:

To introduce to the functional building blocks of an advanced embedded system for Developing a real time system application.

OBJECTIVE:

- Introduction to features that build an ARM Embedded system.
- To understanding the interaction of the various components of ARM 7 within an embedded system.
- Techniques of interfacing ARM processor & peripherals devices related to embedded System

CONTENT:

UNIT-I: INTRODUCTION TO ARM EMBEDDED SYSTEM

RISC design philosophy –ARM Design Philosophy - Embedded System Hardware memory – peripherals –Embedded System Software initialization (Boot) Code – Operating System -Applications.

UNIT- II:ARM PROCESSOR FUNDAMENTALS

ARM introduction - ARM Core data flow model – Registers – Current Program Status register (CPSR) – Processor Modes – Bank registers –State and Instruction sets – Interrupts Masks – Condition Flags – Conditional Execution – Pipeline –Exceptions, interrupts & Vector table – Core Extension - ARM Processor families

UNIT- III : INSTURCTION SET

ARM Instruction V1: Data processing – Branch – Load & Store – Software interrupt – Program Status Register – Loading Constants. THUMB Instruction V1: Branch – Data processing – Single Register Load & Store Multi
Register Load & Store – Stack - Software interrupt.

UNIT- IV: OVERVIEW OF ARM7TDMI MCU (Analog Devices ADuc7128/29)

Features – Functional block diagram – General description – Pin configuration & Function descriptions – Overview of the AR7TDMI Core - Exceptions – ARM registers interrupt Latency.-Memory Organization – Memory access – Flash/EE Memory – SRAM – Memory mapped register.

UNIT- V: HARDWARE CONFIGURATION

ADC – DAC – Oscillator and PLL - PWM - General purpose I/O- Serial port MUX – UART Serial interface - I2C – Timer life time – General purpose timer – Wake up timer – Watch dog timer – General purpose Timer 4

TEXT BOOKS:

1. Andrew N.Sloss Dominic Sysmes Chris Wright "ARM System Development Guide", Morgan Kaufmann Publishers, Reprinted 2010.
2. Data Sheet Reference (Analog Devices ADuc7128/29)

REFERENCE BOOK:

1. Frank Vahid "Embedded System Design", Tata Mc Graw Hill PublicationCompany Ltd.,

Paper-X VLSI DESIGN 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 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.

UNITII: BEHAVIORAL 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.

UNITII: DATA FLOW & STRUCTURAL MODELING TECHNIQUES OF VHDL

Data flow style of modeling: Concurrent signal assignment statement versus signal assignment – Delta delay revisited – Multiple drivers – Conditional signal assignment statement – Selected signal assignment statement – The unaffected value – Block statement- Concurrent assertion statement.

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

UNIT IV: ADVANCED FEATURES IN VHDL

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

UNIT V DESIGN OF FPGA'SANDCPLD

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

TEXT BOOKS

1. J. Bhasker, "VHDL PRIMER", Low price Edition, 2001 PHI.
2. Jr. Charles H.Roth, "DIGITAL SYSTEM DESIGN USING VHDL", Brooks/Cole

Paper-XI DIGITAL SIGNAL PROCESSING

GOAL:

To introduce the concept of analyzing continuous and discrete time signals & systems in the time and frequency domain.

Objective

· Digital signal processing has become a part of many embedded systems.

· To make the student learn, Theory of DSP, design of digital signal processing applications and an introduction to DSP processors.

UNIT – I SIGNALS AND SYSTEMS

Introduction – Signals, System and Signal Processing – Classification of Signals – Concept of frequency in continuous time and discrete time signals – Analog to Digital and Digital to Analog Conversion .

UNIT – II STRUCTURES FOR DISCRETE TIME SYSTEMS

Introduction – Discrete Time Signals – Discrete Time Systems – Analysis of Discrete time linear time invariant systems – Implementation of discrete time systems – z-transform – Inverse of z transform.

Unit – III Computation of Discrete Fourier Transform

Introduction – Frequency analysis of continuous time signals – Frequency analysis of discrete time signals – Frequency domain characteristics of linear time invariant systems (LTI) – Frequency response of LTI systems – Discrete fourier transform – FFT algorithms.

UNIT – IV 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 – V TMS 320C 5416 OVERVIEW

Introduction – TMS320C5416 overview – Key features – Architectural overview – Functional block diagram - Internal Memory organization – CALU – System Control – PLU – Interrupts.

Text Books

1. Sanjith K. Mitra, "**Digital Signal Processing – A computer Based Approach**" Tata McGraw Hill, 1997.

2. John G. Proakis and Dimitris G. Manolakis, "**Digital Signal Processing – Principles, Algorithms and Applications**", John Wiley & sons Inc., 1999.

3. B. Venkataramani and M. Bhaskar, "**Digital Signal Processors – Architecture, Programming and Applications**", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

4. P. Ramesh Babu, "**Digital Signal Processing**", Scitech Publications, 2nd Edition, 2003.

5. TMS 320C5X - Users guide, Texas instruments, 1993.

Paper – XII MATLAB PROGRAMMING

GOAL:

To enable the student to know about the basic concepts of Matlab programming and applied the method in various fields like DSP ,VLSI and Image Procesing.

Objective

· To introduce the MATLAB for numerical computations and in particular familiarizing with the Matlab, basic commands through the Command window and output through the Graph window.

Contents:

UNIT – I INTRODUCTION

Mat lab environment – Help future – Types of files – Platform – Search path – MATLAB commands – Constants, Variables and Expressions: Character set – Data types – Constants and Variables – Operators – Hierarchy of operators – Built-in functions – Assignment statement.

UNIT – II VECTORS AND MATRICES

Scalars and vectors – Entering data in matrices – Line continuation – matrix subscripts/indices –Multidimensional matrices and arrays – Matrix manipulation – Generation of special matrices –Matrix and array operations – Functions with array inputs – Structure arrays – Cell arrays.

UNIT – III I/O STATEMENTS AND GRAPHICS

Data input – Interactive inputs – Reading/Storing file data – Output commands – Low level input-output functions - Mat lab Graphics: Two dimensional plots – Multiple plots – Style options – Sub plots – Specialized two dimensional plots – Three dimensional plots.

UNIT – IV CONTROL STRUCTURES AND MAT LAB PROGRAMMING

Loops – Branches control structures – Matlab Programming: Matlab Editor – Matlab Programming – Function Subprograms – Types of functions – Function handling – Errors and warnings – Matlab debugger.

UNIT – V SIMULINK

Introduction – Starting simulink – Simulink modelling – Solvers – Simulating a model – Using variables from matlab – Data import/export – State space modelling and simulation – Simulation of non-linear systems – obtaining state space model – Creating subsystems – Masked subsystems.

Text Books

1. Rajkumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma, "***MATLAB and its Applications in Engineering***", Pearson Education, 1st Edition, 2009.
2. Matlab Manual from Mathworks.

Practical-III DSP AND MATLAB PROGRAMMING LAB
(UsingTMS320C5X/TMS320C54XX/TMS320C67XX/MATLAB)

1. Study of addressing Modes of DSP using simple examples
2. Arithmetic operations
3. DFT computations
4. FFT Computations
5. Convolution of two discrete signals
6. Correlation of two discrete signals
7. Quantization noise
8. Waveform generation
9. Solving differential equations
10. Solving z-transform
11. Voice storing & Retrieval
12. FIR Filter design
13. IIR filter design
14. Generation of signals
15. Amplitude Modulation & FFT response
16. Impulse, Step, Exponential & Ramp functions
17. Frequency sampling method

PRACTICAL – IV VIRTUAL INSTRUMENTATION AND VLSI DESIGNLAB

Virtual Instrumentation (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 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

VLSI Design Lab

1. NOR and NAND as a Universal gates.
2. Solving of Boolean equations.
3. Half Adder and Full Adder.
4. Half Subtractor and Full Subtractor.
5. Encoder.
6. Decoder.
7. Multiplexer.
8. De-multiplexer.
9. Latches and Flip-Flops.
10. ALU Design.
11. Parity Generator.

12. 2-bit Comparator.
13. Synchronous Counter.
14. Asynchronous Counter.
15. Shift Registers.
16. Clock divider and generator.
17. FIFO Design.
18. UART Module.
19. SPI Module.
20. Memory Module.
21. Sequence Detector.
22. Design and Simulation of Programmable logic Array.
23. Design and simulation of Traffic light controller.
24. Design and simulation of Real time clock (RTC).
25. State machine-Eg. Moore model.

GROUP A ELECTIVE SEM - I

WEB TECHNOLOGIES

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 ELECTIVE SEM - II

PAPER II: RELATIONAL DATA BASE MANAGEMENT SYSTEMS

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

Database Concepts: Introduction to database-Relationships-Database management system-the relational database model-Integrity rules-Theoretical Relational languages.

Database Design: Data modeling-Dependency-Database design-Normal forms-Dependency diagram-Demoralization-Another example of Normalization.

UNIT II: ORACLE TABLES

DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table –Displaying Table Information – Altering an Existing Table – Dropping, Renaming, and Truncating Table.

UNIT-III: WORKING WITH TABLE: DATA MANAGEMENT AND RETRIEVAL

DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records -restricting Data with WHERE clause –Sorting – **Functions and Grouping**: Built-in functions –Grouping Data.

UNIT-IV: MULTIPLE TABLES:

Join & Set operators: Join-set operators. **Sub queries:** Sub query-EXIST and NOT EXIST operators. **PL/SQL: A Programming Language:** Block Structure –Comments – Data Types – Variable Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators.

UNIT V: CONTROL STRUCTURES AND EMBEDDED SQL

Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation in PLSQL . **PL/SQL Cursors and Exceptions:** Cursors-Type of Cursors-Cursors Variables-Exceptions-Triggers.

TEXT BOOK:

1. NILESH SHAH, "**Database System Using Oracle**", Second Edition-PHI Learning Private Limited-New Delhi

GROUP A ELECTIVE SEM - III

PAPER III: LINUX & SHELL PROGRAMMING

UNIT I: WELCOME TO LINUX

Overview of LINUX-Additional Features in LINUX .**The LINUX Operating System:** Logging In-Working with the shell.

UNIT II: LINUX SYSTEM START UP & SHUTDOWN

Introduction Brief outline of X86 LINUX booting process. **System Logging:** Logging – Accounting-Available Graphical Tools.

UNIT III: FILE FILTERS

File Related Commands-Introduction to Piping –Some other means of joining commands-awk commands.

UNIT IV: SHELL PROGRAMMING

Introduction-programming constructors. **The Shell:** Command line-Standard Inputs & Standard output-Filename Generation/pathname expansion.

UNIT V: THE VIM EDITOR

Introduction to Vim features-Command Mode: Moving the cursor-Deleting & changing text -Input mode.

Computing C & C++ Programs under LINUX: Introduction to C Compiler-Computing a Multi source C Program-How main is executed on LINUX-Compiling single source C++ Program

Text Book

1. Mark G. Sobell, "**A Programming Guide to LINUX Commands, Editors and shell programming**", Pearson Education (Unit I,2nd Half Unit IV,1st half Unit V)
2. N.B. Venkateswarlu," **Introduction to LINUX: Installation and Programming** ", BS Publications (Unit II,III,Ist half Unit IV, 2nd Half Unit V)

GROUP A ELECTIVE SEM IV - PRACTICAL: RDBMS AND LINUX LABORATORY
RDBMS LABORATORY

1. Creating Tables and writing simple Queries using
a) Comparison 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 using 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. Splitting the table: Write a PL/SQL block to split the student 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 Roll. No 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 no 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.
a) Data definition, Manipulation of base tables and views.

LINUX LABORATORY

1. Write a Shell script to Wish the User according to Present Time.(i.e GOOD MORNING,GOOD AFTERNOON etc)
2. Write a shell program to print the sum of all digits
3. Write a shell program which informs as soon as a specified user whose name is given along the command line is logged into the system
4. Write a shell program to print the following series
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
6 6 6 6 6 6
5. Write a shell program which takes a source file name & directories names as command line arguments & print the message.
6. Write a shell script which removes empty files from PWD & changes other file time stamps to current time
7. Write a shell program which reads a digit & prints its BCD code
8. Write a shell program which reads a filename along the command line & prints frequency of the occurrence of words
9. Write shell script to see current date time username & current directories.
10. Write script to determine whether given file exist or not, file name is supplied as command line argument, also check for sufficient number of command line argument.

GROUP B ELECTIVE SEM – I

SATELLITE AND NETWORK COMMUNICATION

GOAL:

To enable the students to understand the basic concepts of Satellite communication and its terminologies and also understand the concepts of networks and wireless LANS.

OBJECTIVES:

- To introduce the basic concepts of satellite Orbits.
- To make the student familiar with the Communication satellite subsystems and Application of satellites.
- To make the student familiar with the network concepts, Wireless LANs and other LANs

CONTENTS:

UNIT-I :SATELLITE ORBITS AND INCLINATION

Introduction - Satellite Frequency Allocation and Band spectrum –Characteristics of satellite communication system – Advantages –Active and Passive satellites- Orbit – Orbital parameters – Satellite location with Respect to Earth – Look Angles - Satellite Placement in GEO stationary Orbit - Satellite Station Keeping.

UNIT-II: COMMUNICATION SATELLITE SUBSYSTEMS

Electric Power Supply - Attitude and Orbit Control – Propulsion Sub System - Repeaters - Telemetry Tracking and Command (TTC) Systems - Thermal Control System – Earth Station Design – Earth Station Subsystems – Monitoring and Control

UNIT-III : SATELLITE APPLICATIONS

Satellite Applications - Different Areas – Satellite Television - Telephone service – Data Communication Service – Satellites for Earth Observation – Weather Forecast – Scientific studies – Military Applications.

UNIT-IV: NETWORK CONCEPTS

Introduction-Network Criteria- Physical Structures-Network Categories-Protocols and Standards-Network Models: Layered Tasks-The OSI Model-Peer to Peer Process-Layers in OSI Model-Digital to Digital Conversion and Analog to Digital Conversion Techniques

UNIT-V: WIRELESS LANS AND OTHER LANS

IEEE Standards-Standard Ethernet-Changes in the Standard-Fast Ethernet-High Bit Ethernet-Introduction to Blue tooth- Connecting Devices-Back Bone Networks-Virtual LANs - ATM LANs

TEXT BOOKS:

1. Behrouz A Ferouzan ,"Data Communications and Networking," Tata Mc Graw Hill Publications IV Edition, 2006
2. D.C.AGARWAL "Satellite Communication"

REFERENCES:

1. Uyless Black ,"**Data Communication and Distributed Networks**", Prentice Hall India, III Edition, 2005
2. Uyless Black ,"**Computer Networks**", Prentice Hall India ,II Edition, 2006.

GROUP B ELECTIVE SEM – II

WIRELESS SENSOR NETWORKS

GOAL:

To enable the student to understand the role of sensors and the networking of sensed data for different applications.

OBJECTIVES:

- To learn sensor node essentials and the architectural details, the medium access and routing issues and the energy constrained operational scenario.
- To understand the challenges in synchronization and localization of sensor nodes, topology management for effective and sustained communication, data management and security aspects.

UNIT – I: WIRELESS LANS, PANS AND MANS

Introduction - Fundamentals of WLAN – Technical issues - Network Architecture - IEEE 802.11- Physical layer - Mac layer mechanism - CSMA/CA - Bluetooth – Specification - Transport layer - Middleware Protocol Group - Bluetooth profiles - WLL – Generic WLL architecture - Technologies - Broadband Wireless access - IEEE 802.16 – Differences Between IEEE 802.11 and 802.16 - Physical layer - Data link layer.

UNIT - II: WIRELESS INTERNET

Introduction – Wireless Internet- Address mobility - Inefficiency of transport layer and application layer protocol - Mobile IP – Simultaneous binding - Route optimization- Mobile IP variations – Handoffs - IPv6 advancements - IP for wireless domain - Security in mobile IP - TCP in wireless domain – TCP over wireless - TCPs –traditional – snoop - indirect - mobile Transaction-Oriented - Impact of mobility.

UNIT - III : AD-HOC WIRELESS NETWORK AND WIRELESS SENSOR NETWORK

Introduction - issues – medium access scheme – routing - multicasting - transport layer protocol - pricing scheme - QoS provisioning - self-organization – security – addressing - service discovery - energy management - deployment consideration - ad-hoc wireless internet.

UNIT – IV: WIRELESS SENSOR NETWORK

Introduction – applications of sensor network, comparisons with MANET - Issues and design challenges - Architecture – Layered and clustered- data dissemination - data gathering Mac protocols - location discovery - quality of sensor network – coverage and exposure - zigbee standard.

UNIT - V : RECENT ADVANCES IN WIRELESS NETWORK

UWB radio communication- operation of UWB systems - comparisons with other technologies - major issues - advantages and disadvantages, wi-fi systems- service provider models, issues, interoperability of wi-fi and WWAN, multimode 802.11 – IEEE 802.11a/b/g – software radio-based multimode system, meghadoot architecture -802.11 phone, fundamentals of UMTS.

TEXT BOOK:

1. Wllliam Stallings, “Wireless Communication and Networks”, Prentice Hall, 2nd edition, 2005.
2. C.Siva Ram Murthy and B.S. Manoj, “Ad-hoc wireless networks-architecture and protocols”, Pearson education, 2nd, 2005.

REFERENCES:

1.Kaveh Pahlavan and Prashant Krishnamurthy, “Principle of Wireless network- A unified approach”, Prentice Hall, 2006.

GROUP B ELECTIVE SEM – III

ADVANCED NETWORK TECHNIQUES

GOAL :

To enrich the students to study the principles of various networks, protocols and the advanced techniques and in wireless and optical networks and servicing.

OBJECTIVE:

- To study the basic concepts of netwoks, protocols and topology
- To study and learn about Architecture of ATM,LAN,Repeaters,Routers
- To study about network security and privacy issues.

UNIT I : BASIC CONCEPTS

Data components – Networks – Protocol and Standards – Standards organizations – Line configuration – Topology – Transmission Mode – Categories of Networks – Internetworks

UNIT II : TRANSMISSION MEDIA

Guided Media – Unguided Media – Transmission Impairment – performance – wavelength – media compression – Error detection and Correction - types errors – detection – VRC – LRC – CRC – checksum – error correction

UNIT III : VIRTUAL CIRCUIT NETWORKS (FRAME AND ATM)

Frame relay – Architecture – Layers – Extended address – FRAD – VOFR – LMI – ATM – Design goals – Architecture – Switching – Layers – Congestion control and quality of service – ATM – LAN architecture – LAN Emulation

UNIT IV : SONET/SDH

Synchronous transport signals – physical configuration – sonnet layers – sonnet frame – multiplexing sts frames – applications – networking and internetworking devices – repeaters – bridges – routers – gateways – devices – routing algorithms – distance vector routing – link state routing

UNIT V: VLAN , VPN AND NETWORK SECURITY

VLAN – VPN - Four aspects of security – Privacy – digital Signature – PGP – Access Authorization

TEXT BOOK:

1. Behrouz A. Forouzan, " Data Communication and Networking", Tata McGraw Hill New Delhi,2000 (Unit I - V)

REFERENCE BOOKS:

1. Prokis J J, Digital Communication" TMH Pub Co Ltd, II Edition
2. Ulysees Black, "Data Communication and Distributed Network" III Edition

GROUP B ELECTIVE SEM – IV

RF SYSTEM DESIGN

GOAL:

To enable the students to know about RF filters and Components and also enrich design the knowledge of Amplifiers and Oscillators

OBJECTIVE:

- To know the basic concepts of RF Design
- To study the about RF Components and apply knowledge in Applications.
- To learn the RF design aspects of Oscillators and Amplifiers

CONTENTS:

UNIT – I: RF ISSUES

Importance of RF design, Electromagnetic Spectrum, RF behavior of passive Components, Chip components and Circuit Board considerations, Scattering Parameters, Smith Chart and applications.

UNIT- II: RF FILTER DESIGN

Overview-Basic Resonators and Filter configuration – special filter realization – Smith chart based filter design – coupled filter

UNIT- III: ACTIVE RF COMPONENTS & APPLICATIONS

RF diodes, BJT, RF FETs, High electron mobility transistors; Matching and Biasing Networks – Impedance matching using discrete components, Microstripline matching networks, Amplifier classes of operation and biasing networks.

UNIT- IV: RF AMPLIFIER DESIGNS

Characteristics, Amplifier power relations, Stability considerations, Constant gain circles, Constant VSWR circles, Broadband , high power and multistage amplifiers.

UNIT- V: OSCILLATORS, MIXERS & APPLICATIONS

Basic Oscillator model, High frequency oscillator configuration, Basic characteristics of Mixers ; Phase Locked Loops ; RF couplers Wilkinson divider and Lange coupler ; Detector and demodulator circuits.

TEXT BOOKS:

1.Reinhold Ludwign and Powel Bretchko" RF Circuit Design-Theory and Application",Pearson Education,First Edition,2001**.**

REFERENCES :

1.Joseph J Carr,"Secrets of RF Circuit Design", McGraw Hill Publishers,Third Edition,2000.
2. Mathew M. Radmanesh,"Radio Frequency & Microwave Electronics",Pearson Education,2nd Edition 2002.

GROUP C ELECTIVE SEM - I

PAPER I: PRINCIPLES OF ACOUSTICS AND SOUND ENGINEERING

Objectives: To train the students on professional level studio equipments and integrating all audio production chain line.

UNIT – I

Perception of sound - hearing sensitivity - frequency range- sound- wave length; the speed of sound; measuring sound; psychoacoustics , Room acoustics- means of control – treatments -dBA and dBC concepts ; musical sounds, noise - signal - dynamic range - pitch - harmonicsequalization- reverberation time, Sabine formula.

UNIT – II

Basic set-up of recording system-analog, digital, microphone - Audio signal amplifier, power amplifier - balanced –unbalanced – mic level inputs, Line level inputs - cables and connectors, impedance matching , interference, equipment inter-connection –input, out meters- the essence of Sound engineering.

UNIT – III

Theory of microphones – Microphone as a Transducer - Types - direction - pick up pattern, phantom power, noise, choosing the right mike –Line and signals levels- MIDI Signals Generation and simulation –Basic Recording medium - Sound reproduction devices – Power amplifier – Speaker - cross over - time code, Synchronization - care and handling

UNIT – IV

Mixing console - Echo and reverberation - special effects units- equalizers & compressors, plugins - digital recording software - Input devices - Storage - Output devices - file transfer protocols- networking of studio -streaming - basics of broadcasting- AM, FM, mobile radio, internet radio.

UNIT – V

Introduction to digital sound basics PCM sampling rate types resolution bit rates signal to noise ratio - Over view of digital sound for Films VCD /CDs/ DVDS recording and reproduction principle requirements of multi channel sound DTS, Dolby digital, DVD.

Text Books

1. Michael Talbot-Smith, “Broadcast Sound Technology”, Oxford: Focal Press, 2002.
2. Francis Rumsey and Tim Mick, “Sound and Recording: An Introduction”, Oxford: Focal Press.
3. John Watkinson, “An Introduction to Digital Audio”, Oxford: Focal Press.
4. Francis Rumsey, “MIDI System and Control”, Oxford: Focal Press.
5. Alec Nisbet, “The Sound Studio”, Oxford: Focal Press, 2004.
6. Tim Amyes, “Audio Post-production in Video and Film”, Oxford: Focal Press, 2001.

GROUP C ELECTIVE SEM: II
PAPER II: APPLIED ELECTRONICS FOR ELECTRONIC MEDIA

Objectives:

· To learn the evolution of technologies of electronic media.
· To understand the basics of broadcasting technologies.
· To know the radio and TV transmission standards and systems.
· To introduce students to the emergent technologies in electronic media.

UNIT – I EVOLUTION

Development of Broadcasting and Cable television – Rise of the Internet and deployment of broadband services – regulatory philosophy - leading to dramatic changes in telecommunication industry – Developments and changes in new media – telephony to radio, mobile radio to visual radio, geo-stationary satellites, direct broadcasting satellites, narrowcasting, cable television, DTH – Types of television sets.

UNIT – 2 BROADCASTING BASICS

Analog radio, Digital radio, satellite radio, Audio blogging – RSS – Pod safe music – Analog television, digital television, cable television, Working principle of video camera, Consoles, Video hosting / Download services, Internet radio and television, Digital media production, sound and vision, Image capture techniques, Web-based social interaction.

UNIT – 3 TRANSMISSION STANDARDS AND SYSTEMS

NTSC, PAL, SECAM, IPTV, HDTV, ATSC Digital television, Transmission/Reception lines and other equipments, various modes of receiving systems, FM and TV antenna towers, translators and repeaters, transmitter remote controls. Cell phone media production: SMS, MMs, Cell phone media delivery: streaming and video on demand.

UNIT – 4 TRANSMITTER SYSTEMS

Satellite distribution, Uplink terminals, Transmitter power system equipments, Masts, Towers and Antennas, Earth station types, Uplink earth stations, Downlink earth stations, Outside broadcasting vehicles and mobile control room, Microwave links for OB and ENG, Power generators and Electrical system for OB, Battery systems.

UNIT – 5 MOBILE AND EMERGENT TECHNOLOGIES

Information technology: computer storage, computer networks, Internet streaming, web streaming, Audio and video streaming, Flash streaming, MP3 streaming (radio), Peer to Peer distribution, Digital video broadcasting via satellite services to Handhelds (DVB-SH) Technology, Wifi and Wi Max, podcasting, iPod, Information superhighways, Interactive portals.

TEXT BOOKS

1. Graham Jones, "A Broadcast Engineering Tutorial for Non-Engineers", Focal Press, 2005.
2 Brian Winston, "Media Technology and Society: A History: From the Telegraph to the Internet", Rutledge, 2000.

REFERENCES

1. EPJ Tozer, "Broadcasting Engineering Reference Book", Focal Press, 2004.
2. Borko Furht and Syed A. Ahson, "Handbook of Mobile Broadcasting", Taylor & Francis, 2008.

GROUP C ELECTIVE SEM: III

PAPER III: ADVANCED DIGITAL IMAGE PROCESSING

UNIT – I DIGITAL IMAGE FUNDAMENTALS

Elements of Visual Perception: Structure of the human eye- image formation in the eye brightness adaptation and discrimination- Image sensing and acquisition: Image acquisition using a single sensor- sensor strips- sensor arrays- Image sampling and Quantization: basic concepts in sampling and quantization- representing digital images- spatial and intensity resolution- image interpolation- Some basic relationships between pixels: neighbors of a pixel- distance measures.

UNIT – II INTENSITY TRASFORMATIONS AND SPATIAL FILTERING

Background: basics of intensity transformations and spatial filtering- Some basic intensity transformation functions: image negatives- log transformations- power-law (gamma) transformations- piecewise-linear transformation functions- Histogram Processing: local histogram processing- Fundamentals of Spatial Filtering: mechanics of spatial filtering- spatial correlation and convolution- vector representation of linear filtering- generating spatial filter masks.

UNIT – III IMAGE RESTORATION AND RECONSTRUCTION

A model of the image degradation/restoration process- Noise Models: spatial and frequency properties of noise- some important noise probability density functions- periodic noise estimation of noise parameters- Restoration in the presence of noise only-spatial filtering: mean filters- order-statistic filters- adaptive filters- Periodic noise reduction by frequency domain filtering: band reject filters- band pass filters- notch filters- optimum notch filtering.

UNIT – IV IMAGE COMPRESSION

Fundamentals: coding redundancy- spatial and temporal redundancy- irrelevant information image compression models- Some basic compression methods: Huffman coding- Golomb codes - Arithmetic coding- LZW coding- Bit-plane coding- Digital image watermarking.

UNIT – V IMAGE SEGMENTATION

Fundamentals- Point, Line and Edge Detection: detection of isolated points- line detection- basic edge detection- more advanced techniques for edge detection- Region-Based Segmentation: region growing- region splitting and merging- Use of motion in segmentation: spatial techniques- frequency domain techniques.

Text Books

1. Rafael C. Gonzalez and Richard E. Woods, “Digital Image Processing”, 3rd edition Pearson Education, 2008.

GROUP C ELECTIVE SEM: IV

PRACTICAL: ELECTRONIC MEDIA LAB

1. Study of dynamics and condenser microphones with regards to placement, frequency response, gain etc.
2. Listen, study and analyze different types of music from different parts of the globe.
3. Inside a PC and a MAC.
4. Installing O.S hardware and basic software for recording.
5. Connecting different storage media to Computers and their usage.
6. Study of basic recording of sound using a P.C and Microphones.
7. Networking of Computers.
8. Study of DAW.
9. Working on PROTOOLS8.

10. Working on LOGIC9PRO.
11. Working with MIDI Controller.
12. Mastering and authoring CD's and DVD's.
13. Image Sampling-Zooming and Shrinking operations.
14. Basic gray level transformations: Image Negative, Power law and log transforms.
15. 2-D Discrete Fourier Transform and Walsh transform.
16. Image contrast Enhancement by Histogram Equalization Technique.
17. Spatial Image Filtering: Low pass and High pass Filtering.