UNIT VI

Time Base Generators

General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators.

UNIT VII

Synchronization and Frequency Division : Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Phase delay&phase jitters;Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit.

UNIT VIII

Blocking oscillators & Sampling Gates:

Blocking oscillators: Monostable blocking oscillators (Basetiming& Emitter timing): Astable blocking oscillators (Diode-Controlled & RC controlled), Applications

Sampling gates; Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Four-diode sampling gates; Applications of sampling gates.

TEXT BOOKS:

1 J. Millman and H. Taub, "Pulse, Digital and Switching Waveforms", McGraw-Hill, 1991.

2. A. Anand Kumar, "Pulse and Digital Circuits", PHI, 2005.Second Edition

REFERENCES:

1. Venkat Rao. K. Ramasudha K, Manmadha Rao G, "Pulse and Digital Circuits," Pearson Education, 2010

2. David J.Comer,"Digital Logic State Machine Design', Oxford University Press,2008,Third Edition

3. MS Prakash Rao – " Pulse and Digital Circuits " Tata McGrawHill.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Electronics and Communication Engineering – II Sem.

SWITCHING THEORY AND LOGIC DESIGN

UNIT I: Review of Number systems:

Representation of numbers of different radix, conversion of numbers from one radix to another radix, r-1's complement and r's complement of unsigned numbers subtraction, problem solving. Signed binary numbers, different forms, problem solving for subtraction. 4-bit codes: BCD, EXCESS 3, alphanumeric codes,9's complement, 2421, etc.. (Text Books: 2,, Reference Books: 1,2,4)

UNIT II

Logic operation, error detection and correction codes: Basic logic operations NOT, OR,AND,Boolean theorems, Complement and dual of logical expressions, NAND and NOR Gates, EX-OR, EX-NOR Gates, standard SOP and POS, Minimisation of logic functions using theorems, Generation of self dual functions. Gray code, error detection and error correction codes, parity checking even parity, odd parity, Hamming code, multi leveled AND-NOR Realisations. Two level NAND-NAND and NOR-NOR realizations. Degenerative forms and multi level realizations. (Text Books: 1,2, Reference Books: 12,4)

UNIT III

Minimisation of switching functions: Minimisation of switching functions using K-Map up to 6-variables, Tabular minimization, minimal SOP and POS Realisation. Problem solving using K-map such as code converters binary multiplier etc.,(Text Books: 1,2 , Reference Books: 2,4)

UNIT IV

Combinational logic circuits-I: Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders, 4-bit binary adder, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit Excess3 adder circuit, look-a-head adder circuit. (Text Books: 2, , Reference Books: 1,2,3)

UNIT V

Combinational logic circuits-II: Design of decoder, Demultiplexer, higher order demultiplexing, encoder, multiplexer, higher order multiplexer, realization of Boolean functions using decoders and multiplexers, priority encoder, different code converter using full adders. (Text Books: 1,2, Reference Books: 1,2,3)

UNIT VI

Combinational logic circuits-III: PROM,PLA,PAL, realization of switching functions using PROM,PLA and PAL; comparison of PROM,PLA,and PAL, Programming tables of PROM,PLA and PAL. (Text Books: 1,2, Reference Books: 1,2,4)

UNIT VII

Sequential circuits I: Classification of sequential circuits (synchronous and asynchronous): basic flip-flops, truth tables and excitation tables (nand RS latch, nor RS latch, RS flip-flop. JK flip-flop, T flip-flop, D flip-flop with reset and clear terminals).Conversion of flip-flop to flip-flop. Design of ripple counters, design of synchronous counters, Johnson counters, ring counters. Design of registers, Buffer register, control buffer register, shift register, bi-directional shift register, universal shift register. (Text Books: 1,2, Reference Books: 1,2,3)

UNIT VIII

Sequential circuits II: Finite state machine, capabilities and limitations, analysis of clocked sequential circuits, design procedures, reduction of state tables and state assignment. Realization of circuits using various flip-flops. Meelay to Moore conversion and vice-versa. (Text Books: 1 Reference Books: 1,2,4)

TEXTBOOKS:

1. Switching theory and logic design by Hill and Peterson Mc-Graw Hill MH edition
2. Modern Digital Electronics by RP Jain, TMH.

REFERENCE BOOKS:

1. Switching Theory and Logic Design by A. Ananda Kumar
2. Digital design by Mano 2nd edition PHI.
3. Micro electronics by Millman MH edition.
4. Fundamentals of Logic Design by Charles H.Roth Jr, Jaico Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Electronics and Communication Engineering – II Sem.

EM WAVES AND TRANSMISSION LINES

Review of Coordinate Systems, Vector Calculus:

UNIT I

ELECTROSTATICS: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Related Problems. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Related Problems.

UNIT II

Magneto Statics : Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy. Related Problems.

UNIT III

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface : Dielectric-Dielectric and Dielectric-Conductor Interfaces. Related Problems .

UNIT IV

EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H. Sinusoidal Variations. Wave Propagation in Lossless and Conducting Media. Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics. Polarization. Related Problems.

UNIT V

EM Wave Characteristics – II: Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection,

Surface Impedance. Poynting Vector and Poynting Theorem – Applications, Power Loss in a Plane Conductor. Related Problems.

UNIT VI

Guided Waves : Parallel Plane Waveguides: Introduction, TE, TM, TEM Modes - Concepts and Analysis, Cut-off Frequencies, Velocities, Wavelengths, Wave Impedances. Attenuations Factor – Expression for TEM Case. Related Problems.

UNIT VII

Transmission Lines - I : Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion – Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading. Related Problems.

UNIT VIII

Transmission Lines – II : Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance Transformations. Smith Chart – Configuration and Applications, Single and Double Stub Matching. Related Problems.

TEXT BOOKS :

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.

REFERENCES :

1. Electromagnetic Fields and Wave Theory –GSN Raju, Pearson Education 2006
2. Engineering Electromagnetics – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005.
3. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
4. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Electronics and Communication Engineering – II Sem.

ANALOG COMMUNICATIONS

UNIT I

INTRODUCTION : Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

UNIT II

DSB MODULATION : Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

UNIT III

SSB MODULATION : Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT IV

ANGLE MODULATION : Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM.

UNIT V

NOISE : Noise in Analog communication System, Noise in DSB& SSB System, Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis

UNIT VI

TRANSMITTERS : Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter.

UNIT VII

RECEIVERS : Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT VIII

PULSE MODULATION : Time Division Multiplexing,, Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM, TDM Vs FDM

TEXT BOOKS:

1. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007 3rd Edition.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.

REFERENCES:

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Ed.,.
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
3. Communication Systems– R.P. Singh, SP Sapre, Second Edition TMH, 2007.
4. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Electronics and Communication Engineering – II Sem.

ELECTRONIC CIRCUITS & P D C LAB
List of Experiments (Twelve experiments to be done) :

I) Design and Simulation in Simulation Laboratory using Multisim OR Pspice OR Equivalent Simulation Software. & Veryfing the result by Hardware (Any Six):

1. Common Emitter and Common collector amplifier-Freq. response,Impedances measurement
2. Two Stage RC Coupled Amplifier
3. Current shunt and Voltage shunt Feedback Amplifier- Freq. response,Impedances measurement (with and without feedback)
4. Wien Bridge Oscillator using Transistors- Design for different frequencies
5. RC Phase Shift Oscillator using Transistors - Design for different frequencies
6. Class A Power Amplifier (with and without transformer load)
7. Class B Power Amplifier
8. Single Tuned Voltage Amplifier
9. Series Voltage Regulator
10. Shunt Voltage Regulator

II) Pulse and Digital Circuits (Any Six)- By designing the Circuit

1. Linear wave shaping (Diff. Time Constants, Differentiator, Integrator)
2. Non Linear wave shaping – Clippers.,Clampers
3. Logic gates with discrete components (Diodes, Transistors)
4. Bistable Multivibrator
5. Astable Multivibrator. (Voltage- Frequency convertor)
6. Monostable Multivibrator.
7. Schmitt Trigger.

8. UJT Relaxation Oscillator.
9. Bootstrap sweep circuit.
10. Sampling Gates

Equipments required for Labortaries:

i. For software simultation of Electronic circuits

i) Computer Systems with latest specifications

ii) Connected in Lan (Optional)

iii) Operating system (Windows XP)

iv) Simulations software (Multisim/TINAPRO) Package

Equipment:

1.	RPS	-	0 – 30 V
2.	CRO	-	0 – 20 M Hz.
3.	Function Generators	-	0 – 1 M Hz
4.	Components		
5.	Multimeters		

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Electronics and Communication Engineering – II Sem.

ANALOG COMMUNICATIONS LAB

List of Experiments (Twelve experiments to be done) - (a. Hardware, b.MATLAB Simulink, c. MATLAB Communication tool box)

A. Amplitude Modulation - Mod. & Demod.

B. AM - DSB SC - Mod. & Demod.

C. Spectrum Analysis of Modulated signal using Spectrum Analyser

D. Diode Detector

E. Pre-emphasis & De-emphasis

F. Frequency Modulation - Mod. & Demod.

G. AGC Circuits

H. Sampling Theorem

I. Pulse Amplitude Modulation - Mod. & Demod.

J. PWM , PPM - Mod. & Demod.

K. PLL

Equipments & Software required:

Software :

i.) Computer Systems with latest specifications

ii) Connected in Lan (Optional)

iii) Operating system (Windows XP)

iv) Simulations software (Simulink & MATLAB)

Equipment:

1.	RPS	-	0 – 30 V
2.	CRO	-	0 – 20 M Hz.
3.	Function Generators	-	0 – 1 M Hz
4.	Components		
5.	Multimeters		
6.	Spectrum Analyser		

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Electronics and Communication Engineering – II Sem.

ENGLISH COMMUNICATION PRACTICE

Name of the Course: *Explorations II*

Life, Language and Culture

Purpose of the Course: English for Semester 4 is designed to provide the learners an opportunity to enhance their language skills through a reading of literary texts which will also help them relate themselves to different cultures vis-à-vis their own. Independent reading is also expected to increase spontaneity in expression among the learners.

Objectives: The Course aims at exposing the learners to nuances in culture, inculcating the habit of independent reading which provides the learners an opportunity to develop critical thinking and analytical skills that can be applied to any subject.

Content of the course: The literary pieces are carefully chosen from across cultures as samples of contemporary life and issues of global interest. This is meant to encourage students to relate language to personality development. In all, five literary pieces for Explorations II have been selected and another showcasing a holistic approach to life that can help one develop into better individuals and professionals.

Topics: Culture and traditions, philosophy, familial relationships, ethics, inter-personal relationships, ability to face disaster and poverty, tolerance.

Time frame/Hours of instruction: 2 hrs per week (for pre-reading and post reading tasks of the lessons). Total number of hours per semester - 32.

Time Allocation for each unit: Reading of the text should be done at home. The class hours are meant for discussion, analysis and related activities. Project should be completed in consultation with the teacher.

The title of the book

Explorations- II Life, Language and Culture

The stories included are

1. Morning Bells by Jayashree Mohanraj

2.The Power of the Plate of Rice by Ifeoma Okoye

3. Famadihana and the Other Rituals by Jayashree Mohanraj

4. Dial "000" by Barry Rosenberg

5. Tsunami Religion by Anjali Prashar

1. Prescribed Textbook

Life, Language and Culture : Explorations -2 , Cengage Learning India Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Electronics and Communication Engineering – II Sem.

PROFESSIONAL ETHICS AND MORALS -II

Unit 1

Human Values - Morals, Values, and Ethics – Integrity - Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Spirituality – Character

Unit 2

Engineering Ethics – consensus – controversy – Models of Professional Roles – theories about right action – Self – interest – customs and religion – uses of ethical theories

Unit 3

Engineer's Responsibility for Rights - respect for authority – conflicts of interest- Occupational crime – professional rights and employee rights – Communicating Risk and Public Policy- collective bargaining

Unit 4

Global Issues- Multinational Corporations – Environmental Ethics – Engineers as Managers , Advisors, and experts witnesses – moral leadership sample code of ethics like ASME, ASCE, IEEE, IETE, Institute of Engineers – Problem of Bribery, Extortion and Grease payments – Problem of Nepotism, Excessive Gifts – Paternalism – Different business practices – Negotiating Taxes.

Books:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill
2. Charles E Harris, Micheal J Rabins, "Engineering Ethics, Cengage Learning".
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.
4. PSR Murthy, "Indian Culture Values and Professional Ethics", BS Publications

5. Caroline Whitback< Ethics in Engineering Practice and Research, Cambridgs University Press,.

6. Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill.

7. Charles D Fleddermann, "Engineering Ethics", Prentice Hall.

8. George Reynolds, "Ethics in Information Technology", Cengage Learning.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

LINEAR IC APPLICATIONS

UNIT I

INTEGRATED CIRCUITS : Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.

UNIT II

Characteristics of OP-Amps, Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps, Op-Amp parameters & Measurement, Input & Out put Off set voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT III

LINEAR APPLICATIONS OF OP- AMPS : Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers.

UNIT IV

NON-LINEAR APPLICATIONS OF OP- AMPS: Non- Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

UNIT V

ACTIVE FILTERS: Introduction, Butter worth filters – 1st order, 2nd order LPF, HPF filters. Band pass, Band reject and All pass filters.

UNIT VI

TIMERS & PHASE LOCKED LOOPS: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators. Applications of VCO (566).

UNIT VII

D to A & A to D CONVERTERS : Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications, Specifications AD 574 (12 bit ADC).

UNIT VIII

ANALOG MULTIPLIERS AND MODULATORS : Four Quadrant multiplier, balanced modulator,IC1496,Applications of analog switches and Multiplexers, Sample & Hold amplifiers.

TEXT BOOKS :

1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,1987.

REFERENCES :

1. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.
2. OP AMPS and Linear Integrated Circuits concepts and Applications, James M Fiore, Cenage Learning India Ltd.
3. Operational Amplifiers & Linear Integrated Circuits–R.F.Coughlin & Fredrick Driscoll,

   PHI, 6th Edition.
4. Operational Amplifiers – C.G. Clayton, Butterworth & Company Publ.Ltd./ Elsevier, 1971.
5. Operational Amplifiers & Linear ICs – David A Bell, Oxford Uni. Press, 3rd Edition
6. Linear Integrated Circuits – S Salivahana, VSK Bhaskaran TMH, 2008.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

COMPUTER ARCHITECTURE & ORGANAGATION

UNIT - I

Computer System:

Computer components, computer function, interconnection structures, Bus interconnection, arithmetic and logic unit, integer representation, integer arithmetic, fixed point representation, floating point representation.

UNIT - II

Central Processing Unit:

Instruction Sets: Characteristics and addressing modes – Machine instruction characteristics, Types of operands and operators, addressing modes, instruction formats, Assembly language

Process Structure and Functions – Process organization, register organization, instruction cycle, instruction pipelining.

UNIT - III

Control Unit and Micro Programmed Control:

Micro operations, control of the processor, hardwired implementation, micro programmed control, micro instruction sequencing, micro instruction execution,

UNIT - IV

Computer Arithmetic:

Addition and subtraction, multiplication algorithms, division algorithms, floating point arithmetic operations, decimal arithmetic unit, decimal arithmetic operations.

UNIT - V

The Memory System:

Memory Hierarchy, main memory, auxiliary memory, associative memory, cache memory and Cache organisation, virtual memory, memory management hardware.

UNIT - VI

Input Output Organization:

Peripheral devices, input-output interface, asynchronous data transfer modes of transfer, priority interrupt, direct memory access, input-output processor (IOP), serial communication.

UNIT - VII

Parallel Organization:

Parallel Processing – use of multiprocessors, symmetric multi processors, cache coherence and MESI protocol, multi-threading and chip multiprocessors, non-uniform memory access computers, vector computations.

UNIT - VIII

Multiprocessors – Characteristics of multiprocessors, interconnection structures, inter processor arbitration, inter process arbitration, interprocessor communication and synchronization.

TEXT BOOKS:

1. Computer System Architecure, 3/e, M. Morris Mano, Pearson.
2. Computer Organization and Architecure, 8/e, William Stallings, Pearson.

REFERENCES:

1. Computer Organization, 5/e, Hamachar, Vranesic, TMH.
2. Computer Organization and Architecture, V. Rajaraman, T. Radhakrishnan, PHI Learning.
2. Computer Organization and Design, Pal Choudary, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

DIGITAL IC APPLICATIONS

UNIT I

CMOS LOGIC: Introduction to logic families, CMOS logic, CMOS steady state electrical behaviour, CMOS dynamic electrical behaviour, CMOS logic families.

UNIT II

BIPOLAR LOGIC AND INTERFACING: Diode Logic, Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74XX and CMOS 40XX series-ICs – Specifications.

UNIT III

COMBINATIONAL LOGIC DESIGN-I: Introduction, Design and Analysis procedures, Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & sub tractors, Design considerations of the above combinational logic circuits with relevant Digital ICs.

UNIT IV

COMBINATIONAL LOGIC DESIGN-II: Ripple Adder, Look Ahead Carry Generator, Binary Parallel Adder, n-Bit Parallel Subtractor, Binary Adder-Subtractor**,** ALUs, Combinational multipliers, Barrel Shifter, Simple Floating-Point Encoder, Cascading Comparators, Dual Priority Encoder, Design considerations of the above combinational logic circuits with relevant Digital ICs.

UNIT V

SEQUENTIAL LOGIC DESIGN-I: Introduction, The Basic Bistable Element, Latches, and flip-flops, Flip-Flop Conversions, SSI Latches and Flip-Flops, Counters, Design of Counters using Digital ICs, Counter applications, Synchronous design methodology, Impediments to synchronous design, Design considerations of the above sequential logic circuits with relevant Digital ICs.

UNIT VI

SEQUENTIAL LOGIC DESIGN-II: MSI Registers, Shift Registers, Modes of Operation of Shift Registers, Universal Shift Registers, MSI Shift Registers, Ring Counter, Johnson Counter, Basic sequential logic Design steps, Design of Modulus N Synchronous Counters, Design considerations of the above sequential logic circuits with relevant Digital ICs.

UNIT VII

PROGRAMMABLE LOGIC DEVICES (PLDs): Introduction, Programmable Read Only Memory, Programmable Logic Array, Programmable Array Logic Devices, Comparison between PROM, PLA and PAL. Design considerations of PLDs with relevant Digital ICs.

UNIT-VIII

MEMORIES: ROM: Internal structure, 2D-Decoding, Commercial ROM types, timing and applications,. Static RAM: Internal structure, SRAM timing, standard SRAMS, synchronous SRAMS, Dynamic RAM: Internal structure, timing, synchronous DRAMs, Familiarity with Component Data Sheets-Cypress CY6116, CY7C1006, Specifications.

TEXT BOOKS:

1. Digital Design Principles & Practices By John F. Wakerly, PHI Publications,Third Edition., 2005.
2. Digital IC Applications By Atul P.Godse and Deepali A.Godse, Technical Publications, Pune, 2005.

REFERENCES:

1. Digital Integrated Circuits-A Design Perspective By Jan M.Rabaey, Anantha Chandrakasan, Borivoje Nikolic, Pearson Education, 2005.
2. Introduction to Logic Design – Alan B. Marcovitz,TMH, 2nd Edition,2005.
3. Digital Logic and Computer Design By Mano, Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

DIGITAL COMMUNICATIONS

UNIT I

PULSE DIGITAL MODULATION : Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Compading in PCM systems. Differential PCM systems (DPCM).

UNIT II

DELTA MODULATION : Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT III

DIGITAL MODULATION TECHNIQUES : Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

UNIT IV

DATA TRANSMISSION : Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK.

UNIT V

INFORMATION THEORY : Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties,

UNIT VI

SOURCE CODING : Introductions, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

UNIT VII

LINEAR BLOCK CODES : Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes,

Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes.

UNIT VIII

CONVOLUTION CODES : Introduction, encoding of convolution codes, time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram decoding using Viterbi algorithm.

TEXT BOOKS :

1. Digital communications - Simon Haykin, John Wiley, 2005
2. Principles of Communication Systems – H. Taub and D. Schilling, TMH, 2003

REFERENCES :

1. Digital and Analog Communication Systems - Sam Shanmugam, John Wiley, 2005.
2. Digital Communications – John Proakis, TMH, 1983. Communication Systems Analog & Digital – Singh & Sapre, TMH, 2004.
3. Modern Analog and Digital Communication – B.P.Lathi, Oxford reprint, 3rd edition, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

ANTENNAS AND WAVE PROPAGATION

UNIT I

ANTENNA FUNDAMENTALS : Introduction, Radiation Mechanism – single wire, 2 wire, dipoles, Current Distribution on a thin wire antenna . Antenna Parameters] - Radiation Patterns, Patterns in Principal Planes, Main Lobe and Side Lobes, Beamwidths, Beam Area, Radiation Intensity, Beam Efficiency, Directivty, Gain and Resolution, Antenna Apertures, Aperture Efficiency, Effective Hight. Related Problems.

UNIT II

Thin Linear Wire Antennas: Retarded Potentials, Radiation from Small Electric Dipole, Quarterwave Monopole and Halfwave Dipole – Current Distributions, Evaluation of Field Components, Power Radiated, Radiation Resistance, Beamwidths, Directivity, Effective Area and Effective Hight. Natural current distributions, fields and patterns of Thin Linear Center-fed Antennas of different lengths, Radiation Resistance at a point which is not current maximum. Antenna Theorems – Applicability and Proofs for equivalence of directional characteristics, Loop Antennas: Small Loops - Field Components, Comparison of far fields of small loop and short dipole, Concept of short magnetic dipole, D and Rr relations for small loops.

UNIT III

ANTENNA ARRAYS : 2 element arrays – different cases, Principle of Pattern Multiplication, N element Uniform Linear Arrays – Broadside, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison; Concept of Scanning Arrays. Directivity Relations (no derivations). Related Problems. Binomial Arrays, Effects of Uniform and Non uniform Amplitude Distributions, Design Relations.

UNIT IV

NON-RESONANT RADIATORS : Introduction, Travelling wave radiators – basic concepts, Longwire antennas – field strength calculations and patterns, V-antennas, Rhombic Antennas and Design Relations, Broadband Antennas: Helical Antennas – Significance, Geometry, basic properties;

Design considerations for monofilar helical antennas in Axial Mode and Normal Modes (Qualitative Treatment).

UNIT V

VHF, UHF AND MICROWAVE ANTENNAS - I : Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics. Reflector Antennas : Flat Sheet and Corner Reflectors. Paraboloidal Reflectors – Geometry, characteristics,types of feeds, F/D Ratio, Spill Over, Back Lobes, Aperture Blocking, Off-set Feeds, Cassegrainian Feeds].

UNIT VI

VHF, UHF AND MICROWAVE ANTENNAS - II : Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – Geometry, Features, Dielectric Lenses and Zoning, Applications. Antenna Measurements – Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements (Comparison, Absolute and 3-Antenna Methods).

UNIT VII

WAVE PROPAGATION - I: Concepts of Propagation – frequency ranges and types of propagations. Ground Wave Propagation–Characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations. Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF & Skip Distance – Calculations for flat and spherical earth cases, Optimum Frequency, LUHF, Virtual Height, Ionospheric Abnormalities, Ionospheric Absorption.

UNIT VIII

WAVE PROPAGATION – II: Fundamental Equation for Free-Space Propagation, Basic Transmission Loss Calculations. Space Wave Propagation – Mechanism, LOS and Radio Horizon. Tropospheric Wave Propagation – Radius of Curvature of path, Effective Earth's Radius, Effect of Earth's Curvature, Field Strength Calculations, M-curves and Duct Propagation, Tropospheric Scattering.

TEXT BOOKS :

1. Antennas for All Applications – John D. Kraus and Ronald J. Marhefka, TMHl, 3rd Edn., 2003.

2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

REFERENCES:

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 2nd ed., 2001.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.
5. Antennas – John D. Kraus, McGraw-Hill, SECOND EDITION, 1988.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

UNIT I

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error. DC Voltimeters- Multirange, Range extension/Solid state and differential voltmeters, AC voltmeters- multi range, range extension, shunt. Thermocouple type RF ammeter, Ohmmeters series type, shunt type, Multimeter for Voltage, Current and resistance measurements.

UNIT II

Signal Generator- fixed and variable, AF oscillators, Standard and AF sine and square wave signal generators, Function Generators, Square pulse, Random noise, sweep, Arbitrary waveform.

UNIT III

Wave Analyzers, Haromonic Distortion Analyzers, Spectrum Analyzers, Digital Fourier Analyzers.

UNIT IV

Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, Dual beam CRO, Measurement of amplitude and frequency.

UNIT V

Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO-Active & Passive, attenuator type, Frequency counter, Time and Period measurement.

UNIT VI

AC Bridges Measurement of inductance- Maxwell's bridge, Anderson bridge. Measurement of capacitance - Schearing Bridge. Wheat stone bridge. Wien Bridge, Errors and precautions in using bridges. Q-meter.

UNIT VII

Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors.

UNIT VIII

Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed, proximity and displacement. Data acquisition systems.

TEXTBOOKS:

1. Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI,5th Edition, 2002.

REFERENCES:

1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2nd Edition, 2003.
2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2nd Ed., 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

DIGITAL COMMUNICATIONS LAB

1. Time division multiplexing.
2. Pulse code modulation.
3. Differential pulse code modulation.
4. Delta modulation.
5. Frequency shift keying.
6. Phase shift keying .
7. Differential phase shift keying.
8. Companding
9. Source Encoder and Decoder
10. Linear Block Code - Encoder and Decoder
11. Binary Cyclic Code - Encoder and Decoder
12. Convolution Code - Encoder and Decoder

Equipment required for Laboratories:

1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. RF Generators - 0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Digital Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

IC APPLICATIONS LAB

Minimum Twelve Experiments to be conducted :

1. Study of OP AMPs – IC 741, IC 555, IC 565, IC 566, IC 1496 – functioning, parameters and Specifications.
2. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
3. Integrator and Differentiator Circuits using IC 741.
4. Active Filter Applications – LPF, HPF (first order)
5. Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
6. IC 741 Oscillator Circuits – Phase Shift and Wien Bridge Oscillators.
7. Function Generator using OP AMPs.
8. IC 555 Timer – Monostable Operation Circuit.
9. IC 555 Timer – Astable Operation Circuit.
10. Schmitt Trigger Circuits – using IC 741 and IC 555.
11. IC 565 – PLL Applications.
12. IC 566 – VCO Applications.
13. Voltage Regulator using IC 723.
14. Three Terminal Voltage Regulators – 7805, 7809, 7912.
15. 4 bit DAC using OP AMP.

Equipment required for Laboratories:

1. RPS
2. CRO
3. Function Generator
4. Multi Meters
5. IC Trainer Kits (Optional)
6. Bread Boards
7. Components:- IC741, IC555, IC565, IC1496, IC723, 7805, 7809, 7912 and other essential components.
8. Analog IC Tester

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – I Sem.

INTELLECTUAL PROPERTY RIGHTS AND PATENTS – 1

Unit 1

Introduction to Intellectual Property Law – The Evolutionary Past - The IPR Tool Kit- Para -Legal Tasks in Intellectual Property Law – Ethical obligations in Para Legal Tasks in Intellectual Property Law - Introduction to Cyber Law – Innovations and Inventions Trade related Intellectual Property Right

Unit 2

Introduction to Trade mark – Trade mark Registration Process – Post registration procedures – Trade mark maintenance - Transfer of Rights - Inter partes Proceeding – Infringement - Dilution Ownership of Trade mark – Likelihood of confusion - Trademarks claims – Trade marks Litigations – International Trade mark Law –

Unit 3

Introduction to Copyrights – – Principles of Copyright Principles -The subjects Matter of Copy right – The Rights Afforded by Copyright Law – Copy right Ownership, Transfer and duration – Right to prepare Derivative works – Rights of Distribution – Rights of Perform the work Publicity Copyright Formalities and Registrations - Limitions - Copyright disputes and International Copyright Law – Semiconductor Chip Protection Act

Unit 4

Introduction to Trade Secret – Maintaining Trade Secret – Physical Secrurity –Employee Limitation - Employee confidentiality agreement - Trade Secret Law - Unfair Competation – Trade Secret Letigation – Breach of Contract – Applying State Law

Books:

1. Deborah E.Bouchoux: "Intellectual Property". Cengage learning , New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections

4. Prabhuddha Ganguli: ‘ Intellectual Property Rights” Tata Mc-Graw – Hill, New Delhi

5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.

6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.

7. M.Ashok Kumar and Mohd.Iqbal Ali: “Intellectual Property Right” Serials Pub.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – II Sem.

COMPUTER NETWORKS

UNIT – I

Introduction : OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks ,Arpanet, Internet, Network Topologies WAN, LAN, MAN.

UNIT - II

Physical Layer : Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications; Narrow band, broad band ISDN and ATM.

UNIT - III

Data link layer : Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM.

UNIT - IV

Medium Access sub layer : ALOHA, MAC addresses, Carrier sense multiple access. IEEE 802.X Standard Ethernet, wireless LANS. Bridges,

UNIT - V

Network Layer : Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing.

UNIT – VI

Dynamic routing – Broadcast routing. Rotary for mobility. Congestion, Control Algorithms – General Principles of Congestion prevension policies. Internet working: The Network layer in the internet and in the ATM Networks.

UNIT –VII

Transport Layer: Transport Services, Connection management, TCP and UDP protocols; ATM AAL Layer Protocol.

UNIT – VIII

Application Layer – Network Security, Domain name system, SNMP, Electronic Mail; the World WEB, Multi Media.

TEXT BOOKS :

1. Computer Networks — Andrew S Tanenbaum,4th Edition. Pearson Education/PHI
2. Data Communications and Networking – Behrouz A. Forouzan.Third Edition TMH.

REFERENCES :

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – II Sem.

DIGITAL SIGNAL PROCESSING

UNIT I

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

UNIT II

DISCRETE FOURIER SERIES: Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT. Relation between Z-transform and DFS

UNIT III

FAST FOURIER TRANSFORMS: Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, and FFT for composite N

UNIT IV

REALIZATION OF DIGITAL FILTERS: Review of Z-transforms, Applications of Z – transforms, solution of difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations, Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems, System function,

UNIT V

IIR DIGITAL FILTERS: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations.

UNIT VI

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

UNIT VII

MULTIRATE DIGITAL SIGNAL PROCESSING: Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion.

UNIT VIII

INTRODUCTION TO DSP PROCESSORS: Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, multiport memory, VLSI Architecture, Pipelining, Special addressing modes, On-Chip Peripherals. Architecture of TMS 320C5X- Introduction, Bus Structure, Central Arithmetic Logic Unit, Auxiliary Registrar, Index Registrar, Auxiliary Registger Compare Register, Block Move Address Register, Parallel Logic Unit, Memory mapped registers, program controller, Some flags in the status registers, On- chip registers, On-chip peripherals

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI
3. Digital Signal Processors – Architecture, Programming and Applications, B.Venkataramani, M. Bhaskar, TATA McGraw Hill, 2002.

Reference Books:

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006
2. Digital Signal Processing: Ashok Ambardar , Satya Prasad , Cenage Learning,
3. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
4. DSP Primer - C. Britton Rorabaugh, Tata McGraw Hill, 2005.
5. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007.
6. Digital Signal Processing – Alan V. Oppenheim, Ronald W. Schafer, PHI Ed., 2006.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – II Sem.

VLSI DESIGN

UNIT I

INTRODUCTION : Introduction to IC Technology, The IC Era, MOS and related VLSI Technology, Basic MOS Transistors, Enhancement and Depletion modes of transistor action, IC production process, MOS and CMOS Fabrication processes,BiCMOS Technology, Comparison between CMOS and Bipolar technologies.

UNIT II

BASIC ELECTRICAL PROPERTIES of MOS and BiCMOS Circuits: I_{ds} versus V_{ds} Relationships, Aspects of MOS transistor Threshold Voltage, MOS transistor Trans-conductance and Output Conductance, MOS transistor Figure of Merit, The Pass transistor, The nMOS Inverter, Determination of Pull-up to Pull-down Ratio for nMOS inverter driven by another nMOS inverter and for an nMOS inverter driven through one or more pass transistors, Alternative forms of pull-up, The CMOS Inverter, MOS transistor circuit model, Bi-CMOS Inverter, Latch-up in CMOS circuits and BiCMOS Latch-up Susceptibility.

UNIT III

MOS and BiCMOS CIRCUIT DESIGN PROCESSES: MOS Layers, Stick Diagrams, Design Rules and Layout, General observations on the Design rules, 2μm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2μm Double Metal, Double Poly CMOS rules, Layout Diagrams of NAND and NOR gates and CMOS inverter, Symbolic Diagrams-Translation to Mask Form.

UNIT IV

BASIC CIRCUIT CONCEPTS: Sheet Resistance, Sheet Resistance concept applied to MOS transistors and Inverters, Area Capacitance of Layers, Standard unit of capacitance, Some area Capacitance Calculations, The Delay Unit, Inverter Delays, Driving large capacitive loads, Propagation Delays, Wiring Capacitances, Fan-in and fan-out characteristics, Choice of layers, Transistor switches, Realization of gates using nMOS, pMOS and CMOS technologies.

UNIT V

SCALING OF MOS CIRCUITS: Scaling models and scaling factors, Scaling factors for device parameters, Limitations of scaling, Limits due to subthreshold currents, Limits on logic levels and supply voltage due to noise, Limits due to current density, Some architectural Issues, Introduction to Switch Logic and Gate Logic

UNIT VI

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN: Introduction to Programmable Logic Devices (PLDs), Programmable Logic Arrays (PLA), Programmable Array Logic (PAL), Implementation approaches in VLSI Design-Full Custom Design, Semicustom Design, Gate Arrays, Standard Cells, Complex Programmable Logic Devices (CPLDs), Field Programmable Gate Arrays(FPGAs), Design Issues**.**

UNIT VII

DIGITAL DESIGN USING HDL: Digital system design process, VLSI Circuit Design Process, Hardware Simulation, Hardware Synthesis, History of VHDL, VHDL requirements, Levels of Abstraction, Elements of VHDL, Packages, Libraries and Bindings, Objects and Classes, Variable assignments, Sequential statements, Usage of subprograms, Comparison of VHDL and Verilog HDL.

UNIT VIII

VHDL MODELLING : Simulation, Logic Synthesis, Inside a logic Synthesizer, Constraints, Technology Libraries, VHDL and Logic Synthesis, Functional Gate-Level verification, Place and Route, Post Layout Timing Simulation, Static Timing, Major Netlist formats for design representation, VHDL Synthesis-Programming Approach.

TEXT BOOKS:

1. Essentials of VLSI Circuits and Systems - Kamran Eshraghian, Douglas and A. Pucknell and Sholeh Eshraghian, Prentice-Hall of India Private Limited, 2005 Edition.
2. VLSI Design-A.Shanthi and A.Kavita, New Age International Private Limited, 2006 First Edition.
3. VLSI Design-K.Lal Kishore and V.S.V.Prabhakar,I.K.International Publishing House Private Limited, 2009 First Edition.

REFERENCES:

1. VLSI Design By Debaprasad Das,Oxford University Press,2010.
2. VLSI Design By A.Albert Raj & T.Latha,PHI Learning Private Limited,2010.
3. Principles of VLSI and CMOS Integrated Circuits By Richa Jain & Amrita Rai, S.Chand & Company Limited,First Edition,2012.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – II Sem.

MICROWAVE ENGINEERING

UNIT I

MICROWAVE TRANSMISSION LINES: Introduction, Microwave Spectrum and Bands, Applications of Microwaves. Rectangular Waveguides – TE/TM mode analysis, Expressions for Fields, Characteristic Equation and Cut-off Frequencies, Filter Characteristics, Dominant and Degenerate Modes, Sketches of TE and TM mode fields in the cross-section, Mode Characteristics – Phase and Group Velocities, Wavelengths and Impedance Relations; Power Transmission and Power Losses in Rectangular Guide. Related Problems.

UNIT II

CIRCULAR WAVEGUIDES: Introduction, Nature of Fields, Characteristic Equation, Dominant and Degenerate Modes. Impossibility of TEM mode. Microstrip Lines– Introduction, Zo Relations, Effective Dielectric Constant, Losses, Q factor. Cavity Resonators– Introduction, Rectangular and Cylindrical Cavities, Dominant Modes and Resonant Frequencies, Q factor and Coupling Coefficients. Related Problems.

UNIT III

WAVEGUIDE COMPONENTS AND APPLICATIONS - I : Coupling Mechanisms – Probe, Loop, Aperture types. Waveguide Discontinuities – Waveguide irises, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators – Resistive Card, Rotary Vane types; Waveguide Phase Shifters – Dielectric, Rotary Vane types. Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee, Hybrid Ring; Directional Couplers – 2 Hole, Bethe Hole types.

UNIT IV

WAVEGUIDE COMPONENTS AND APPLICATIONS - II : Ferrites– Composition and Characteristics, Faraday Rotation; Ferrite Components – Gyrator, Isolator, Circulator. Scattering Matrix– Significance, Formulation and Properties. S Matrix Calculations for – 2 port Junction, E plane and H plane Tees, Magic Tee, Directional Coupler, Circulator and Isolator. Related Problems.

UNIT V

MICROWAVE TUBES – I: Limitations and Losses of conventional tubes at microwave frequencies. Microwave tubes – O type and M type classifications. O-type tubes : 2 Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions for o/p Power and Efficiency. Reflex Klystrons – Structure, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance; Oscillating Modes and o/p Characteristics, Electronic and Mechanical Tuning. Related Problems.

UNIT VI

HELIX TWTS: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Nature of the four Propagation Constants, Gain Considerations.

M-type Tubes

Introduction, Cross-field effects, Magnetrons – Different Types, 8-Cavity Cylindrical Travelling Wave Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics.

UNIT VII

MICROWAVE SOLID STATE DEVICES: Introduction, Classification, Applications. TEDs – Introduction, Gunn Diode – Principle, RWH Theory, Characteristics, Basic Modes of Operation, Oscillation Modes. Avalanche Transit Time Devices – Introduction, IMPATT and TRAPATT Diodes – Principle of Operation and Characteristics.

UNIT VIII

MICROWAVE MEASUREMENTS: Description of Microwave Bench – Different Blocks and their Features, Precautions; Microwave Power Measurement – Bolometer Method. Measurement of Attenuation, Frequency, VSWR, Cavity Q. Impedance Measurements.

TEXT BOOKS :

1. Microwave Devices and Circuits – Samuel Y. Liao, PHI, 3rd Edition,1994.
2. Microwave Principles – Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, CBS Publishers and Distributors, New Delhi, 2004.

REFERENCES:

1. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition,

   2002.

2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.

3. Microwave Engineering – GS Raghuvanshi and K Satya Prasad Cenage Learning

3. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.

4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th ed., 1955.

5. Elements of Microwave Engineering – R. Chatterjee, Affiliated East-West Press Pvt. Ltd., New Delhi, 1988.

6. Micro Wave and Radar Engineering – M. Kulkarni, Umesh Publications, 1998.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – II Sem.

MICRO PROCESSORS AND MICRO CONTROLLERS

UNIT-I: 8086/8088 MICROPROCESSORS

Register organization of 8086, Architecture, signal description of 8086, physical memory organization, general bus operation, I/O addressing capability, special purpose activities, Minimum mode, maximum mode of 8086 system and timings, the processor 8088, machine language instruction formats, addressing mode of 8086, instruction set off 8086,assembler directives and operators.

UNIT-II: PROGRAMMING WITH 8086 MICROPROCESSOR

Machine level programs, programming with an assembler, Assembly language programs, introduction to stack, stack structure of 8086/8088, interrupts and interrupt service routines, interrupt cycle of 8086, non-mask able interrupt and mask able interrupts, interrupt programming.

UNIT-III: BASIC PERIPHERALS AND THEIR INTERFACING WITH 8086/88

Semiconductor memory interfacing, dynamic RAM interfacing, interfacing i/o ports, PIO 8255 modes of operation of 8255,interfacing to D/A and A/D converters, stepper motor interfacing, control of high power devices using 8255.

UNIT-IV: SPECIAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES AND THEIR INTERFACING

Programmable interrupt controller 8259A, the keyboard /display controller8279, programmable communication interface 8251 USART, DMA Controller 8257, programmable with DMA interface 8237.

UNIT-V: ADVANCED MICRO PROCESSORS

Salient features of 0386DX, architecture and signal description of 80386, register organization of 80386 and addressing modes, data types of 80386, real address mode of 80386, protected mode of 80386, segmentation and Paging, virtual 8086 mode and enhanced mode. Instruction set of 80386.The coprocessor 80387, the CPU with a numeric coprocessor-80486DX.

UNIT-VI: 8051 MICROCONTROLLER

Introduction to microcontrollers, 8051Microcontrollers, 8051pin description, connections, i/o ports and memory organization, MCS51addressing modes and instructions, assembly language programming tools.

UNIT-VII: PIC MICROCONTROLLERS

Overview and features, PIC16Cx/7X instructions, interrupts in PIC 16C61/71, PIC 16F8XX Flash controllers, DATA EEPROM and Flash EEPROM, i/o ports and timers.

UNIT-VIII: ARM 32-BIT MICROCONTROLLER

Introduction to 16/32 Bit processors, ARM architecture and organization, ARM / Thumb programming model, ARM / Thumb instruction set, Development tools.

TEXT BOOKS:

1. A.K.Ray, K.M.Bhurchandi ,"Advanced Microprocessors and Peripherals", Tata McGraw Hill Publications,2000.
2. N.Sentil Kumar, M.Saravanan, S.Jeevananthan, "Microprocessors and Microcontrollers", Oxford University Press,2010.

REFERENCES:

1. Ajay V Deshmukh, "Microcontrollers", TATA McGraw Hill publications,2012.
2. Krishna Kant, "Microprocessors and Microcontrollers", PHI Publications, 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – II Sem.

MANAGEMENT SCIENCE

Unit I

Introduction to Management: Concept –nature and importance of Management – Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization - Types of organization structure

Unit II

Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control-EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis)

Unit III

Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager- Wage payment plans(Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions.

Unit IV

Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems)

Unit V

Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis-Steps in Strategy Formulation and Implementation, Generic Strategy alternatives

Unit VI

Management Ethics: Importance of Ethics in Business and Management – Ethics in Marketing - HRM-Financial Management – Business Ethics and Law (Case example)

Unit VII

Business Communication: Report writing – Cross Cultural Communication, Problems and Challenges- Presentation Skills – Interviews- Video conferences

Unit VIII

Contemporary Management Practice: Basic concepts of MIS, MRP, Just-in-Time(JIT) system, Total Quality Management(TQM), Six sigma and Capability Maturity Model(CMM) Levies, Supply Chain Management , Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

Text Books

1. Dr. P. Vijaya Kumar & Dr. N. Appa Rao, '*Management Science'* Cengage, Delhi, 2012.
2. Dr. A. R. Aryasri, *Management Science'* TMH 2011.

References

1. Koontz & Weihrich: 'Essentials *of management'* TMH 2011
2. Seth & Rastogi: Global Management Systems, Cengage learning , Delhi, 2011
3. Robbins: Organizational Behaviour, Pearson publications, 2011
4. Kanishka Bedi: Production & Operations Management, Oxford Publications, 2011
5. Philip Kotler & Armstrong: Principles of Marketing, Pearson publications
6. Biswajit Patnaik: Human Resource Management, PHI, 2011
7. Hitt and Vijaya Kumar: Starategic Management, Cengage learning

Pre-requisites: Managerial Economics

Objective: To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/ Tables: Normal Distribution Function Tables need to be permitted into the examination Halls

Question paper pattern: 5 questions to be answered out of 8 questions.

Each question should not have more than 3 bits.

Unit VIII will have only short questions, not essay questions

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – II Sem.

MICRO PROCESSORS AND MICRO CONTROLLERS LAB

The students are required to develop the necessary Algorithm, Flowchart and Assembly Language Program Source Code for executing the following functions using MASM/TASM software and to verify the results with necessary Hardware Kits.

PART-I: MICROPROCESSOR 8086

1. Introduction to MASM/TASM.
2. Arithmetic operation- Multi byte Addition and Subtraction, Multiplication and Division- Signed and unsigned Arithmetic operation, ASCII- Arithmetic operation.
3. Logic operations-Shift and rotate- Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo)- Display characters, Strings.

PART-II: INTERFACING WITH MICROPROCESSOR

1. 8259 – Interrupt Controller-Generate an interrupt using 8259 timer.
2. 8279 – Keyboard Display- Write a program to display a string of characters.
3. 8255 – PPI-Write ALP to generate sinusoidal wave using PPI.
4. 8251 – USART-Write a program in ALP to establish Communication between two processors.

PART-III: MICROCONTROLLER 8051

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

PART-IV: INTERFACING WITH MICROCONTROLLER

Write C programs to interface 8051 chip to Interfacing modules to Develop single chip solutions.

1. Simple Calculator using 6 digit seven segment display and Hex Keyboard interface to 8051.
2. Alphanumeric LCD panel and Hex keypad input interface to 8051.
3. External ADC and Temperature control interface to 8051.
4. Generate different waveforms Sine, Square, Triangular, and Rampetc. using DAC interface to 8051; change the frequency and Amplitude.

EQUIPMENT REQUIRED FOR LABORATORY

1. MASM/TASM software
2. 8086 Microprocessor Kits
3. 8051 Micro Controller kits
4. Interfaces/peripheral subsystems
   - i) 8259 PIC
   - ii) 8279-KB/Display
   - iii) 8255 PPI
   - iv) 8251 USART
5. A/D and D/AC Interface

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – II Sem.

ELECTRONIC COMPUTER AIDED DESIGN LABORATORY

The students are required to Design and draw the internal structure of the following Digital Integrated Circuits and to develop VHDL Source code, Perform Simulation using relevant Simulator and analyze the obtained simulation results using necessary Synthesizer. Further, it is required to verify the logical operations of the Digital ICs (Hardware) in the Laboratory.

1. Realization of Logic Gates
2. 3 to 8 Decoder -74138
3. 8 x 1 Multiplexer-74151 and 2x 4 De-multiplexer-74155
4. 4- Bit comparator-7485
5. D Flip-Flop-7474
6. Decade counter -7490
7. 4 Bit counter-7493
8. Shift registers-7495
9. Universal shift registers-74194/ 195
10. RAM (16 x 4)-74189 (Read and Write operations)
11. Stack and Queue implementation using RAM
12. ALU Design

EQUIPMENT REQUIRED FOR LABORATORY

1. Xilinx ISE Software.
2. Digital ICs.
3. Personal Computers.
4. Necessary Hardware Kits.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Electronics and Communication Engineering – II Sem.

INTELLECTUAL PROPERTY RIGHTS AND PATENTS – II

UNIT - I

Intellectual Property Law Basics – Types of Intellectual Property – Agencies responsible for Intellectual Property Regristration - Cyber crime and E-commerce – International Aspects of Computer and Online Crime

UNIT - II

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law –Patent requirements - Ownership - Transfer - Patents Application Process – Patent Infringement - Patent Litigation - International Patent Law – Double Patenting – Patent Searching – Patent Law Treaty - New developments in Patent Law - Invention Developers and Promoters

UNIT - III

Introduction to Transactional Law: Creating Wealth and Managing Risk – The Employment Relationship in the Internet and Tech Sector – Contact for the Internet and Tech Sector - Business Assets in Information Age – Symbol and Trademark – Trolls and Landmines and other Metaphors

UNIT - IV

Regulatory , Compliance and Liability Issues – State Privacy Law - Date Security – Privacy issues - Controlling Over use or Misuse of 1 Intellectual Property Rights

BOOKS:

1. Deborah E.Bouchoux: "Intellectual Property". Cengage learning , New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections
4. Prabhuddha Ganguli: ' Intellectual Property Rights" Tata Mc-Graw – Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.
7. M.Ashok Kumar and Mohd.Iqbal Ali: "Intellectual Property Right" Serials Pub.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

OPTICAL COMMUNICATIONS

UNIT I

Overview of optical fiber communication - Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, Vnumber, Mode coupling, Step Index fibers, Graded Index fibers.

UNIT II

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. [2]. Fiber materials Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

UNIT III

Information capacity determination, Group delay, Types of Dispersion - Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss.

UNIT IV

Fiber Splicing- Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints,. Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency,Laser diode rate equations,Resonant frequencies. Reliability of LED&ILD.

UNIT V

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT VI

Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparision of Photodetectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

UNIT VII

Optical system design — Considerations, Component choice, Multiplexing. Point-to- point links, System considerations, Link power budget with examples. Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples.

UNTI VIII

Transmission distance, Line coding in Optical links, WDM, Necessity , Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye pattern.

TEXT BOOKS :

1. Optical Fiber Communications – Gerd Keiser, Mc Graw-Hill International edition, 3rd Edition, 2000.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

RERFERENCES :

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

EMBEDDED SYSTEMS

UNIT- I

INTRODUCTION: Embedded System-Definition, Embedded system versus General computing systems, History of Embedded systems, Classification of Embedded systems, Major application areas of embedded systems, purpose of embedded systems, The typical embedded system-Core of the embedded system, Memory, Sensors and Actuators, Communication Interface, Embedded firmware, other system components, PCB and passive components.

UNIT-II

EMBEDDED SYSTEMS-CHARACTERISTICS AND QUALITY ATTRIBUTES: Characteristics of an embedded system, Quality attributes of embedded systems, Application-specific embedded system-Washing Machine, Domain-Specific examples of Embedded system-Automotive.

UNIT-III

EMBEDDED HARDWARE DESIGN: Analog and digital electronic components, I/O types and examples, Serial communication devices, Parallel device ports, Wireless devices, Timer and counting devices, Watchdog timer, Real time clock, VLSI and Integrated circuit design, EDA Tools, OrCAD EDA tool, The PCB Layout design.

UNIT-IV

EMBEDDED FIRMWARE DESIGN: Embedded Firmware design approaches, Embedded Firmware development languages, ISR concept, Interrupt sources, Interrupt servicing mechanism, Multiple interrupts, DMA, Device driver programming, Concepts of C versus Embedded C and Compiler versus Cross-compiler.

UNIT-V

REAL TIME OPERATING SYSTEM: Operating system basics, Types of operating systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling, Threads, Processes and Scheduling, Task communication, Task synchronisation, Device Drivers, How to choose an RTOS.

UNIT-VI

HARDWARE SOFTWARE CO-DESIGN: Fundamental Issues in Hardware Software Co-Design, Computational models in embedded design, Hardware software Trade-offs, Integration of Hardware and Firmware, ICE, issues in embedded system design.

UNIT-VII

EMBEDDED SYSTEM DEVELOPMENT: The integrated development environment, Types of files generated on cross-compilation, Deassembler/ Decompiler, Simulators, Emulators and Debugging, Target hardware debugging, Boundary Scan, Embedded Software development process and tools.

UNIT-VIII

EMBEDDED SYSTEM IMPLEMENTATION AND TESTING: The main software utility tool, CAD and the hardware, Translation tools-Pre-processors, Interpreters, Compilers and Linkers, Debugging tools, Quality assurance and testing of the design, Testing on host machine, Simulators, Laboratory Tools.

TEXT BOOKS:

1. Introduction to Embedded Systems By Shibu.K.V-Tata McGraw Hill Education Private Limited,2009
2. Embedded Systems Architecture By Tammy Noergaard, Elsevier Publications, 2005.

REFERENCES:

1. Embedded Systems, Raj Kamal-Tata McGraw Hill Education Private Limited, Second Edition, 2008
2. Embedding system building blocks By Labrosse, CMP publishers.
3. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

DIGITAL IMAGE PROCESSING

UNIT - I

Introduction

Origins of Digital Image Processing, Uses Digital Image Processing, Fundamental steps in Digital Image Processing, Components of an Image Processing System, Digital Image Fundamentals

Elements of Visual Perception, Light and Electromagnetic Spectrum, Imaging Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels, An Introduction to the Mathematical Tools used in Digital Image Processing

Image Transforms:

Need for Image Transforms, Spatial Frequencies in Image Processing, Introduction to Fourier Transform, Discrete Fourier Transform, Fast Fourier Transform and its algorithm, Properties of Fourier transform – *Sampling Theorem, Parseval's Theorem,* Discrete Cosine Transform, Discrete Sine Transform, Walsh Transform, Hadamard Transform, Haar Transform, Slant Transform, SVD and KL Transforms *or Hotelling Transform*

UNIT - II

Intensity Transformations and Spatial Filtering

Background, Some Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods, using Fuzzy Techniques for Intensity Transformations and Spatial Filtering

UNIT - III

Filtering in the Frequency Domain

Preliminary Concepts, Sampling and the Fourier Transform of Sampled Functions, The Discrete Fourier Transform (DFT) of one Variable, Extension to Functions of Two Variables, Some Properties of the 2-D Discrete Fourier Transform, The Basic of Filtering in the Frequency Domain, Image Smoothing using Frequency Domain Filters, Selective Filtering, Implementation

UNIT - IV

Image Restoration and Reconstruction

A Model of the Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only- Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimation the Degradation Function, Inverse Filtering,

Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering, Geometric Mean Filter, Image Reconstruction from Projections

UNIT - V

Color Image Processing

Color Fundamentals, Color Models, Pseudocolor Image Processing, Basic of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Image Segmentation Based on Color, Noise in Color Images, Color Image Compression

UNIT - VI

Wavelets and Multi-resolution Processing

Image Pyramids, Subband Coding & Haar Transform, Multiresolution Expansions, Wavelet Transforms in One Dimension, The Fast Wavelet Transform, Wavelet Transforms in Two Dimensions, Wavelet packets

Image Compression

Fundamentals, Various Compression methods – Coding Techniques, Digital Image watermarking

UNIT - VII

Morphological Image Processing

Preliminaries, Erosion and Dilation, Opening and Closing, The Hit-or-Miss Transformation, Some Basic Morphological Algorithms, Grey- Scale Morphology

UNIT - VIII

Image segmentation

Fundamentals, Point, Line, and Edge Detection, Thresholding, Region-Based Segmentation, Segmentation Using Morphological Watersheds, The use of Motion in Segmentation

TEXT BOOKS:

1. Rafael C.Gonzalez and Richard E. Woods, "Digital Image Processing" Pearson Education, 2011
2. S.Sridhar, "Digital Image Processing" Oxford Publishers, 2011

REFERENCE BOOKS:

1) S. Jayaraman, S. Esakkirajan, T. Veerakumar, "Digital Image Processing" Mc Graw Hill Publishers, 2009
2) B.Chanda and D.Dutta Majumder, "Digital Image Processing and Analysis" Prentice Hall of India, 2011/2012(Print)
3) Anil K. Jain, "Fundamentals of Digital Image Processing," Prentice Hall of India, 2012
4) Milan Sonka, Hlavac & Boyle "Digital Image Processing and Computer Vision," Cengage Learning Publishers, 2010(Reprinted)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

RADAR SYSTEMS

UNIT I

Introduction Nature of Radar, Maximum Unambiguous Range, Radar Waveforms, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications. Related Problems.

UNIT II

Radar Equation : Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise and SNR, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment). Related Problems.

UNIT III

CW and Frequency Modulated Radar : Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar.FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Measurement Errors, Multiple Frequency CW Radar.

UNIT IV

MTI and Pulse Doppler Radar : Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance. Non-coherent MTI, MTI versus Pulse Doppler Radar.

UNIT V

Tracking Radar : Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse. Target Reflection Characteristics and Angular Accuracy. Tracking in Range, Acquisition and Scanning Patterns. Comparison of Trackers.

UNIT VI

Radar Antennas - Antenna Parameters, Reflector Antennas, Lens Antennas, Cosecant-Squared Antenna Pattern, Radomes, Electronically Steered Phased Array Antennas, Phase Shifters , Frequency –scan Arrays, , Radiators for Phased Arrays, Architectures for Phased Arrays.

UNIT VII

Detection of Radar Signals in Noise : Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation detection, Detection criteria, Detector Characteristics, Automatic Detection, Constant False Alarm Rate Receiver .

UNIT VIII

Radar Receivers – Noise Figure and Noise Temperature. Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus Parallel Feeds, Applications, Advantages and Limitations.

TEXT BOOKS :

1. Introduction to Radar Systems – Merrill I. Skolnik, SECOND EDITION, McGraw-Hill, 1981.

REFERENCES :

1. Introduction to Radar Systems – Merrill I. Skolnik, THIRD EDITION, Tata McGraw-Hill, 2001.
2. Radar : Principles , Technologies, Applications – Byron Edde, Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

TELECOMMUNICATION SWITCHING SYSTEMS (ELECTIVE – I)

UNIT I

TELECOMMUNICATION SWITCHING SYSTEMS : Introduction, Elements of switching systems, switching network configuration, principles of cross bar switching.

UNIT II

Electronic space division switching, Time division switching, Combination switching.

UNIT III

TELEPHONE NETWORKS: Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans.

UNIT IV

SIGNALING TECHNIQUES: In channel signaling, common channel signaling. Network traffic load and parameters, grade of service and blocking probability.

UNIT V

DATA COMMUNICATION NETWORKS: Introduction, network architecture, layered network architecture, protocols, data communications hardware, data communication circuits.

UNIT VI

Public switched data networks, connection oriented & connection less service, Circuit Switching, packet switching and virtual circuit switching concepts, OSI reference model, LAN, WAN, MAN & Internet. Repeaters, Bridges, Routers and gate ways.

UNIT VII

INTEGRATED SERVICES DIGITAL NETWORK (ISDN) : Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture, signaling, numbering, addressing, BISDN.

UNIT VIII

DSL Technology: ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS. SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries and Higher rate of service.

TEXT BOOKS :

1. Tele communication switching system and networks - Thyagarajan Viswanath, PHI, 2000.
2. Advanced electronic communications systems - Wayne Tomasi, PHI, 2004.

REFERENCES :

1. Digital telephony - J. Bellamy, John Wiley, 2nd edition, 2001.
2. Data Communications & Networks - Achyut. S.Godbole, TMH, 2004.
3. Principles of Communication Systems – H. Taub & D. Schilling , TMH, 2nd Edition, 2003.
4. Data Communication & Networking - B.A. Forouzan, TMH, 3rd Edition, 2004.
5. Telecommunication switching, Traffic and Networks - J E Flood, Pearson Education, 2002.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

ANALOG IC DESIGN
(Elective-I)

UNIT I: BASIC MOS DEVICES

MOS structure, I/V characteristics, MOS device models, second order effect, Advanced MOS Modeling, Spice modeling parameters.

UNIT II: INTEGRATED DEVICES AND CURRENT MIRRORS

Single Stage Amplifiers: Basic concepts, common source stages, Source follower, Common gate stage, Cascade stage, Differential amplifiers: single ended differential amplifier, basic differential pair, common mode response, differential pair with MOS loads, Current Mirrors: basic current mirrors, cascade and active current mirrors, bipolar current mirrors and gain stages, advanced current mirrors, Op-amp: Folded cascade, fully differential, current mirror, current feedback.

UNIT III: DESIGN OF OP-AMP AND ITS FREQUENCY RESPONSE

Operational Amplifiers: one stage and two stage op-amps, gain boosting, comparison, common mode feedback, input range limitation, slew-rate, power supply rejection, noise in op-amp.

Frequency Response: Miller effect, common source stage, source followers, common gate stage, cascade stage, differential pair.

UNIT IV: NOISE AND FEEDBACK ANALYSIS OF OP-AMPS

Statistical characteristics of noise, types of noise, representation of noise in circuits, noise in single stage and differential pairs, noise bandwidth, time and frequency domain analysis of noise models.

Feedback: Properties of feedback circuits, types of amplifiers, feedback topologies, effect of loading, effect of feedback on noise.

UNIT V: STABILITY AND FREQUENCY COMPENSATION OF OPAMP

Compensation: Two-stage CMOS op-amp, Feedback and op-amp compensation, General considerations of stability, Multipole systems, Phase margin, Frequency compensation, Slewing in two-stage op-amps, Other compensation techniques.

UNIT VI: SWITCHED CAPACITOR CIRCUITS

Basic building blocks, basic operation and analysis, sampling switches, Filters: First order, Bi-quad, charge injection, switched capacitor, amplifiers , gain circuits, integrators, common mode feedback circuits, other circuits.

UNIT VII: SAMPLE & HOLD AND COMPARATOR CIRCUITS

Performance and basics of sample and hold circuit, examples of CMOS, Bi-Polar, BiCMOS sample and hold Circuits, Band gap voltage reference: basics circuit for band gap reference , trans-linear gain Cell , trans-linear multiplier using op-amp as comparator, charge injection error, latched comparator, examples of CMOS, BiCMOS, Bi-Polar comparators.

UNIT VIII: OSCILLATORS AND DATA CONVERTERS

Ring oscillator, LC Oscillator, voltage controlled oscillator, Ideal D/A & A/D converters , Quantization Noise ,Performance Limitation, Nyquist Rate, A/D Converters : Integrating , Successive Approximation ,Cyclic A/D , Two step A/D , Interpolating A/D, Folding And Pipe-Lined , Time Interleaved Converters.

TEXT BOOKS:

1. D.A John & Ken Martin: “Analog Integrated Circuit Design”. John Wiley Publications, 1997.
2. Behzad Razavi, “Design of Analog CMOS Integrated Circuits”, Tata-McGraw Hill Publications, 2002.

REFERENCES:

1. Philip E. Allen & Douglas R. Holberg, “CMOS Analog Circuit Design”, Oxford University Press, 2002.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

OBJECT ORIENTED PROGRAMMING
(ELECTIVE – I)

UNIT I :

Object oriented thinking :- Need for oop paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

UNIT II :

Java Basics History of Java, Java buzzwords, datatypes, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT III :

Inheritance – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes.

UNIT IV :

Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.Exploring packages – Java.io, java.util.

UNIT V :

Exception handling and multithreading - Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT VI :

Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes.The AWT class hierarchy, user interface components-labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – boarder, grid, flow, card and grib bag.

UNIT VII :

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

UNIT VIII :

Networking – Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, Java .net package ,Packages – java.util,

TEXT BOOKS :

1. Java; the complete reference, 7th edition, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.

REFERENCES :

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, Pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, Pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and GaryCornell, Seventh Edition, Pearson Education
7. Object Oriented Programming through Java, P. Radha Krishna, University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

DIGITAL SIGNAL PROCESSING LAB

LIST OF EXPERIMENTS:

1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions.
2. To verify linear convolution.
3. To verify the circular convolution.
4. To design FIR filter (LP/HP) using windowing technique

a) Using rectangular window

b) Using triangular window

c) Using Kaiser window

5. To Implement IIR filter (LP/HP) on DSP Processors
6. N-point FFT algorithm.
7. MATLAB program to generate sum of sinusoidal signals.
8. MATLAB program to find frequency response of analog LP/HP filters.
9. To compute power density spectrum of a sequence.
10. To find the FFT of given 1-D signal and plot.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

MICROWAVE AND OPTICAL COMMUNICATIONS LAB

Minimum Twelve Experiments to be conducted:

Part – A (Any 7 Experiments) :

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance and Frequency Measurement.
7. Waveguide parameters measurement.
8. Scattering parameters of Circulator.
9. Scattering parameters of Magic Tee.

Part – B (Any 5 Experiments) :

10. Characterization of LED.
11. Characterization of Laser Diode.
12. Intensity modulation of Laser output through an optical fiber.
13. Measurement of Data rate for Digital Optical link.
14. Measurement of NA.
15. Measurement of losses for Analog Optical link.

Equipment required for Laboratories:

1. Regulated Klystron Power Supply
2. VSWR Meter -
3. Micro Ammeter - 0 – 500 μA
4. Multi meter
5. CRO

6. GUNN Power Supply, Pin Modulator
7. Reflex Klystron
8. Crystal Diodes
9. Micro wave components (Attenuation)
10. Frequency Meter
11. Slotted line carriage
12. Probe detector
13. wave guide shorts
14. Pyramidal Horn Antennas
15. Directional Coupler
16. E, H, Magic Tees
17. Circulators, Isolator
18. Matched Loads
19. Fiber Optic Analog Trainer based LED
20. Fiber Optic Analog Trainer based laser
21. Fiber Optic Digital Trainer
22. Fiber cables - (Plastic, Glass)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

BIO-MEDICAL ENGINEERING
(OPEN ELECTIVE)

1. INTRODUCTION TO BIOMEDICAL INSTRUMENTATION: Age of Biomedical Engineering, Development of Biomedical Instrumentation, Man Instrumentation System, Components of the Man-Instrument System, Physiological System of the Body, Problems Encountered in Measuring a Living System, Sources of Bioelectric Potentials, Muscle, Bioelectric Potentials, Sources of Bioelectric Potentials, Resting and Action Potentials, Propagation of Action Potential, Bioelectric Potentials-ECG, EEG and EMG, Envoked Responses.

2. ELECTRODES AND TRANSDUCERS: Introduction, Electrode Theory, Biopotential Electrodes, Examples of Electrodes, Basic Transducer Principles, Biochemical Transducers, The Transducer and Transduction Principles, Active Transducers, Passive Transducers, Transducers for Biomedical Applications, Pulse Sensors, Respiration Sensor, Transducers with Digital Output.

3. CARDIOVASCULAR SYSTEM AND MEASUREMENTS: The Heart and Cardiovascular System, Electro Cardiography, Blood Pressure Measurement, Measurement of Blood Flow and Cardiac Output, Measurement of Heart Sound, Plethysmography.

4. MEASUREMENTS IN THE RESPIRATORY SYSTEM: The Physiology of The Respiratory System, Tests and Instrumentation for The Mechanics of Breathing, Respiratory Therapy Equipment.

5. PATIENT CARE AND MONITORING: Elements of Intensive-Care Monitoring, Patient Monitoring Displays, Diagnosis, Calibration and Repair ability of Patient-Monitoring Equipment, Other Instrumentation for Monitoring Patients, Organization of the Hospital for Patient-Care Monitoring, Pacemakers, Defibrillators, Radio Frequency Applications of Therapeutic use.

6. THERAPEUTIC AND PROSTHETIC DEVICES: Audiometers and Hearing Aids, Myoelectric Arm, Laparoscope, Ophthalmology Instruments, Anatomy of Vision, Electrophysiological Tests, Ophthalmoscope, Tonometer for Eye Pressure Measurement, Diathermy, Clinical Laboratory Instruments, Biomaterials, Stimulators.

7. DIAGNOSTIC TECHNIQUES AND BIO-TELEMETRY: Principles of Ultrasonic Measurement, Ultrasonic Imaging, Ultrasonic Applications of Therapeutic Uses, Ultrasonic Diagnosis, X-Ray and Radio-Isotope Instrumentations, CAT Scan, Emission Computerized Tomography, MRI, Introduction to Biotelemetry, Physiological Parameters Adaptable to Biotelemetry, The Components of Biotelemetry System, Implantable Units, Telemetry for ECG Measurements during Exercise, Telemetry for Emergency Patient Monitoring

8. MONITORS, RECORDERS AND SHOCK HAZARDS: Biopotential Amplifiers, Monitors, Recorders, Shock Hazards and Prevention, Physiological Effects and Electrical Current, Shock Hazards from Electrical Equipment, Methods of Accident Prevention, Isolated Power Distribution System.

TEXT BOOKS:

1. "Bio-Medical Electronics and Instrumentation", Onkar N. Pandey, Rakesh Kumar, Katson Books.
2. "Bio-Medical Instrumentation", Cromewell , Wiebell, Pfeiffer

REFERENCES:

1. "Introduction to Bio-Medical Equipment Technology", 4th Edition, Joseph J. Carr, John M. Brown, Pearson Publications.
2. "Hand Book of Bio-Medical Instrumentation", Khandapur. McGrawHill.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

IMAGE PROCESSING
(OPEN ELECTIVE)

UNIT - I

Introduction to Image Processing:

Overview of Image Processing, Nature of Image Processing, Image Processing Computer Graphics, Signal Processing, Machine Vision, video Processing, Optics, Statistics, Digital Image Representation, Types of Images, Digital Image Processing Operations, Fundamental steps in Image Processing, Image Processing Applications Digital Imaging System

Digital Imaging System:

Physical Aspects of Imaging Acquisition, Biological Aspects of Image Acquisition, Properties of Human Visual System, Review of Digital Camera, Sampling and Quantization, Image Quality – *Optical Resolution, Image Display Device and Device Resolution,* Digital Halftone Process – *Random Dithering, Ordered Dithering, Non-Periodic Dithering,* Image Storage and File Formats – Need for File Format Types of File Formats – *GIF, JPEG, PNG, DICOM, SVG Structure of TIFF File Format*

UNIT - II

Digital Image Processing Operations:

Basic Relationship and Distance Metrics, Classification of Image Processing Operations, Arithmetic and Logical Operations, Geometric Operations, Image Interpolation Techniques, Set Operations, Statistical Operations, Convolution and Correlation Operations, Data Structures and Image Processing Applications Development –

Relational Structures, Hierarchical Data Structures, Pyramids, Quadtrees, Application Development

UNIT - III

Digital Image Transforms:

Need for Image Transforms, Spatial Frequencies in Image Processing, Introduction to Fourier Transform, Discrete Fourier Transform, Fast Fourier Transform and its algorithm, Properties of Fourier transform – *Sampling*

Theorem, Parseval's Theorem, Discrete Cosine Transform, Discrete Sine Transform, Walsh Transform, Hadamard Transform, Haar Transform, Slant Transform, SVD and KL Transforms *or Hotelling Transform*

UNIT - IV

Image Enhancement:

Image Quality and Need for Image Enhancement, Image Quality Metrics, Image Enhancement Point Operations Linear and Non-linear Functions, Piecewise Linear Functions, Histogram-based Techniques, Spatial Filtering Concepts, Image Smoothing Spatial Filters and its design, Image Sharpening Spatial Filters Frequency Domain Filtering

UNIT - V

Image Restoration:

Image Degradation (Restoration) Model, Categories of Image Degradations, Noise Modeling, Blur and Distortions, Image Restoration in the Presence of Noise Only, Mean Filters, Order-statistics Filters, Image Restoration Techniques, Constrained and Unconstrained Methods Geometrical Transforms for Image Restoration

UNIT - VI

Image Compression:

Image Compression Model**,** Compression Algorithm and its types – *Entropy Coding, Predictive Coding, Transform Coding, Layered Coding,* Types of Redundancy – *Coding Redundancy, Inter-pixel Redundancy, Psychovisual Redundancy, Chromatic Redundancy,*

Lossless Compression Algorithms, Run-length Coding, Huffman Coding , Shannon–Fano Coding, Bit-plane Coding, Arithmetic Coding, Lossless Predictive Coding, Lossy Compression Algorithms, Block Transform Coding, Image and Video Compression standards, JPEG, Video Compression – MPEG

UNIT - VII

Image Segmentation:

Introduction – Classification of Image Segmentation Algorithms, Detection of Discontinuities, Edge Detection – Staged in Edge Detection – Types of Edge Detectors, First-order Edge Detection Operators – Second-order Derivative Filters, Edge Operator Performance

Edge Linking Algorithms, Principle of Thresholding - Effect of Noise over Threshold Process and Peakiness Test - Parametric Methods, Non-parametric Methods, Principle of Region- growing –Dynamic Segmentation approaches Validation of Segmentation Algorithms

UNIT - VIII

Colour Image Processing:

Introduction – Colour Fundamentals, Devices for Colour Imaging, Colour Image Storage and Processing – Colour Models – RGB Colour Model, HIS Colour Model, HSV Colour Model, HLS Colour Model, TV Colour Model– YUV Model, YIQ Model, Y C_b C_r Colour Model, Printing Colour Models- CMK and CMYK Models, Colour Quantization – Popularity Algorithm, Median-cut Algorithm, Octree-based Algorithm, Pseudo Colour Image Processing

Full Colour Processing – Colour Transformation – Image Filters for Colour Images – Noise in Colour Images, Colour Image Segmentation– Thresholding, K-means Clustering Technique, RGB Colour Space Segmentation, Colour Features

TEXT BOOKS:

1. S.Sridhar, "Digital Image Processing" Oxford Publishers, 2011
2. S.Jayaraman, S.Esakkirajan, T.Veerakumar, "Digital Image Processing" Mc Graw Hill Publishers, 2009

REFERENCE BOOKS:

1. Rafael C.Gonzalez and Richard E. Woods, "Digital Image Processing" Pearson Education, 2011
2. B.Chanda and D.Dutta Majumder, "Digital Image Processing and Analysis" Prentice Hall of India, 2011/2012(Print)
3. Anil K. Jain, "Fundamentals of Digital Image Processing," Prentice Hall of India, 2012
4. Milan Sonka, Hlavac & Boyle "Digital Image Processing and Computer Vision," Cengage Learning Publishers, 2010(Reprinted)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – I Sem.

PRINCIPLES OF SIGNALS, SYSTEMS AND COMMUNICATIONS (OPEN ELECTIVE)

UNIT – I

Signal Analysis: Introduction, Fourier Series - Trigonometric Fourier Series, Complex Exponential Fourier Series; Complex Fourier Spectrum – Time Domain and Frequency Domain Representation of a Signal; Fourier Transform - Analysis of a Non Periodic Function over entire interval; Fourier Transform Involving Impulse Function; Properties of Fourier Transform and Significance- Convolution Integral, Fourier Transform of Periodic Functions.

UNIT – II

Linear Systems: Introduction; System Function – Representation of a function f(t) and its response r(t), Definition of System Function; Distortionless Transmission – Band width of a system, Rise Time and System Band Width; Energy Signals and Power Signals, Energy and Power Spectral Densities; Correlation – Cross and Auto Correlation and their properties.

UNIT – III

Amplitude Modulation: Introduction to Communication System, Need for Modulation, Types of Amplitude Modulations, AM-SC- DSB-SC & SSB-SC, AM- DSB, SSB & VSB, Power and BW requirements, Generation of AM, DSB-SC, SSB-SC; Demodulation of AM-: Diode detectors.

UNIT – IV

Angle Modulation: Frequency & Phase Modulations, Advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, Comparison of FM & PM, FM Modulators – Direct Method and Indirect or Armstrong method of generations; FM Demodulators- Slope Detection, Balanced Slope, Foster Seeley and Ratio Detectors.

UNIT – V

Pulse Modulations: Sampling Theorem – Nyquist Interval, Aliasing, Signal recovery from its sampled version; Flat Top and Natural Sampling, PAM-PAM Modulation and Demodulation, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing and Comparison between TDM and FDM.

UNIT – VI

Pulse Code Modulations: Digital Representation of Analog Signal- Quantization of Signals, Quantization Error, Pulse Code Modulation- PCM System, Line Codes and their properties, Delta Modulation, Adaptive DM and comparisons.

UNIT – VII

Digital Modulation: ASK, FSK, PSK and DPSK, QPSK demodulation, Coherent and Non-coherent Reception, Comparison of Binary and Quaternary Modulation Schemes, M-ary modulation techniques.

UNIT – VIII

Advanced Communication Systems: Telephone Switching, Computer Communication, Optical Communications, Mobile Telephone Communication – The Cellular Concept, Satellite Communications, RADAR Systems.

TEXT BOOKS:

1. Communication Systems Analog and Digital – R.P. Singh and SD Sapre, TMH, 2nd Edition, 2008
2. Principles of Communication Systems- H. Taub and D. Schilling, TMH, 2003.

REFERENCE BOOKS:

1. Modern Digital and Analog Communication Systems – B.P. Lathi, Oxford 3rd Edition
2. Communication Systems – Simon Haykin, John Wiley, 3rd Edition
3. Digital and Analog Communication Systems – K Sam Shanmugam, WSE, 2006
4. Electronic & Communication Systems – Kennedy and Davis, TMH, 4th Edition, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

CELLULAR AND MOBILE COMMUNICATIONS

UNIT I

CELLULAR MOBILE RADIO SYSTEMS : Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

UNIT II

ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN : General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNIT III

INTERFERENCE : Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-cochannel interference-different types.

UNIT IV

CELL COVERAGE FOR SIGNAL AND TRAFFIC : Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

UNIT V

CELL SITE AND MOBILE ANTENNAS : Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

UNIT VI

FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT : Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

UNIT VII

Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

UNIT VIII

DIGITAL CELLULAR NETWORKS : GSM architecture, GSM channels, multiplex access scheme , TDMA, CDMA.

TEXTBOOKS :

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.
2. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2007.

REFERENCES :

1. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.
2. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.
4. Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

NETWORK SECURITY & CRYPTOGRAPHY (ELECTIVE – II)

UNIT-I:

Introduction: Security Attacks, Security Services, Security Mechanisms, and a Model for Network Security, Non-Cryptographic Protocol Vulnerabilities - DoS, DDoS, Session Hijacking and Spoofing, Software Vulnerabilities - Phishing, Buffer Overflow, Format String Attacks, SQL Injection, Basics of Cryptography - Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Other Cipher Properties - Confusion, Diffusion, Block and Stream Ciphers.

UNIT-II:

Secret Key Cryptography: Data Encryption Standard(DES), Strength of DES, Block Cipher Design Principles and Modes of Operations, Triple DES, International Data Encryption algorithm, Blowfish, CAST-128, AES

UNIT-III

Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, the Chinese Remainder Theorem, Discrete Logarithms.

UNIT-IV

Public Key Cryptography: Principles of Public Key Cryptosystems, RSA Algorithm, Diffie-Hellman Key Exchange, Introduction to Elliptic Curve Cryptography.

UNIT-V:

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Secure Hash Algorithm, Message Authentication Codes - Message Authentication Requirements and Functions, HMAC, Digital signatures, Digital Signature Schemes, Authentication Protocols, Digital Signature Standards.

UNIT-VI:

Authentication Applications: Kerberos, Key Management and Distribution, X.509 Directory Authentication service, Public Key Infrastructure, Electronic

Mail Security: Pretty Good Privacy, S/MIME.

UNIT-VII:

IP Security: Overview, Architecture, Authentication Header, Encapsulating Security Payload, Combining security Associations, Internet Key Exchange, Web Security: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Electronic Payment.

UNIT-VIII:

System Security: Intruders, Intrusion Detection, Password Management, Malicious Software - Types, Viruses, Virus Countermeasures, Worms, Firewalls - Characteristics, Types of Firewalls, Placement of Firewalls, Firewall Configuration, Trusted systems.

TEXT BOOKS:

1. Cryptography and Network Security: Principles and Practice, 5th Edition, William Stallings, Pearson Education, 2011.
2. Network Security and Cryptography, Bernard Menezes, Cengage Learning, 2011.
3. Cryptography and Network, 2nd Edition, Behrouz A. Fourouzan and Debdeep Mukhopadhyay, McGraw-Hill, 2010.

REFERENCE BOOKS:

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Principles of Information Security, Whitman, Thomson.
3. Introduction to Cryptography, Buchmann, Springer.
4. Applied Cryptography, 2nd Edition, Bruce Schneier, Johnwiley & Sons.
5. Mobile Cellular Communications- G. Sashibhushana Rao, Pearson Publications, 2012

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

SATELLITE COMMUNICATIONS
(ELECTIVE – II)

UNIT I

INTRODUCTION [2] : Origin of Satellite Communications, Historical Background, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

UNIT II

ORBITAL MECHANICS AND LAUNCHERS[1] : Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance.

UNIT III

SATELLITE SUBSYSTEMS[1] : Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.

UNIT IV

SATELLITE LINK DESIGN[1] : Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.

UNIT V

MULTIPLE ACCESS[1][2] : Frequency division multiple access (FDMA) Intermodulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA, Code Division Multiple access (CDMA),Spread spectrum transmission and reception.

UNIT VI

EARTH STATION TECHNOLOGY[3] : Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods.

UNIT VII

LOW EARTH ORBIT AND GEO-STATIONARY SATELLITE SYSTEMS[1] : Orbit consideration, coverage and frequency considerations, Delay & Throughput considerations, System considerations, Operational NGSO constellation Designs

UNIT VIII

SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM [1] : Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite signal acquisition, GPS Navigation Message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, Differential GPS.

TEXT BOOKS :

1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

REFERENCES :

1. Satellite Communications : Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed.
3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004
4. Satellite Communications – Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

DIGITAL CONTROL SYSTEMS
(ELECTIVE - II)

UNIT – I SAMPLING AND RECONSTRUCTION

Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

UNIT-II THE Z – TRANSFORMS

Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z-Transforms

UNIT-III Z-PLANE ANALYSIS OF DISCRETE-TIME CONTROL SYSTEM

Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane.

UNIT – IV STATE SPACE ANALYSIS

State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it's Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations.

UNIT – V CONTROLLABILITY AND OBSERVABILITY

Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT – VI STABILITY ANALYSIS

Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stablility test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT – VII DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS

Transient and steady – State response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

UNIT – VIII STATE FEEDBACK CONTROLLERS AND OBSERVERS

Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula.State Observers – Full order and Reduced order observers.

TEXT BOOKS:

1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition

2. Digital Control and State Variable Methods by M.Gopal, TMH

REFERENCES:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.

2. Digital Control Engineering, M.Gopal

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

OPERATING SYSTEMS
(ELECTIVE - III)

UNIT I

Computer System and Operating System Overview; Overview of Computer System hardware – Instruction execution – I/O function – Interrupts – Memory hierarchy – I.O Communication techniques. Operating System Objectives and functions – Evaluation of operating System – Example Systems.

UNIT II

Process Description – Process Control-process states – Process and Threads - Examples of Process description and Control.

UNIT III

Concurrency : Principles of Concurrency – Mutual Exclusion – Software and hardware approaches – semaphores – Monitors – Message Passing – Readers Writers Problem.

UNIT IV

Principles of deadlock – deadlock prevention, detection and avoidance dining philosophers problem – example Systems.

UNIT V

Memory Management: Memory Management requirements – loading programmes in to main memory – virtual memory – hardware and Control structures – OS Software – Examples of Memory Management.

UNIT VI

Uniprocessor Scheduling: Types of Scheduling – Scheduling algorithms – I/O management and Disc Scheduling – I/o devices – organization – of I/O function – OS design issues – I/O buffering – Disk I/O – disk scheduling Policies – examples System.

UNIT VII

File Management and Security: Overview of file management – file organization

and access – File Directories – File sharing – record blocking – secondary Storage Management – example system.

UNIT VIII

Security : Security threats – Protection – intruders – Viruses – trusted System.

TEXT BOOKS :

1. Operating Systems' – Internal and Design Principles, Fifth Edition– 2005, Pearson education./PHI
2. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne,7th Edition John Wiley

REFERENCES :

1. Operating Systems A design approach- Crowley,TMH.
2. Modern Operating Systems, Andrew S Tanenbaum. 2nd Edition, PHI/ PEARSON.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

STRUCTURED DIGITAL DESIGN
(Elective-III)

UNIT-I: INTRODUCTION TO HDL

Design Concepts: The Design process, Design of Digital Hardware, Introduction to Logic Circuits, Introduction to CAD Tools, Introduction to VHDL, Introduction to Digital Design Methodology, Design methodology, Introduction to Verilog.

UNIT-II: DIGITAL LOGIC DESIGN USING VHDL

Introduction, designing with VHDL, design entry methods, logic synthesis , entities , architecture , packages and configurations, types of models: dataflow , behavioral , structural, signals vs. variables, generics, data types, concurrent vs. sequential statements , loops and program controls.

UNIT-III: COMBINATIONAL LOGIC CIRCUIT DESIGN USING VHDL

Combinational circuits building blocks: Multiplexers, Decoders , Encoders , Code converters , Arithmetic comparison circuits , VHDL for combinational circuits , Adders-Half Adder, Full Adder, Ripple-Carry Adder, Carry Look-Ahead Adder, Subtraction, Multiplication.

UNIT-IV: SEQUENTIAL LOGIC CIRCUIT DESIGN USING VHDL

Flip-flops, registers & counters, synchronous sequential circuits: Basic design steps, Mealy State model, Design of FSM using CAD tools, Serial Adder Example, State Minimization, Design of Counter using sequential Circuit approach.

UNIT-V: DIGITAL LOGIC CIRCUIT DESIGN USING VERILOG

Verilog Data types and Operators, Binary data manipulation, Combinational and Sequential logic design, Structural Models of Combinational Logic, Logic Simulation, Design Verification and Test Methodology, Propagation Delay, Truth Table models of combinational and sequential logic using Verilog, Verilog for combinational circuits.

UNIT-VI: DIGITAL LOGIC CIRCUIT DESIGN EXAMPLES USING VERILOG

Behavioral modeling , Data types, Boolean-Equation-Based behavioral

models of combinational logics , Propagation delay and continuous assignments , latches and level-sensitive circuits in Verilog, Cyclic behavioral models of flip-flops and latches and Edge detection, comparison of styles for behavioral model; Behavioral model, Multiplexers, Encoders and Decoders, Counters, Shift Registers, Register files, Dataflow models of a linear feedback shift register, Machines with multi cycle operations, ASM and ASMD charts for behavioral modeling, Design examples, Keypad scanner and encoder.

UNIT-VII: SYNTHESIS OF DIGITAL LOGIC CIRCUIT DESIGN

Introduction to Synthesis, Synthesis of combinational logic, Synthesis of sequential logic with latches and flip-flops, Synthesis of Explicit and Implicit State Machines, Registers and counters.

UNIT-VIII: TESTING OF DIGITAL LOGIC CIRCUITS AND CAD TOOLS

Testing of logic circuits, fault model, complexity of a test set, path-sensitization, circuits with tree structure, random tests , testing of sequential circuits, built in self test, printed circuit boards, computer aided design tools, synthesis, physical design.

TEXT BOOKS:

1. Stephen Brown & Zvonko Vranesic, "Fundamentals of Digital logic design with VHDL", Tata McGraw Hill,2nd edition.
2. Michael D. Ciletti, "Advanced digital design with the Verilog HDL", Eastern economy edition, PHI.

REFERENCES:

1. Ian Grout, "Digital systems design with FPGAs and CPLDs", Elsevier Publications.
2. Stephen Brown & Zvonko Vranesic, "Fundamentals of Digital logic with Verilog design", Tata McGraw Hill,2nd edition.
3. Bhaskar, "VHDL Primer",3rd Edition, PHI Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

WIRELESS SENSOR NETWORKS
(ELECTIVE - III)

UNIT I

OVERVIEW OF WIRELESS SENSOR NETWORKS:

Key definitions of sensor networks, Advantages of sensor Networks, Unique constraints an challenges, Driving Applications, Enabling Technologies for Wireless Sensor Networks.

UNIT II

ARCHITECTURES:

Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture -Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

UNIT III

NETWORKING Technologies:

Physical Layer and Transceiver Design Considerations, Personal area networks (PANs), hidden node and exposed node problem, Topologies of PANs, MANETs,WANETs.

UNIT-IV

MAC Protocols for Wireless Sensor Networks:

Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT-V

ROUTING PROTOCOLS:

Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols, Proactive Routing

UNIT-VI

TRANSPORT LAYER AND SECURITY PROTOCOLS:

Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc

Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks,

UNIT VII

INFRASTRUCTURE ESTABLISHMENT:

Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

SECURITY IN WSNs:

Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.

UNIT-VIII

SENSOR NETWORK PLATFORMS AND TOOLS:

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.

APPLICATIONS of WSN:

S Ultra wide band radio communication, Wireless fidelity systems. Future directions, Home automation, smart metering Applications

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control – Jagannathan Sarangapani, CRC Press
3. Holger Karl & Andreas Willig, "Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.

REFERENCES:

1.. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks- Technology, Protocols, and Applications", John Wiley, 2007.
2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.
3. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh ,1 ed. Pearson Education.
4. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer
5. Wireless Sensor Networks – S Anandamurugan , Lakshmi Publications

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

ANALYTICAL INSTRUMENTATION (ELECTIVE - IV)

UNIT – I: pH AND CONDUCTIVITY & DISSOLVED COMPONENT ANALYSER

Conductivity meters – pH meters – Dissolved oxygen, hydrogen analyzers – Sodium analyzer – Silica analyzer and sampling systems.

UNIT – II: GAS ANALYSERS

Thermal conductivity types – CO monitor – NOX analyzer – H2S analyzer system and sampling – Industrial analyzer circuits, Theory and problems on Beer – Lamberts Law.

UNIT – III: CHROMATOGRAPHY - I

Gas chromatography – Liquid chromatography – their principles and applications –

UNIT – IV: CHROMATOGRAPHY – II oxygen analyzer – paramagnetic type – detectors and sampling systems.

UNIT – V: SPECTROPHOTOMETERS - I

UV, VIS Spectrophotometers – Single beam and double beam instruments – Instrumentation associated with the above Spectrophotometers – Sources and detectors – Sources and detectors for IR Spectrophotometers.

UNIT – VI: SPECTROPHOTOMETERS - II

FT IR Spectrometer – Flame emission and atomic absorption Spectrophotometer – Atomic emission Spectrophotometer - sources for Flame Photometers and online calorific value measurements.

UNIT – VII: PRINCIPLE OF NUCLEAR MAGNETIC RESONANCE

Instrumentation associated with NMR Spectrophotometer – Introduction to mass spectrophotometers , Principle and brief discussion on ELECTRON SPIN RESONANCE (ESR.)

UNIT – VIII: APPLICATIONS

Nuclear radiation detectors – Ionization chamber – GM Counter – Proportional Counter – Solid state detectors.

TEXT BOOK:

1. Handbook of Analytical Instruments – by Khandpur. TMH

REFERENCES:

1. Instrumental Methods of Analysis – by Willard H.H., Merrit L.L., Dean J.A.. and Seattle F.L., CBS Publishing and Distributors, 6/e, 1995.
2. Instrument Technology – by Jones B.E., Butterworth Scientific Publ., London, 1987.
3. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishing, New Delhi, 2/e, 1992.
4. Principles of Instrumental Analysis – by Skoog D.A. and West D.M., Holt Sounder Publication, Philadelphia, 1985.
5. Instrumental Analysis – by Mann C.K., Vickerks T.J. & Gullick W.H., Harper and Row Publishers, New York, 1974.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

REAL TIME OPERATING SYSTEMS
(Elective-IV)

UNIT-I: INTRODUCTION TO REAL-TIME OPERATING SYSTEM

OS Services, Process Management, Timer Functions, Event Functions, Memory Management, Device, File and IO Systems Management, Interrupt Routines in RTOS Environment and Handling of Interrupt Source Calls, Real-Time Operating Systems, Basic Design Using an RTOS, RTOS Task Scheduling Models, Interrupt Latency and Response of the Tasks as Performance Metrics, OS Security Issues.

UNIT-II: REAL-TIME OPERATING SYSTEM PROGRAMMING-I

Basic Functions and Types of RTOS for Embedded Systems, RTOS mCOS-II, RTOS Vx Works, Programming concepts of above RTOS with relevant Examples.

UNIT-III: REAL-TIME OPERATING SYSTEM PROGRAMMING-II

Programming concepts of RTOS Windows CE, RTOS OSEK, RTOS Linux 2.6.x and RTOS RT Linux.

UNIT-IV: DESIGN EXAMPLES AND CASE STUDIES OF PROGRAM MODELING WITH RTOS-I

Case study of embedded system design and coding for an Automatic Chocolate Vending Machine (ACVM) Using Mucos RTOS, case study of digital camera hardware and software architecture, case study of coding for sending application layer byte streams on a TCP/IP Network Using RTOS Vx Works.

UNIT-V: DESIGN EXAMPLES AND CASE STUDIES OF PROGRAM MODELING WITH RTOS-II

Case Study of Communication, Orchestra, Robots, Embedded System in Automobile, Case Study of Embedded System for an Adaptive Cruise Control (ACC) System in Car, Case Study of Embedded System for a Smart Card, Case Study of Embedded System of Mobile Phone Software for Key Inputs.

UNIT-VI: TARGET IMAGE CREATION

Off-The-Shelf Operating Systems, Operating System Software, Target Image

Creation for Window XP Embedded, Porting RTOS on a Micro Controller based Development Board.

UNIT-VII: PROGRAMMING IN LINUX

Overview and programming concepts of Unix/Linux Programming, Shell Programming, System Programming.

UNIT-VIII: PROGRAMMING IN RTLINUX

Overview of RT Linux, Core RT Linux API, Program to display a message periodically, semaphore management, Mutex, Management, Case Study of Appliance Control by RT Linux System.

TEXT BOOKS:

1. Dr. K.V.K.K. Prasad: "Embedded/Real-Time Systems" Dream Tech Publications, Black pad book.
2. Rajkamal: "Embedded Systems-Architecture, Programming and Design", Tata McGraw Hill Publications, Second Edition, 2008.

REFERENCES:

1. Labrosse, "Embedding system building blocks ", CMP publishers.
2. Rob Williams," Real time Systems Development", Butterworth Heinemann Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Electronics and Communication Engineering – II Sem.

TELEVISION ENGINEERING (ELECTIVE – IV)

UNIT I

INTRODUCTION : TV transmitter and receivers, synchronization. Television Pictures: Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution, Composite video signal: Horizontal and vertical sync, scanning sequence. Colour signal generation and Encoding**:** Perception of brightness and colours, additive colour mixing, video signals for colours, luminance signal, colour difference signals, encoding of colour difference signals, formation of chrominance signals, PAL encoder.

UNIT II

TV SIGNAL TRANSMISSION AND PROPAGATION : Picture signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW, TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas.

UNIT III

TV CAMERAS : Camera tube types, Vidicon, Silicon Diode Array Vidicon, Monochrome TV camera, color camera. CCD Image Sensors.

UNIT IV

PICTURE TUBES : Monochromatic Picture tube, Electrostatic focussing, Beam deflection, picture tube characteristics and specifications, colour picture tubes. TV Standards: American 525 line B&W TV system, NTSC colour system, 625-line monochrome system,b PAL colour system, TV standards.

UNIT V

MONOCHROME TV RECEIVER : RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits. PAL-D Colour Receiver: Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Colour Phasors, synchronous demodulators, Subcarrier generation, raster circuits.

UNIT VI

VISION IF SUBSYSTEM : AGC, noise cancellation, video and intercarrier

sound signal detection, vision IF subsystem of Black and White receivers, Colour receiver IF subsystem. Receiver sound system: FM detection, FM Sound detectors, typical applications. TV Receiver Tuners: Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions.

UNIT VII

COLOUR SIGNAL DECODING : PAL – D decoder, chroma signal amplifiers, separation of U and V signals, Color burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, RO phase shift and 180o PAL–SWITCH circuitry, U & V demodulators, Colour signal mixing.

UNIT VIII

SYNC SEPARATION, AFC AND DEFLECTION OSCILLATORS : Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses. AFC, single ended AFC circuit. Deflection Oscillators, deflection drive Ics. Receiver Antennas. DIGITAL TV Digital Satellite TV, Direct to Home Satellite TV, Digital TV Receiver, Digital Terrestrial TV.

TEST BOOKS :

1. Modern Television Practice – Principles, Technology and Service – R.R. Gulati, New Age International Publication, 2002.

2. Television and Video Engineering - A.M. Dhake, 2nd Edition

3. Monochrome and Colour TV – R.R. Gulati, New Age International Publication, 2002.

REFERENCES :

1. Colour Television Theory and Practice – S.P. Bali, TMH, 1994.

2. Basic Television and Video Systems – B. Grob and C.E. Herndon, McGraw Hill, 1999.