## I SEMESTER

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UNIT I
MATRICES

Characteristic equation – Eigen values and eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors (Without proof) – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form.

UNIT II
ORDINARY DIFFERENTIAL EQUATIONS

Solutions of First and Second order linear ordinary differential equation with constant coefficients – Method of variation of parameters – Simultaneous first order linear equations with constant coefficients.

UNIT III
MULTIPLE INTEGRALS AND VECTOR CALCULUS


UNIT IV
LAPLACE TRANSFORMS


UNIT V
APPLICATIONS OF LAPLACE TRANSFORMS

Inverse Laplace transform – Convolution theorem – Initial and Final value theorem-Solution of linear ODE of second order with constant coefficients and first order simultaneous equation with constant coefficients using Laplace transforms.
TEXT BOOKS

1. “Engineering Mathematics” by Department of Mathematics, VMU

REFERENCE BOOKS

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(Common to B.E all branches)

OBJECTIVE: It is the branch of science which deals with the effects of human activities & modern technology on environment. It creates awareness among the engineering students about environmental pollution and the role of the engineers in conservation of environment.

OUT COME: The students will get the knowledge about environment and they will work their corresponding field with eco friendly. It will protect our environment from pollution.

UNIT – I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES 10

Definition, scope and importance – need for public awareness- forest resources: use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their ground water, floods, drought, conflicts over water, dams-benefits and problems-mineral resources: use effects on forests and tribal people-water resources: use and over-utilization of surface and exploitation, environmental effects if extracting and using mineral resources, case studies-food resources: world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies-energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies – land resources: land as a resource, land degradation, man induced
landslides, soil erosion and desertification – role of an individual in conservation of natural resources-equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets - river/forest/ grassland/hill/mountain.

UNIT – II ECOSYSTEMS AND BIODIVERSITY

Concept of and ecosystem – structure and function of an ecosystem – producers, consumers and decomposers-energy flow in the ecosystem-ecological succession-food chains, food webs and ecological pyramids-introduction, types, characteristic features, structure and function of the (a)forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)-introduction to biodiversity- definition: genetic, species and ecosystem diversity- biogeographical classification of India-value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values-biodiversity at global, national and local levels-India as a mega-diversity nation-hot-spots of biodiversity-threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts-endangered and endemic species of India – conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT - III ENVIRONMENTAL POLLUTION

Definition-causes, effects and control measures of: (a) air pollution (b) water pollution (c) soil pollution (d) marine pollution (e) noise pollution (f) thermal pollution (g) nuclear hazards – solid waste management: caused, effects and control measures of urban and industrial wastes-role of an individual in prevention of pollution-pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site-urban / rural / industrial / agriculture

UNIT - IV SOCIAL ISSUES AND THEIR ENVIRONMENT

UNIT – V HUMAN POPULATION AND THE ENVIRONMENT


Total Hours : 45

TEXT BOOK:

1. Raman Sivakumar, Environmental Science and Engineering, Vijay Nicole imprints Pvt.Ltd.

REFERENCE BOOKS :

1. Bharucha Erach, The Biodiversity of India, publishing Pvt. Ahmedabad, India,
OBJECTIVES:

• To enable the student to learn the major components of an electronic system

• To know the correct and efficient ways of knowing various electronic gadgets

PROGRAMME OUTCOMES:

• The broad education necessary to understand the impact of engineering solutions in a global context.

• An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

UNIT I: ELECTRON BALLISTICS AND INTRINSIC SEMICONDUCTORS 9

Force on charge in electric field - Motion of Charge in uniform and time varying electric fields - Force on a moving charge in a magnetic field - calculation of cyclotron frequency - calculation of electrostatic and magnetic deflection sensitivity.

Energy band structure of conductors, semiconductors and insulators - Density distribution of available energy states in semiconductors - Fermi- Dirac probability distribution function at different temperatures - Thermal generation of carriers - Calculation of electron and hole densities in intrinsic semiconductors - Intrinsic concentration - Mass Action Law.

UNIT II: EXTRINSIC SEMICONDUCTOR AND PN JUNCTIONS 9

N and P type semiconductors and their energy band structures - Law of electrical neutrality - Calculation of location of Fermi level and free electron and hole densities in extrinsic semiconductors - Mobility, drift current and conductivity - Diffusion current - Continuity equation - Hall effect. Band structure of PN Junction - Current Component in a PN Junction - Derivation of diode equation - Temperature dependence of diode characteristics.

UNIT III: SWITCHING CHARACTERISTICS OF PN JUNCTION AND SPECIAL DIODES 9

BE_ECE_PT_CBCS
Calculation of transition and diffusion capacitance - Varactor diode - charge control description of diode - switching characteristics of diode - Mechanism of avalanche and Zener breakdown - Temperature dependence of breakdown voltages - Backward diode - Tunneling effect in thin barriers Tunnel diode - Photo diode - Light emitting diodes.

UNIT IV: BIPOLAR JUNCTION TRANSISTORS AND FIELD EFFECT TRANSISTORS

Construction of PNP and NPN transistors - BJT current components - Emitter to collector and base to collector current gains - Base width modulation CB and CE characteristics - Breakdown characteristics - Ebers - Moll model - Transistor switching times.

Construction and Characteristics of JFET - Relation between Pinch off Voltage and drain current - Derivation. MOSFETS - Enhancement and depletion types.

UNIT V: METAL SEMICONDUCTOR CONTACTS AND POWER CONTROL DEVICES


TOTAL HOURS: 60

TEXT BOOK:


REFERENCE:

OBJECTIVES:

- To introduce the concepts and techniques associated with the understanding of signals and systems.
- To familiarize with techniques suitable for analyzing and synthesizing both continuous-time and discrete time systems. To provide with an appreciation of applications for the techniques and mathematics used in this course.

PROGRAMME OUTCOMES:

- Apply engineering principles in solving problems relevant to electrical and electronics engineering.
- Apply critical thinking in designing and evaluating components, processes and systems related to electrical and electronics engineering.

UNIT I: CLASSIFICATION OF SIGNALS AND SYSTEMS  9
Continuous time signals (CT signals), discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Exponential, Classification of CT and DT signals - periodic and aperiodic, random signals, CT systems and DT systems, Classification of systems - Linear Time invariant Systems.

UNIT II: ANALYSIS OF C.T. SIGNALS  9
Fourier series analysis, Spectrum of C.T. signals, Fourier Transform and Laplace Transform in Signal Analysis.

UNIT III: LTI-CT SYSTEMS  9
Differential equation, Block diagram representation, Impulse response, Convolution integral, Frequency response, Fourier Methods and Laplace transforms in analysis, State equations and Matrix.

UNIT IV: ANALYSIS OF D.T. SIGNALS  9
Z Transforms and Properties, Spectrum of D.T. signals, Discrete Time Fourier Transform (DTFT)

UNIT V: LTI-DT SYSTEMS  9
Difference equations, Block diagram representation, Impulse response, Convolution SUM, Frequency response, FFT and Z-transform analysis, State variable equation and Matrix.

TOTAL HOURS: 60

TEXT BOOKS:

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OBJECTIVE
To provide exposure to the students with hands on experience on basic Engineering practices of Electronics Engineering.

List of Experiments
1. Diode Forward characteristics.
2. Zener Diode characteristics.
3. Input and Output characteristics of BJT.
4. Output characteristics of JFET.
5. Fixed Bias amplifier circuits using BJT.
6. Differential amplifier using BJT.
7. Power supply Full wave rectifier with simple capacitor filter.
9. Measurement of SCR Characteristics

TOTAL HOURS: 45
1. DISCRETE FOURIER TRANSFORMS & FAST FOURIER TRANSFORMS: 9
Introduction to DFT-Efficient computation of DFT properties of DFT -FFT algorithms-Radix-2 and Radix-4 FFT algorithms-Decimation in Time- Decimation in Frequency algorithms-Use of FFT algorithms in Linear Filtering and correlation.

2. IIR FILTER DESIGN: 9
Structure of IIR-System Design time IIR filter from continuous time filter-IIR filter design by Impulse Invarience.Bilinear transformation-Approximation derivatives-Design of IIR filter in the frequency domain.

3. FIR FILTER DESIGN: 9
Symmetric and Antisymmetric FIR filters – Linear phase FIR filters – Windowing technique-Rectangular, Kaiser windows-Frequency sampling techniques-Structure for FIR systems.

4. FINITE WORD LENGTH EFFECTS: 9

5. DIGITAL SIGNAL PROCESSORS: 9
Introduction to DSP architecture-Harvard architecture-Dedicated MAC unit-Multiple ALUs Advanced addressing modes, Pipelining, Overview of instruction set of TMS320C5X and C54X.

TOTAL HOURS: 45

TEXT BOOK:

REFERENCES:

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1. BASIC CONCEPTS AND BOOLEAN ALGEBRA
Number systems - Binary, Octal, Decimal, Hexadecimal, conversion from one to another, complement arithmetic, Boolean theorems of Boolean algebra, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map, Tabulation and computer aided minimization procedures.

2. LOGIC GATES
RTL, DTL, TTL, ECL, ICL, HTL, NMOS & CMOS logic gates, Circuit diagram and analysis characteristics and specifications, tri-state gates.

3. COMBINATIONAL CIRCUITS
Problem formulation and design of combinational circuits, Adder / Subtractor, Encoder / decoder, Mux / Demux, Code-converters, Comparators, Implementation of combinational logic using standard ICs, ROM, EPROM, EEPROM, Basics of PLD, PAL, PLA and their use in combinational circuit design.

4. SEQUENTIAL CIRCUITS
Flip flops - SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis of clocked sequential circuits - their design, State minimization, state assignment, Circuit implementation, Registers-Shift registers, Ripple counters, Synchronous counters, Timing signal, RAM, Memory decoding, Semiconductor memories.

5. FUNDAMENTAL MODE SEQUENTIAL CIRCUITS
Stable, Unstable states, Output specifications, Cycles and Races, Race free Assignments, Hazards, Essential hazards, Pulse mode sequential circuits.

TOTAL HOURS: 45

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1. **STATIC ELECTROMAGNETIC FIELDS**

2. **STATIC MAGNETIC FIELD**

3. **ELECTRIC FIELD IN DIELECTRICS**
   - Permittivity, Polarization, Boundary relation, Capacitance, Dielectric strength, Energy and energy density, Poisson's and Laplace equations and applications, Electric Current, Current Density, Ohms law at a point, Resistance and Conductance, Continuity relations for current problems.

4. **MAGNETIC FIELD IN FERROMAGNETIC MATERIALS**

5. **TIME VARYING ELECTRIC & MAGNETIC FIELDS**

**TOTAL HOURS: 45**

**TEXT BOOKS:**

**REFERENCES:**

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1. BASIC STABILITY AND DEVICE STABILIZATION 9
Biasing circuits for BJT, DC and AC Load lines, Stability factor analysis, Temperature compensation methods, biasing circuits for FET’s and MOSFET's.

2. SMALL SIGNAL LOW FREQUENCY ANALYSIS AND DESIGN 9
Transistor, FET and MOSFET Amplifiers, Equivalent circuit, input and output characteristics, calculation of midband gain, input and output impedance of various amplifiers, cascode amplifier, Darlington Bootstrapping, Differential amplifier, CMRR measurement, Use of current source in Emitter.

3. LARGE SIGNAL AMPLIFIERS 9
Class A, B, AB and C type of operation, efficiency of Class A amplifier with resistive and transformer coupled load, efficiency of Class B, Complementary Symmetry amplifiers, Thermal stability of Power amplifiers, heat sink design.

4. FREQUENCY RESPONSE OF AMPLIFIERS 9
High frequency equivalent circuits for BJT and FET amplifiers, Calculation of Lower and Higher cutoff frequencies, Bode plot of frequency response, relation bandwidth and rise time, HF amplifiers, Video amplifiers, Optocouplers, BJT modeling.

5. RECTIFIERS AND POWER SUPPLIES 9
Half and Full wave rectifiers, Ripple factor calculation for C, L, L-C and \( \pi \) section filters, Switch mode power supplies, Linear electronic voltage regulators, Power control using SCR.

TOTAL HOURS: 45
TEXT BOOKS:

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List of Experiments:
1. Design and implementation of Adders and Subtractors using logic gates
2. Design and implementation of code converters using logic gates
   1) BCD to excess -3 codes 2) Binary to gray
3. Design and implementation of 4 bit BCD adder using IC 7483
4. Design and implementation of 2 Bit Magnitude comparator using logic gates 8 bit magnitude comparator using IC 7485
5. Design and implementation of Multiplexer and De-Multiplexer using logic gates and study of IC74150 and IC74154
6. Design and implementation of encoder and decoder using logic gates and study of IC7445 and IC74147
7. Design and implementation of 3 bit synchronous up/down counter
8. Implementation of SISO, SIPO, and PISO shift registers using flip flops
AIM
To understand the principles of microcontrollers and applications towards real world existence.

OBJECTIVES
* To learn the concepts of microprocessors.
* To get knowledge in interfacing devices.
* To know the concepts of microcontroller and its applications.
* To develop skill in simple program writing.

UNIT I – INTEL 8086 MICROPROCESSOR
Architecture of 8086-Register organization – Signal Description of 8086 - 8086 Instructions set – Addressing modes – Assembler directives and operators- simple programs.

UNIT II – PERIPHERAL INTERFACING

UNIT III – INTEL 8051 MICROCONTROLLER
Introduction to 8 bit microcontroller – architecture of 8051- Signal descriptions of 8051- Role of PC and DPTR- Flags and PSW- CPU registers- Internal RAM & ROM- Special Function Register-Counter & Timers- Serial Communication.

UNIT IV – ASSEMBLY LANGUAGE PROGRAM OF INTEL 8051
Interrupt- Addressing Mode- Data Transfer Instruction- Arithmetic Instruction- Logical Instruction- Jump Loop & Call Instruction- I/O Port Programming.

UNIT V – INTERFACING AND APPLICATION OF INTEL 8051
LCD Interfacing - A/D and D/A Interfacing- Sensor Interfacing- Relays and Optoisolators- Stepper Motor Interfacing- DC Motor Interfacing.

TOTAL PERIODS: 45

TEXTBOOKS

REFERENCE BOOKS

3. AIM:
To introduce the basic concepts of Digital Communication in baseband and passband domains and to give an exposure to error control coding techniques.

OBJECTIVES:
- To study signal space representation of signals and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals.
- To understand baseband and bandpass signal transmission and reception techniques.
- To learn error control coding which encompasses techniques for the encoding and decoding of digital data streams for their reliable transmission over noisy channels.

UNIT I  WAVEFORM CODING TECHNIQUES
9

UNIT II  BASEBAND SHAPING FOR DATA TRANSMISSION
9

UNIT III  DIGITAL MODULATION TECHNIQUES
9

UNIT IV  ERROR-CONTROL CODING
9
Rationale for Coding and Types of Codes- Discrete Memoryless Channels- Linear Block Codes- Cyclic Codes- Convolution Codes-Maximum Likelihood Decoding of Convolution Codes-Distance Properties of Convolution Codes- Sequential Decoding of Convolutional Codes-Trellis Codes.

UNIT V  SPREAD-SPECTRUM MODULATION
9

TOTAL HOURS: 45

TEXT BOOK

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AIM
To provide sound knowledge in the basic concepts of linear control theory and design of control system.

OBJECTIVE
- To understand the methods of representation of systems and to desire their transfer function models.
- To provide adequate knowledge in the time response of systems and steady state error analysis.
- To accord basic knowledge in obtaining the open loop and closed-loop frequency responses of systems.
- To understand the concept of stability of control system and methods of stability analysis.
- To study the three ways of designing compensation for a control system.

UNIT - I: SYSTEMS AND THEIR REPRESENTATION
12

UNIT - II: TIME RESPONSE
9

UNIT - III: FREQUENCY RESPONSE
9
Frequency response – Bode plot – Polar plot – Determination of closed loop response from open loop response – Correlation between frequency domain and time domain specifications.

UNIT - IV: STABILITY OF CONTROL SYSTEM
9

UNIT - V: COMPENSATOR DESIGN
6
Performance criteria – Lag, lead and lag-lead networks – Compensator design using bode plots.

Lecture Hours : 45, Tutorial Hours : 15
Total Hours : 60

TEXT BOOKS

REFERENCES
SEMESTER III

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**AIM:**
To study the course on antenna theory and propagation of waves.

**OBJECTIVES:**
- To study the EM theory and radiation fundamentals
- To study about wire antenna and arrays
- To study about the aperture antennas
- To study about the antenna measurements
- To study about the wave propagation

**UNIT I ELECTROMAGNETIC RADIATION AND ANTENNA BASICS**

**UNIT II POINT SOURCES AND THEIR ARRAYS**

**UNIT III LOOP, SLOT and HORN ANTENNAS**

**UNIT IV SPECIAL ANTENNAS and ANTENNA MEASUREMENTS**

**UNIT V PROPAGATION OF RADIO WAVES**
TEXTBOOK

REFERENCE BOOKS
AIM
To provide the knowledge of assembly language programming of microprocessor and microcontroller and interfacing peripheral devices with microcontroller.
To acquire the knowledge to construct and realize the basic communication circuits and interpret the obtained results.

OBJECTIVE
- To write the assembly language program for 8086 and 8051.
- To write the programs for communication between microcontroller and peripheral devices.
- To interface ADCs, DACs with microcontroller and learn the real time applications like stepper motor control, keyboard etc.

LIST OF EXPERIMENTS - Microcontroller
1. 8085 & 8086 Assembly Language Program (ALP) for Arithmetic Operations.
2. 8051 Assembly Language Program (ALP) for Arithmetic Operations.
3. 8051 Assembly Language Program (ALP) for Logical Operations.
4. 8051 Assembly Language Program (ALP) for Bit Manipulation Operations.
5. 8051 Assembly Language Program (ALP) for arrange the numbers in Ascending and Descending order.
6. 8051 Assembly Language Program (ALP) for Interrupt & UART Operations.
7. Interfacing an ADC to 8051 Controller.
8. Interfacing DAC to 8051 Controller and generate Square, Triangular & Saw-tooth waveform.
9. Interfacing a Stepper motor to 8051 Controller and operate it in clockwise and anti-clockwise directions.
10. Interfacing a Keyboard & Display controller (8279) to 8051 Controller.

LIST OF EXPERIMENTS - Digital Communication
1. Signal Sampling and reconstruction.
2. Amplitude modulation and demodulation.
3. Frequency modulation and demodulation.
4. Pulse code modulation and demodulation.
5. ASK, FSK and PSK Modulation and Demodulation.
6. TDM and FDM
7. Line Coding Schemes
8. FSK, PSK and DPSK schemes (Simulation)
9. Error control coding schemes (Simulation)
10. Spread spectrum communication (Simulation).
AIM:
To introduce the student to various image processing techniques.

OBJECTIVES:
❖ To study the image fundamentals
❖ To study the mathematical transforms necessary for image processing.
❖ To study the image enhancement techniques.
❖ To study image restoration procedures.
❖ To study the image compression techniques.

UNIT I - DIGITAL IMAGE FUNDAMENTALS

UNIT II - IMAGE TRANSFORMS

UNIT III - IMAGE ENHANCEMENT

UNIT IV - IMAGE RESTORATION

UNIT V - IMAGE COMPRESSION AND SEGMENTATION

Total Hours: 45

TEXT BOOKS:

REFERENCE BOOKS:

BE_ECE_PT_CBCS
AIM:
To understand the architecture, recent advances, current practices and trends in computer network, analyze the networking protocols and the contemporary issues in computer networks

OBJECTIVE
- To know about the concepts of Data communication and net-works and Physical Layer and different protocols.
- To impart knowledge on Medium Access Layer
- To impart knowledge on Networks Layer
- To impart knowledge on transport protocol.
- To impart knowledge on Application Layer.

UNIT I INTRODUCTION & PHYSICAL LAYER

UNIT II DATA LINK LAYER
Data link layer design issues - framing, error control, flow control - Error detecting codes and Error Correcting codes, Elemen-tary data link protocols -stop-and wait protocol for error free and noisy channel - sliding window protocol - one bit, go back-N and selective repeat.

UNIT III NETWORK LAYER

UNIT IV TRANSPORT LAYER

UNIT V APPLICATION LAYER
DNS-(Domain Name System), Electronic Mail, World Wide Web, Real Time Audio and Video, Content Delivery and Peer-to-peer,

TOTAL HOURS: 45

TEXT BOOKS:
REFERENCE BOOKS:
Aim
To provide the knowledge on VLSI fabrication and circuit design procedures

Objective
❖ To understand the MOS transistor theory, CMOS technologies and the Layout
❖ To understand the circuit concepts and scaling of MOS Circuits.
❖ To understand the concepts of designing combinational and sequential circuit using CMOS logic configuration
❖ To understand the subsystem design of IC’s
❖ To understand the concepts of CMOS testing

Unit – I: Introduction to MOS Technology
A brief History-MOS transistor, Ideal I-V characteristics, C-V characteristics, Non ideal I-V effects, DC transfer characteristics - CMOS technologies, Layout design Rules, CMOS process enhancements, Technology related CAD issues, Manufacturing issues.

Unit – II: Concepts and Scaling of MOS Circuits

Unit – III: Combinational and Sequential Circuit design
Circuit families –Low power logic design – comparison of circuit families – Sequencing static circuits, circuit design of latches and flip flops, Static sequencing element methodology- sequencing dynamic circuits – synchronizers

Unit – IV: Datapath and Array Subsystems

Unit – V: Testing
Need for testing- Testers, Text fixtures and test programs- Logic verification- Silicon debug principles- Manufacturing test – Design for testability – Boundary scan

Total Hours: 45

Text Books:

Reference Books:
AIM
To impart knowledge on Image processing Techniques
To impart knowledge on design of Digital Circuits using VLSI Techniques

OBJECTIVE:
To expertise in writing the program for generalized image processing and to understand its utilization in real time applications.
To gain expertise in design and development and simulation of digital circuits with VHDL and Verilog

LIST OF EXPERIMENTS: Image Processing Lab
1. Image types - acquisition and display
2. Image Transforms - fourier and inverse fourier
3. Image Transforms - DCT,
4. Image Transforms – Hadamard
5. Image Enhancement - Histogram Equalisation
6. Image Smoothening
7. Image Sharpening
8. Edge detection
9. Image restoration - Noise removal
10. Image Restoration - Inverse filtering
11. Image Compression - Lossy compression
12. Image Compression - Wavelet coding

LIST OF EXPERIMENTS : VLSI DESIGN LAB
1. Design of all logic gates
2. Design of adders
3. Design of subtractors
4. Design of Encoder and Decoder
5. Design of Multiplexer and Demultiplexer
6. Design of Comparator
7. Design of Flip Flop
8. Design of Code converters
9. Design of Magnitude Comparator
10. Design of registers using latches and flip flops
11. Design of Synchronous Counters
12. Design of State machines
13. Design of Microprocessor parts
AIM
To enable the student to become familiar with active & passive microwave devices & components used in RF & Microwave communication systems.

OBJECTIVE
- To study RF and passive microwave components and their S-Parameters.
- To study Microwave Components.
- To study Microwave Tubes.
- To study Microwave Semiconductor Devices.
- To Study Microwave Antennas.

UNIT I INTRODUCTION TO MICROWAVES AND RF
Microwave spectrum and bands-characteristics of microwaves-a typical microwave system. Traditional, industrial and biomedical applications of microwaves. Microwave hazards. S-matrix – significance, formulation and properties. S-matrix representation of a multi port network, S-matrix of a two port network with mismatched load. Introduction to RF, General applications, Frequency band definitions, Overview.

UNIT II MICROWAVE COMPONENTS and their S-parameters

UNIT III MICROWAVE O-type and M-type TUBES
Microwave tubes: O-type – Two cavity Klystrons: structure, resonant cavities, velocity modulation and Apple gate diagram, bunching process. Reflex Klystrons- structure, modes and o/p characteristics, electronic and mechanical tuning. M-type – cross-field effects, Magnetrons- types, 8-cavity Cylindrical Travelling Wave Magnetron- Hull cut-off and Hartree conditions, modes of resonance and PI-mode operation, o/p characteristics. HELIX TWT- types and characteristics of slow wave structures, structure of TWT and amplification process (qualitative treatment), Backward Wave Oscillators.

UNIT IV MICROWAVE SEMICONDUCTOR DEVICES AND IC'S
Avalanche Transit Time Devices- principle of operation and characteristics of IMPATT and TRAPATT diodes, Point Contact Diodes, Schottky Barrier Diodes, Parametric Devices, Detectors and Mixers. Monolithic Microwave Integrated Circuits (MMIC), MIC materials- substrate, conductors and dielectric materials. Types of MICs, hybridMICs(HMIC)
UNIT V MICROWAVE MEASUREMENTS  

TEXT BOOKS: 

REFERENCE BOOKS: 
AIM
To learn different types of optical emission, detection, modulation and opto electronic integrated
circuits and their applications

OBJECTIVES
- To know the basics of solid state physics and understand the nature and characteristics of light.
- To understand different optical sources.
- To learn the principle of optical detection and mechanism in different detection devices.
- To understand different light modulation techniques and the concepts and applications of optical
  switching.
- To study optical networks and their applications

UNIT I - INTRODUCTION: OPTICAL FIBRES - STRUCTURES, WAVEGUIDES AND FABRICATION
9
Introduction to vector nature of light, Basic optical Laws and Definitions, Optical Fiber Modes and
Configurations, Single Mode Fibers and Graded- Index Fiber Structures, Fiber Materials, Fiber Fabrication

UNIT II - ATTENUATION AND DISPERSION AND OPTICAL SOURCES
9
Attenuation- Absorption, Scattering Losses, Bending Losses, Core and Cladding Losses. Signal distortion in
Single-Mode Fiber - Optical sources - LED and LASER diode - Principles of operation, concepts of line width,
phase noise, switching and modulation characteristics.
Power Launching and Coupling and Optical Connectors

UNIT III - OPTICAL DETECTORS
9
Physical Principal of Photodiodes, Types of Optical detectors –PN Photodiode, PIN Photodiode, Avalanche
photodiode, Phototransistor - Principles of operation, concepts of Responsivity, Sensitivity and quantum
efficiency, noise in detection.
Multichannel Transmission Technique- Multichannel Amplitude Modulation -Multichannel Frequency
Modulation, WDM Concepts and Components.

UNIT IV OPTICAL AMPLIFIERS
9
Basic concepts, semiconductor Laser Amplifiers, Erbium-Doped Fiber Amplifier, Raman Fiber amplifier,
Brillouin Fiber amplifier ,Applications of Optical Amplifiers, Noise in Optical Amplifiers, Noise Figure of
Amplifier.

UNIT V OPTICAL NETWORKS AND OPTICAL SPACE COMMUNICATION
9
Network Concepts, Network Topologies, SONET/SDH, High Speed Light wave Links, Optical Add/Drop
Multiplexing, Optical Switching, WDN Networks, Passive Optical Networks, Optical Ethernet.
Introduction and application of Optical Space Communication.
TEXT BOOKS:

REFERENCE BOOKS:
Objective

- To understand the concept and devices of Embedded Systems
- To understand the basic programming tool for embedded systems
- To learn about various RTOS available
- To understand the basic real time systems and databases

Unit – I Embedded Devices

Unit – II Embedded Programming

Unit – III Real Time Operating Systems

Unit – IV Real Time Systems and Tasks

Unit – V Databases and Communication

Text Books

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AIM

To make students to understand the Concept and applications of Remote Sensing.

OBJECTIVE

- To study the process of remote sensing.
- To study about characteristics of EMR.
- To understand the various satellites and microwave remote sensing.
- To understand the use of Geographic Information System.
- To learn about the recent application of remote sensing.

UNIT I REMOTE SENSING AND TYPES OF REMOTE SENSING & SENSOR CHARACTERISTICS


UNIT II EMR INTERACTION WITH ATMOSPHERE AND EARTH MATERIALS


UNIT III OPTICAL AND MICROWAVE REMOTE SENSING


UNIT IV GEOGRAPHIC INFORMATION SYSTEM


UNIT V MISCELLANEOUS TOPICS


TOTAL HOURS: 45

TEXT BOOKS

REFERENCE BOOKS
AIM
To know and understand how communication is being established at RF, microwave frequencies and using fiber in optical communication.

OBJECTIVES
- To have a detailed practical study on RF circuits, microwave equipments
- To study the optical devices and to use in the appropriate application

LIST OF EXPERIMENTS
Experiments pertaining to RF, Microwave, Fiber optics, Optical Communication and Fiber optic sensors

RF
2. Characteristics of RF Filter.

MICROWAVE:
2. Characteristics of Reflex Klystron.
3. Characteristics of Directional Coupler
5. Horn Antenna – Gain and directional Characteristics

OPTICAL COMMUNICATION
1. Numerical aperture determination for fibers
2. D.C. Characteristics of LED and PIN Photo Diode
3. Optical transmission using Analog Modulation
4. Data transmission through Fiber Optic Link.
5. PI Characteristics of LASER diode.
AIM
To impart awareness on disasters and preparedness during disasters.

OBJECTIVES
☞ To Understand basic concepts in Disaster Management
☞ To Understand Definitions and Terminologies used in Disaster Management
☞ To Understand the Challenges posed by Disasters
☞ To understand Impacts of Disasters

UNIT 1 INTRODUCTION
9
Concept of disaster; Different approaches; Concept of Risk; Levels of disasters; Disaster phenomena and events (Global, national and regional); Natural and man-made hazards

UNIT 2 RISK ASSESSMENT AND VULNERABILITY ANALYSIS
9
Response time, frequency and forewarning levels of different hazards; Characteristics and damage potential of natural hazards; hazard assessment ;Dimensions of vulnerability factors; vulnerability assessment; Vulnerability and disaster risk; Vulnerabilities to flood and earthquake hazards

UNIT 3 DISASTER MANAGEMENT MECHANISM
9
Concepts of risk management and crisis management -Disaster management cycle; Response and Recovery; Development, Prevention, Mitigation and Preparedness-Planning for relief

UNIT 4 DISASTER RESPONSE
9
Mass media and disaster management-Disaster Response Plan; Communication, Participation, and Activation of Emergency Preparedness Plan-Logistics Management-Psychological Response-Trauma and Stress Management-Rumour and Panic Management-Minimum Standards of Relief-Managing Relief-Funding

UNIT 5 DISASTER MANAGEMENT IN INDIA
9
Strategies for disaster management planning; Steps for formulating a disaster risk reduction plan; Disaster management Act and Policy in India; Organisational structure for disaster management in India; Preparation of state and district disaster management plans

Total Hours: 45

TEXT BOOKS
REFERENCE BOOKS

AIM
To introduce the concepts of wireless / mobile communication using cellular environment and to make the students to know about the various wireless network systems and standards are to be introduced.

OBJECTIVES:
- It deals with the fundamental cellular radio.
- It presents different ways to radio propagation models
- It provides idea about analog and digital modulation techniques used in wireless communication.
- It also deals with the different types of equalization techniques and diversity concepts
- It deals with advanced transceiver schemes and second generation and third generation wireless networks.

UNIT I SERVICES AND TECHNICAL CHALLENGES
Types of Services, Requirements for the services, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems, Principles of Cellular networks, Multiple Access Schemes.

UNIT II WIRELESS PROPAGATION CHANNELS
Propagation Mechanisms (Qualitative treatment), Propagation effects with mobile radio, Channel Classification, Link calculations, Narrowband and Wideband models.

UNIT III WIRELESS TRANSCEIVERS
Structure of a wireless communication link, Modulation and demodulation – Quadrature Phase Shift Keying, π/4-Differential Quadrature Phase Shift Keying, Offset-Quadrature Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian Minimum Shift Keying, Power spectrum and Error performance in fading channels.

UNIT IV SIGNAL PROCESSING IN WIRELESS SYSTEMS
Principle of Diversity, Macrodiversity, Microdiversity, Signal Combining Techniques, Transmit diversity, Equalisers- Linear and Decision Feedback equalisers, Review of Channel coding and Speech coding techniques.

UNIT V ADVANCED TRANSCEIVER SCHEMES
Spread Spectrum Systems- Cellular Code Division Multiple Access Systems- Principle, Power control, Effects of multipath propagation on Code Division Multiple Access, Orthogonal Frequency Division Multiplexing – Principle, Cyclic Prefix, Transceiver implementation, Second Generation(GSM, IS–95) and Third Generation Wireless Networks and Standards

TOTAL HOURS: 45

TEXT BOOKS:
REFERENCES:
AIM:
To make students to understand the applications of electronics in diagnostic and therapeutic area.

OBJECTIVE

- To study the methods of recording bio-potentials
- To study how to measure biochemical and various physiological information
- To understand the working of units which will help to restore normal functioning
- To understand the use of radiation for diagnostic and therapy
- To learn about the recent trends in medical field and also the electrical safety in Hospitals

UNIT I - ELECTRO-PHYSIOLOGY AND BIOPOTENTIAL RECORDING
9
The Cell: the Basic Unit of Life - Molecular Components of Cells, The origin of Biopotentials, Biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, EOG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT II - BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENTS
9

UNIT III - THERAPEUTIC EQUIPMENT
9
Cardiac pacemakers, DC Debrillators, Dialyzer, Artificial Kidney, Artificial Heart, Artificial Ventilation and Ventilators.

UNIT IV - PHYSICAL MEDICINE AND BIO-TELEMETRY
9
Diathermies – its type and their applications, Bio telemetry – Elements and design of Bio telemetry system, Multi-patient Telemetry, Implantable Telemetry, Tele-stimulation. Medical imaging-X-ray generation, Magnetic Resonance Imaging system, Image Intensifiers-Computer Aided Tomography,

UNIT V - RECENT TRENDS IN MEDICAL INSTRUMENTATION
9

TOTAL HOURS: 45

TEXT BOOKS:
2. Leslie Cromwell, “Biomedical instrumentation and measurement”, Prentice Hall of India New Delhi, 1997. (All Five Units)
REFERENCE BOOKS:
AIM
To enable the students to know about the measurements and recording of Bioelectric Signals.

OBJECTIVES
- Record the various Bio Signals and Analysis it.
- To study the different preamplifiers used for amplifying the Bio Signals.
- To measure various physiological parameters using patient monitoring units.

LIST OF EXPERIMENTS
1. Study of Operational amplifier IC741 with its Characteristics.
2. Inverting and Non-Inverting mode of operation.
3. Construction and testing of Instrumentation amplifier
4. Recording and analysis of ECG signals.
5. Recording and analysis of EEG signals.
6. Recording and analysis of EMG signals.
7. Measurement of Heart Beat Rate
8. Measurement of Respiration Rate
9. Measurement of Pulse Rate
10. Study of biotelemetry
AIM:
This course is offered to students to gain basic knowledge on RF Identification and various techniques involved in RFID, Applications in Various fields.

OBJECTIVE:
- To Know the basic concepts in RF Identification
- To learn the Fundamental of RFID Tags
- To learn the RFID authenticity of goods and RFID privacy and regulation.
- To learn the RFID Applications in healthcare, Pharmacy and in Library
- To study about the threats in RFID, hacking and it’s Technical Solutions.

Unit-I RFID Principles

Unit-II RFID Global and Private Policies
Definitions of Privacy-Personal Information-Current Privacy Paradigm-Privacy through Data protection Law and Fair Information Practices-Understanding RFID’s Privacy threats-current state of RFID Policy-issues – privacy, Integrity, security of the system, Health impact-Labour impact, Current EPC global policy

Unit-III RFID in Authenticity of Goods and Interaction Design for Wireless
Important concepts in Authentication-Key Distribution problem-stolen keys and revocation-Authenticity of Tags and Goods. Anticounterfeiting Measures of Goods, Authentication of Readers and Users Across the supply chain-Role of Interaction Design-Designing and Modifying WID Systems-Disclosure at read and Read range, Identifiable Reqaders, permissions based Tags, Physical remedies

Unit-IV RFID Applications

Unit-V RFID Technical Solutions, Hacking Problem, threats
Reverse Engineering the protocol-Security Implications-protect against these tyes of Attacks-Bluetooth’s background-Bluetooth security and Privacy Attacks-Cracking Bluetooth-Bluetapping-Locational Surveillance Technical Challenges of RFID Privacy-Blocker Tags-Soft Blocking-Signal to Noise Measurement-Tags with Pseudonyms-Corporate Privacy-Technology and Policy-Robust RFID Security

Total Hours: 45
Text Book:

Reference Books:
OBJECTIVE

The objective of the project work is to enable the students to form the groups of not more than 3 members on a project involving theoretical and experimental studies related to the branch of study.

- Formation of Group as follows
- Group A: 8.5 CGPA and above
- Group B: 7 to 8.49 CGPA
- Group C: 5 to 6.9 CGPA

Group A Student will have a choice to take 2 students from Group B&C

- Every project work shall have a guide who is the member of the faculty of the institution. Six periods per week shall be allotted in the time table and this time shall be utilized by the students to receive the directions from the guide, on library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.
- The aim of the project work is to deepen comprehension of principles by applying them to a new problem which may be the design and manufacture of a device, a research investigation, a computer or management project or a design problem.
- The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department.
- Each student shall finally produce a comprehensive report covering background information, literature survey, problem statement, project work details and conclusion.
- This final report shall be typewritten form as specified in the guidelines.
- The continuous assessment shall be made as prescribed in the regulations
AIM:
To understand the basic concept in the field of satellite communication

OBJECTIVE
☞ To obtain knowledge on orbital aspects involved in satellite communication.
☞ To obtain knowledge on Power budget calculation.
☞ To obtain knowledge on Satellite system and services provided

UNIT I - SATELLITE ORBIT

UNIT II - INK DESIGN

UNIT III - SPACE AND EARTH SEGMENT

UNIT IV - SATELLITE ACCESS

UNIT V - BROADCAST AND SERVICES

TEXT BOOK

REFERENCES
ELECTIVE

WIRELESS SENSOR NETWORKS

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**AIM:**
To impart knowledge on the wireless sensors and its network communications

**OBJECTIVE**
- To study the basic wireless sensor networks
- To study the architecture of WSN
- To study the networking sensors
- To study about infrastructure establishment
- To study the sensor network platforms and tools

**UNIT I OVERVIEW OF WIRELESS SENSOR NETWORKS**
9

**UNIT II ARCHITECTURES**
9

**UNIT III NETWORKING SENSORS**
9

**UNIT IV INFRASTRUCTURE ESTABLISHMENT**
9
Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

**UNIT V SENSOR NETWORK PLATFORMS AND TOOLS**
9

**TOTAL HOURS: 45**

**TEXT BOOKS**

**REFERENCES**
The purpose of Video Processing course is to cover the fundamentals of digital video signal generation and further processing over the communication systems.

OBJECTIVE
To learn the basic concepts of video processing
To learn about the various methodologies for motion estimation
To learn the basic concepts of coding systems
To understand about the waveform based video coding techniques
To understand about the content dependent and scalable video coding techniques

UNIT I VIDEO FORMATION, PERCEPTION AND REPRESENTATION

UNIT II TWO-DIMENSIONAL MOTION ESTIMATION
General Methodologies, Pixel-Based Motion Estimation, Block Matching Algorithm, Mesh-based Motion estimation, Global Motion Estimation, Region Based Motion Estimation, Multi resolution Motion Estimation, Application of Motion Estimation in Video Coding. Feature based Motion Estimation.

UNIT III FOUNDATIONS OF VIDEO CODING
Overview of Coding Systems, Basic Notions in Probability and Information Theory, Information Theory for Source Coding, Binary Encoding, Scalar Quantization , Vector Quantization.

UNIT IV WAVEFORM-BASED VIDEO CODING
Block Based Transform Coding, Predictive Coding, Video Coding Using Temporal Prediction and Transform Coding.

UNIT V CONTENT DEPENDENT & SCALABLE VIDEO CODING
Two Dimensional Shape Coding, Texture coding for Arbitrarily Shaped Regions, Joint Shape & Texture Coding, Region-Based Video Coding, Object-based Video Coding. Basic Modes of Scalability, Object Based Scalability, Wavelet-transform Based Coding.

TOTAL HOURS: 45

TEXT BOOKS:

REFERENCES:
AIM
To learn the architecture and programming of advanced Intel family microprocessors and microcontrollers.

OBJECTIVES
- To introduce the concepts in internal programming model of Intel family of microprocessors.
- To introduce the programming techniques using MASM, DOS and BIOS function calls.
- To introduce the basic architecture of Pentium family of processors.
- To introduce the architecture programming and interfacing of 16 bit microcontrollers.
- To introduce the concepts and architecture of RISC processor and ARM.

UNIT I ADVANCED MICROPROCESSOR ARCHITECTURE
Internal Microprocessor Architecture-Real mode memory addressing – Protected Mode Memory addresses – Memory paging - Data addressing modes – Program memory addressing modes – Stack memory addressing modes – Data movement instructions – Program control instructions- Arithmetic and Logic Instructions.

UNIT II MODULAR PROGRAMMING AND ITS CONCEPTS
Modular programming – Using keyboard and Video display – Data Conversions- Disk files- Interrupt hooks-using assembly languages with C/ C++

UNIT III PENTIUM PROCESSORS

UNIT-IV 16-BIT MICRO CONTROLLER

UNIT V RISC PROCESSORS AND ARM

Total Hours: 45

TEXT BOOK

REFERENCE BOOKS
UNIT I-INTRODUCTION TO PHOTONICS  

UNIT II-OPTICAL FIBER WAVEGUIDES, SOURCES AND DETECTORS  

UNIT III-OPTICAL COMPONENTS AND SYSTEM DESIGN  

UNIT IV-OPTICAL NETWORKS ARCHITECTURE  

UNIT V-WDM NETWORK DESIGN  
WDM network elements, WDM network design - Cost tradeoffs, virtual Topology design, Routing and wavelength assignment, statistical dimensioning models.

TEXT BOOKS  
AIM:
To provide comprehensive background knowledge of wireless, mobile communication and to introduce all the most important wireless technologies.

OBJECTIVES
- To discuss the fundamentals of cellular mobile wireless networks
- To provide an overview of various approaches to communication networks
- To study the numerous different-generation technologies with their individual pros and cons
- To discuss about the principles of operation of the different access technologies like FDMA, TDMA, SDMA and CDMA and their pros and cons.

UNIT I - TRANSMISSION FUNDAMENTALS
10

UNIT II - NETWORK CONCEPTS
12
Communication Networks: LANs, MANs, WANs, circuit switching, packet switching, ATM Cellular Networks: Cells, duplexing, multiplexing, voice coding Multiple Access Techniques: FDMA, TDMA, SDMA, CDMA, spectral efficiency.

UNIT III - PERSONAL COMMUNICATION SERVICES
8
GSM, HSCSD, GPRS, D-AMPS, CDMA One, CDMA Two, Packet Data Systems.

UNIT IV - 3G & BEYOND
7
IMT-2000, W-CDMA, CDMA 2000, EDGE, Wi-Fi, WiMAX, OFDM.

UNIT V - MOBILE DATA SERVICES & SHORT-RANGE NETWORKS
8
Mobile Data Services: Messaging, wireless web, WAP, site design Short-Range Wireless Networks: Unlicensed spectrum, WLANs, cordless telephony, IrDA, Bluetooth Smart Phones: Future phones, mobile OSs, smart phone applications.

TEXT BOOKS:

REFERENCE BOOKS:
ELECTIVE

ROBOTICS AND AUTOMATION

AIM
To learn the fundamentals of Robotics and implementation aspects of real time concepts.

OBJECTIVES

حضور
To learn about the Basic concepts of Robots
Hosting
To study the Sensor and Vision Systems.
Hosting
To learn the Grippers and robot dynamics.
Hosting
To know about kinematics and path planning.
Hosting
To learn about Robot Programming Languages and applications

UNIT I BASIC CONCEPTS

UNIT II SENSORS AND VISION SYSTEM

UNIT III GRIPPERS AND ROBOT DYNAMICS

UNIT IV KINEMATICS AND PATH PLANNING

UNIT V PROGRAMMING LANGUAGES AND APPLICATIONS
Robot programming - Fixed instruction, sequence control, General programming language, Specific programming languages. Robots for welding, painting and assembly – Remote Controlled robots – Robots for nuclear, thermal and chemical plants.

Total Hours: 45

TEXT BOOKS:

REFERENCE BOOKS:
ELECTIVE

ADVANCED DIGITAL DESIGN

AIM:
Learning design of digital circuits is a fundamental necessity for designing embedded systems. This subject provides necessary instruments to achieve that goal.

OBJECTIVE:
To make the student learn: theory of logic and logic functions, design of digital circuits, and an introduction to VHDL language.

1. ADVANCED TOPICS IN BOOLEAN ALGEBRA
Shannon's expansion theorem, Consensus theorem, Octal designation, Run measure, INHIBIT /
INCLUSION / AOI / Driver / Buffer gates, Gate expander, Reed Muller expansion, Synthesis of multiple output combinational logic circuits by product map method, Design of static hazard free and dynamic hazard free logic circuits.

2. THRESHOLD LOGIC
Linear separability, Unateness, Physical implementation, Dual comparability, reduced functions, various theorems in threshold logic, Synthesis of single gate and multigate threshold Network.

3. SYMMETRIC FUNCTIONS
Elementary symmetric functions, partially symmetric and totally symmetric functions, Mc Cluskey decomposition method, Unity ratio symmetric ratio functions, Synthesis of symmetric function by contact networks.

4. SEQUENTIAL LOGIC CIRCUITS
Mealy machine, Moore machine, Trivial / Reversible / Isomorphic sequential machines, State diagrams,
State table minimization, Incompletely specified sequential machines, State assignments, Design of synchronous and asynchronous sequential logic circuits working in the fundamental mode and pulse mode, Essential hazards Unger's theorem.

5. PROGRAMMABLE LOGIC DEVICES
Basic concepts, Programming technologies, Programmable Logic Element (PLE), Programmable Logic Array (PLA), Programmable Array Logic (PAL), Structure of Standard PLD's, Complex PLD's (CPLD). System Design Using PLD's - Design of combinational and sequential circuits using PLD's, Programming PAL device using PALASM, Design of state machine using Algorithmic State Machines (ASM) chart as a design tool. Introduction To Field Programmable Gate Arrays - Types of FPGA, Xilinx XC3000 series, Logic Cell array (LCA), Configurable Logic Blocks (CLB) Input/Output Block (IOB)-Programmable Interconnect Point (PIP), Introduction to Actel ACT2 family and Xilinx XC4000 families, Design examples.

Total Hours: 45

Reference


BE_ECE_PT_CBCS
OBJECTIVES:

- To tutor the basics of EMI, EMC
- To instill knowledge on the EMI coupling mechanism and its mitigation techniques
- To impart comprehensive insight about the current EMC standards and about various measurement techniques

UNIT I  INTRODUCTION

UNIT II  INTERFERENCE MEASUREMENT
Introduction to Radiated Interference measurement- Anechoic chamber- Transverse electromagnetic cell- Reverberating chamber- Giga-Hertz TEM cell- Comparison of test facilities- Introduction to Conducted Interference measurement- Characterization of conduction currents/voltages- Conducted EM noise on power supply lines- Conducted EMI from equipment.

UNIT III  EMI FILTERS AND COMPONENTS
Introduction to EMI filters- Characteristics of filters- Power line filter design- Introduction to cables, connectors and components- EMI suppression cables- EMC connectors- EMC gaskets- Isolation transformer- Opto-isolators- Transient and surge suppression devices- EMI accessories.

UNIT IV  SPECTRUM CONSERVATION AND EMC COMPUTER MODELING
Introduction to Frequency allocation and frequency assignment- Modulation techniques- Introduction to spectrum conservation- Introduction to EMC computer modeling and simulation- EMC analysis of complex systems- Illustrating an automated system level EMC analysis procedure- Future of EMC computer modeling and simulation.

UNIT V  SIGNAL INTEGRITY AND EMC STANDARDS

TEXT BOOK:

AIM:
To learn the VLSI Signal Processing Techniques.

OBJECTIVE:
- To study about Iteration Bound and parallel processing
- To study about Retiming and Unfolding
- To study about Systolic Architecture Design
- To study about Scaling and Lattice Filter
- To study about pipelining and power reduction techniques

UNIT-I

UNIT-II
Retiming-Unfolding-critical path-retiming properties of unfolding transformation-algorithmic strength reduction in filters & transforms-Discrete cosine transform & Inverse DCT.

UNIT-III
Systolic architecture design-FIR systolic arrays-Systolic design for Space representation containing delays-fast convolution-Pipelined & parallel recursive and adaptive filters.

UNIT-IV
Scaling and round off noise-Digital lattice filter structure-Schur Algorithm-Derivation of one multiplier lattice filter-Normalized lattice filter-Bit level arithmetic Architecture-Bit-serial multipliers-Bit-serial filter design and implementation-Redundant arithmetic-Redundant number representation.

UNIT-V
Numerical strength reduction-synchronous pipelining and clocking styles-Wave pipelining-Asynchronous pipelining-Low power design-Scaling versus power consumption-Power reduction techniques-Programmable digital signal processors.

TEXT BOOKS:

REFERENCES:
UNIT I – INTRODUCTION

UNIT II – TQM PRINCIPLES

UNIT III – STATISTICAL PROCESS CONTROL (SPC)

UNIT IV – TQM TOOLS

UNIT V – QUALITY SYSTEMS

TEXT BOOKS

REFERENCES
ELECTIVE

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

| UNIT - I Introduction to Managerial Economics | 9 |

| UNIT - II Theory of Production and Cost Analysis | 10 |
| Production Function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts, Opportunity cost, Fixed Vs Variable costs, Explicit costs Vs Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA) - Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEA. |

| UNIT III Introduction to Markets & Pricing strategies | 8 |
| Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing Strategies |

| UNIT IV Capital and Capital Budgeting | 9 |
| Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (only theory) |

| UNIT V Introduction to Financial Accounting & Ratios | 9 |
| Introduction to Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments only). Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt-Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS). |

TOTAL HOURS: 45

TEXT BOOK


REFERENCES

ELECTIVE

NANOTECHNOLOGY

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AIM:
This course is offered to students to gain basic knowledge on Nano electronics and various fabrication techniques involved in Nano science.

OBJECTIVE:

- To Know basic concepts in Nanotechnology
- To learn the Fundamental of Nano electronics
- To learn the silicon MOSFET and Quantum Transport Devices
- To learn the fabrication of Carbon Nanotubes
- To study about the Molecular Electronics in Nanotechnology

UNIT I INTRODUCTION TO NANOTECHNOLOGY


UNIT II FUNDAMENTALS OF NANOELECTRONICS


UNIT III SILICON MOSFETS& QUANTUM TRANSPORT DEVICES


UNIT IV CARBON NANOTUBES


UNIT V MOLECULAR ELECTRONICS

TEXTBOOKS

REFERENCES:
AIM
To learn about Programmable logic Controllers.

OBJECTIVES
- To study about programmble logic.
- To study about PLCs and operation of PLC
- To study about PLC programming.
- To study about Timers and counters
- To get an idea about PLC applications

UNIT I PROGRAMMABLE LOGIC
Programmable logic introduction, Programmbale logic structures, Programmbale Logic Arrays (PLAs), Programmbale Array Logic (PALs). Field Programmable Gate Array(FPGA). Sequential network design with Programmable logic devices. Design of sequential networks using ROMs and PLAs. Traffic light controller using PAL.

UNIT II PROGRAMMABLE LOGIC CONTROLLERS (PLCs)
Programmable Logic Controller. Introduction part of PLC- Principles of operation. PLC sizes, PLC hardware components, I/O section, Analog I/O section, Analog I/O modules, digital I/O modules. CPU, Processor memory module, Programming devices, Diagnostics of PLCs with computers.

UNIT III PLC PROGRAMMING
PLC programming, simple instructions, Programming EXAMINE ON and EXAMINE OFF instructions , Electromagnetic control relays, Motor starters, Manually operated switchs, Mechanically operated and proximity switches, Output control devices, Latching relays, PLC ladder diagram, Converting simple relay ladder diagram into PLC relay ladder diagram.

UNIT V TIMERS
Timer instructions, ON DELAY timer and OFF DELAY timer , counter instructions, UP/DOWN counters, Timer and counter applications, Program control instructions, Data manipulating instructions, math instructions.

UNIT V APPLICATIONS OF PLC
Automatic control of warehouse door, Automatic lubricating oil supplier, Conveyor belt motor control, Automatic car washing machine, Bottle label detection, Process control applications.

TOTAL HOURS : 45

TEXT BOOKS:

REFERENCE BOOKS:
AIM
To students to gain basic knowledge on MEMS (Micro Electro Mechanical System). This enables them to design, analyze, fabricate and test the MEMS based components.

OBJECTIVES
☞ Introduction to MEMS.
☞ To study the Mechanics for MEMS Design.
☞ To study Electro Static Design and System Issues.
☞ To know various MEMS Applications

UNIT I  INTRODUCTION TO MEMS  9

UNIT II  PRINCIPLES OF MICROSYSTEIMS  9
Micro sensors- Acoustic wave sensors, Biomedical Sensors and Biosensors, Optical Sensors, Pressure sensors, Micro actuation- Actuation using Thermal Forces, Piezoelectric Crystals, Electrostatic Forces, MEMS with Micro actuators- Micro grippers , Micro motors , Micro valves , Micro accelerometers

UNIT III  MICROMACHINING  9
Introduction, Photolithography, Bulk Micromachining, Thin Film Deposition, Etching, surface Micromachining, LIGA

UNIT IV  MICRO-OPTO-ELECTROMECHANICAL SYSTEMS  9
Fundamental Principle of MOEMS Technology, Review Properties of Light, Light Modulators, Beam Splitter, Micro lens, Micro mirrors, Digital Micro mirror Device(DMD),Light Detectors, Grating Light Valve, Optical Switch

UNIT V  MEMS APPLICATION  9

TOTAL HOURS: 45

TEXT BOOKS:

REFERENCE BOOKS:
ELECTIVE

ELECTRONICS MEASUREMENTS  3 0 0 3

AIM
To provide adequate knowledge in Electrical and electronic measurements and instrumentation

OBJECTIVES
- To make the students to gain a clear knowledge of the fundamental elements of an instrument and static and dynamic characteristics.
- Emphasis is laid on the meters used to measure current & voltage and instrument transformers.
- To have an adequate knowledge in the measurement techniques for power and energy meters are included.
- To have basic knowledge about output display devices.
- Elaborate discussion about transducer and its classification.

UNIT I - INTRODUCTION
Functional elements of an instrument - static and dynamic characteristics – errors in measurement - statistical evaluation of measurement data - standard and calibration.

UNIT II - ELECTRICAL AND ELECTRONICS INSTRUMENTS
Principle and types analog and digital ammeters and voltmeters – single and three phase Wattmeters and Energy meter– instrument transformers – instruments for measurement of frequency and phase.

UNIT III - SIGNAL CONDITIONING CIRCUITS

UNIT IV - STORAGE AND DISPLAY DEVICES
Magnetic disc and tape recorders – digital plotters and printers – CRT displays – digital CRO – LED, LCD and Dot matrix displays. Data Logger

UNIT V - TRANSDUCERS
Classification of transducers – selection of transducers – resistive, capacitive and inductive transducers – piezo electric transducers – optical and digital transducers. - transducers for measurement of displacement, temperature, level, flows, pressure, velocity, torque, speed. Smart sensor.

Total Hours = 45

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**AIM:**
To study the internal organization and the architecture of computer.

**OBJECTIVE:**
- To learn about the design of the processors.
- To learn about the data transfer

**UNIT I: INTRODUCTION**

**UNIT II: PROCESSOR DESIGN AND CONTROL UNIT**
Goals – Design process – Data path organization – Main memory interface – Data path for single instructions- Floating point unit data path – Role of control unit – Reset sequence – Interrupt recognition and servicing – Abnormal situation handling – Hardwired control unit – Micro programmed control unit

**UNIT III: MEMORY DESIGN & MEMORY MANAGEMENT**
Memory types – Functional and usage modes – Memory allocation- Multiple memory decoding – Memory hierarchy – Instruction pre fetch – Memory interleaving – Write buffer – Cache memory –Virtual memory – Associative memory

**UNIT IV: INTRA SYSTEM COMMUNICATION AND I/O**

**UNIT V: ADVANCED ARCHITECTURE**

**TOTAL HOURS: 45**

**TEXT BOOKS**

**REFERENCE BOOKS**
AIM:
To learn the basic concepts of Neural Networks & Fuzzy Logic and learn to design and use them for biomedical applications

OBJECTIVES
- To understand the basic concepts of artificial neural networks
- To study the various ANN Models
- To familiarize about the Self organizing maps and competitive networks
- To study the basic concepts of fuzzy Logic systems
- To apply the concepts of ANN and Fuzzy Logic in Biomedical applications

UNIT I - ARTIFICIAL NEURAL NETWORKS-AN OVERVIEW
Neural Networks Basics-Biological Neural nets, Processing elements-Mc Culloh Pitts Model, Types of Learning, Network Parameters-Weights, Activation, Threshold Functions, Hebb Rule, Delta Rule, Perception learning Algorithm.

UNIT II - ANN MODELS

UNIT III - SELF ORGANIZING MAPS (SOM)

UNIT IV - INTRODUCTION TO FUZZY LOGIC
Fuzzy logic-Basic concepts -Fuzzy Vs Crisp set, Linguistic variables, Membership functions, Fuzzy IF-THEN rules, Variable inference techniques, De-fuzzification techniques, Basic fuzzy inference algorithm,. Implementation

UNIT V - NEURAL NETWORK AND FUZZY LOGIC APPLICATIONS IN MEDICINE
Neural Networks in Biomedical Applications, Cancer, Cardiovascular Applications, Medical Image Analysis using neural networks, Image Analysis –Case Study, Fuzzy Logic Applications, Fuzzy Logic Controller, Neuro fuzzy systems- Applications in medicine

Total Hours: 45

TEXT BOOKS
REFERENCE BOOKS
ELECTIVE

ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS 3 0 0 3

AIM:
To represent the concepts of intelligent agents, search techniques, knowledge, reasoning and planning and applications in expert systems.

OBJECTIVE

- To study the ideas of intelligent agents and search methods.
- To study about knowledge representation.
- To study about planning and learning methodologies.
- To construct plans and methods for designing controllers.
- To study the concepts of expert systems

UNIT I – INTRODUCTION TO ARTIFICIAL INTELLIGENCE 8

UNIT II – SEARCH STRATEGIES AND ALGORITHMS. 9

UNIT III – KNOWLEDGE REPRESENTATION AND REASONING. 10

UNIT IV – PLANNING AND LEARNING 10

UNIT V – EXPERT SYSTEMS 8

TEXT BOOKS

REFERENCE BOOKS
ELECTIVE

GRID & CLOUD COMPUTING

L | T | P | C
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AIM
To Study about Grid and Cloud Computing.

OBJECTIVES

- Understand how Grid computing helps in solving large scale scientific problems.
- Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
- Learn how to program the grid and the cloud.
- Understand the security issues in the grid and the cloud environment.

UNIT I  INTRODUCTION

UNIT II  GRID SERVICES

UNIT III  VIRTUALIZATION
Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

UNIT IV  PROGRAMMING MODEL

UNIT V  SECURITY
Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TOTAL HOURS: 45

TEXT BOOKS:
REFERENCES
1. Jason Venner, “Pro Hadoop- Build Scalable, Distributed Applications in the Cloud”, A Press, 2009
ELECTIVE

INFORMATION SECURITY

AIM
To study the critical need for ensuring Information Security in Organizations

OBJECTIVES
- To understand the basics of Information Security
- To know the legal, ethical and professional issues in Information Security
- To know the aspects of risk management
- To become aware of various standards in this area
- To know the technological aspects of Information Security

UNIT 1 INTRODUCTION

UNIT II SECURITY INVESTIGATION
Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III SECURITY ANALYSIS
Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV LOGICAL DESIGN

UNIT V PHYSICAL DESIGN

TOTAL HOURS: 45

TEXT BOOK

REFERENCE BOOKS
**ELECTIVE**

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**AIM**

To study the critical need for ensuring Cyber Security in real time problems

**OBJECTIVES**

- To understand the basics of Cyber Security
- To know the legal, ethical and professional issues in Cyber Security
- To know the various attacker techniques

**UNIT I CYBER SECURITY FUNDAMENTALS**


**UNIT II ATTACKER TECHNIQUES AND MOTIVATIONS**

Antiforensics – Tunneling techniques – Fraud Techniques - Threat Infrastructure.

**UNIT III EXPLOITATION**

Techniques to gain a foot hold – Misdirection, Reconnaissance, and disruption methods.

**UNIT IV MALICIOUS CODE**


**UNIT V DEFENSE AND ANALYSIS TECHNIQUES**


**TEXT BOOK**


**REFERENCE BOOKS**


AIM:
To impart the knowledge on basic functioning of GPS and its calibration.

OBJECTIVE:
- To understand Global Positioning systems
- To analyse and calibrate GPS devices
- To learn about various types of communication in GPS

Unit – I: Overview of GPS
Basic concept, system architecture, space segment, user segment, GPS aided Geo-augmented navigation (GAGAN) architecture.

Unit II GPS Signals
Signal structure, anti spoofing (AS), selective availability, Difference between GPS and GALILEO satellite construction.

Unit III GPS coordinate frames
Time references: Geodetic and Geo centric coordinate systems, ECEF coordinates, world geodetic 1984 (WGS 84), GPS time.

Unit IV GPS orbits and satellite position determination
GPS orbital parameters, description of receiver independent exchange format (RINEX) – Observation data and navigation message data parameters, GPS position determination.

Unit V GPS Errors
GPS error sources – clock error, ionospheric error, tropospheric error, multipath, ionospheric error estimation using dual frequency GPS receiver.

Total Hours: 45

TEXTBOOKS:

REFERENCE BOOKS:
AIM
To learn about the building up of a successful BI strategy.

OBJECTIVES
- Introduce students to various business intelligence concepts
- To learn the concepts of data integration
- To introduce enterprise reporting

UNIT-I  INTRODUCTION TO BUSINESS INTELLIGENCE

UNIT - II  BASICS OF DATA INTEGRATION

UNIT - III  INTRODUCTION TO MULTIDIMENSIONAL DATA MODELING
Introduction to Data and Dimensional Modeling – Multi Dimensional Data Model – ER modeling Vs Multi Dimensional Model – Concepts of Dimensions - facts - cubes- attributes- hierarchies- star and snowflake schema – Introduction to Business Metrics and KPIs – Creating Cubes using SSAS.

UNIT - IV  BASICS OF ENTERPRISE REPORTING
Introduction to Enterprise Reporting - Concepts of dashboards - balanced scorecards – Introduction to SSRS Architecture– Enterprise Reporting using SSRS reporting service

UNIT - V  BI ROAD AHEAD
BI and Mobility – BI and cloud computing – BI for ERP systems - Benefits of BI in ERP-NorthWind_Traders Data-Data Analyses through Excel-Kettle Tool – Conversion of data using Kettle Tool.

TOTAL HOURS: 45

TEXT BOOKS
1. RN Prasad, Seema Acharya, "Fundamentals Of Business Analytics" Wiley India,2011

REFERENCES
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**UNIT I**


**UNIT II**


**UNIT III**

RDBMS- data processing - the database technology - data models, ER modeling concept -notations - Extended ER features, Logical database design – normalization, SQL - DDL statements - DML statements - DCL statements, Writing Simple queries - SQL Tuning techniques - Embedded SQL – OLTP

**UNIT IV**


**UNIT V**


**TOTAL: 45 PERIODS**