Bachelor of Technology (Electronics and Communication Engg.)
Scheme of Courses/Examination
(7th Semester)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/VV	Tot	
1	-------	Departmental Elective-I	3	1	-	4	100	50	-	150	3
2	-------	Departmental Elective-II	3	2	-	5	100	50	-	150	3
3	ECE-401E	VLSI Design	3	2	-	5	100	50	-	150	3
4	ECE-403E	Television Engineering	4	1	-	5	100	50	-	150	3
5	ECE-405E	Optical Communication	4	1	-	5	100	50	-	150	3
6	ECE-407E	Microwave Engineering	3	2	-	5	100	50	-	150	3
7	ECE-409E	Digital Signal Processing (Pr)			3	3		50	25	75	3
8	ECE-411E	Minor Project	-	-	3	3	-	75	50	125	3
10	ECE-413E	Practical Training Report	-	-	-		-	75	-	75	-
		Total	20	9	6	35	600	500	75	1175	

DEPARTMENTAL ELECTIVES-I

ECE-415E Micro-controllers
ECE-417E Bio-medical Signal Processing
ECE-419E Reliability
4. ECE-421E Nanotechnology

DEPARTMENTAL ELECTIVES-II

ECE-423E Advanced Microprocessors
ECE-425E Artificial Intelligence and Expert Systems
ECE-427E Power Electronics

Bachelor of Technology (Electronics and Communication Engg.)
Scheme of Courses/Examination
(8th Semester)

Sl. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/VV	Tot	
1	-	Departmental Elective-III	3	1	-	4	100	50	-	150	3
2	-	Departmental Elective-IV	3	2	-	5	100	50	-	150	3
3	ECE-402E	Wireless and Mobile Communication	3	2	-	5	100	50	-	150	3
4	ECE-404E	Radar Engineering	3	2	-	5	100	50	-	150	3
5	ECE-406E	Multimedia Communications	3	1	-	4	100	50	-	150	
6	ECE-408E	Microwave (Pr)	-	-	3	3	-	25	25	50	3
7	ECE-410E	Audio Visual Electronics (Pr)	-	-	3	3	-	25	25	50	3
8	ECE-412E	Major Project	-	-	4	4	-	75	75	150	-
9	ECE-414E	Seminar	2	-	-	2	-	25	-	25	-
10	ECE-416E	Comprehensive Viva Voce	-	-	-	-	-	75	-	75	-
11	ECE-418E	General Fitness & Professional Aptitude	-	-	-	-	-	-	75	75	-
Total			17	8	10	35	500	475	200		1175

DEPARTMENTAL ELECTIVES-III

ECE-420E Image Processing
ECE-422E Advanced Control Systems
ECE- 424E Embedded System Design

DEPARTMENTAL ELECTIVES-IV

1. ECE-426E Neuro Fuzzy Systems
2. ECE-428E Electronic Switching System
3. ECE-430E Transducers and their Applications

B.TECH VIIth SEMESTER
VLSI DESIGN
(ECE-401E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1 :
NMOS & CMOS Fabrication Process Sequence, Basic electrical properties of NMOs & CMOS inverters, MOS Design Process : Stick Diagram & Design rules.

UNIT 2 :
Delay in MOS Circuits, Scaling of MOS Circuits, Some design examples, inverter, NAND gates, Multiplexer, Logic Function Block.
Introduction to physical design of IC's Layout rules & circuit abstractor, Cell generation, Layout environments, Layout methodologies, Packaging, Computational Complexity, Algorithmic Paradigms.

UNIT 3:
Placement : Partitioning, Floorplanning, Placement.
Routing : Fundamentals, Global Routing, Detailed Routing, Routing in FPGA's.

UNIT-4:
Performance issues in Circuit Layout : Delay models, Timing Driven placement,TimingDrivenRouting,Via Minimization, Power Minimization, other issues.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.Each question will be of equal marks.

Suggested Books:

Pucknell DA & Eshraghian K, Basic VLSI Design, PHI.
Sanfarazdeh M. & Wong C.K , An Introduction to VLSI Physical Design,.Mc Graw Hill.
John P. Uyemura , Introduction to VLSI circuits and systems, John Wiley.

B.TECH VII SEMESTER
TELEVISION ENGINEERING
(ECE-403E)

L	T	P			
4	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:
ELEMENTS OF A TELEVISION SYSTEM :
Picture transmission, sound transmission, picture reception, sound reception synchronization, receiver controls. Analysis and Synthesis of Television Pictures: Gross structure, image continuity, no. of scanning lines, flicker, fine structure, tonal gradation. Composite Video signal , channel B.W. Vestigial side band transmission and reception, TV standards.

UNIT – II:
THE PICTURE TUBE : Monochrome picture tube, Beam deflection, screen phosphor, face plate, picture tube characteristics, picture tube circuit controls.Television Camera Tubes: Basic principal, Image orthicon, Vidicon, plumbicon.
MONOCHROME SIGNAL TRANSMISSION AND RECEPTION :Block diagram of Monochrome Signal Transmitter and Receiver, Explanation of different sections, Transmitting and receiving antennas.

UNIT-III
ELEMENTS OF COLOUR TV :Introduction, compatibility considerations, Interleaving process, Three color theory, Chrominance Signal, composite color signal, comparison of NTSC, PAL and SECAM Systems. color television display tubes (Delta gun, PIL, Trinitron).
Color signal transmission, bandwidth for color signal transmission.

UNIT – III:
ADVANCED TOPICS IN TV. ENGINEERING :Introduction, & working and block diagram of the Projector TV, 3D-TV, HDTV, Digital TV, Camcorders.
TELEVISION APPLICATIONS: Cable television, CCTV, picture phone & fascimile, television via satellite, Remote Control (Electronic control system), Introduction to Digital TV Technology and their merits.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

AM Dhake, Monochrome and Colour TV, TMH.
R.R.Gulati, Colour TV.Engg. Wiley Eastern Ltd.
SP Bali, Colour TV theory & practice, TMH
Merrill I. Skolnik, Introducion to Radar Systems, TMH

B.TECH VII SEMESTER
OPTICAL COMMUNICATION
(ECE-405E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:
INTRODUCTION : Propagation within the fiber, Numerical aperture of fiber, diffraction, step index and graded index fiber, Modes of propagation in the fiber, Single mode and multi mode fibers. Splices and connectors.

UNIT – II:
LOSSES IN OPTICAL FIBER : Rayleigh Scattering Losses, Absorption Losses, Leaky modes, mode coupling losses, Bending Losses, Combined Losses in the fiber.
DISPERSION EFFECT : Effect of dispersion on the pulse transmission Intermodal dispersion, Material dispersion, Wave guide dispersion, Total dispersion, Transmission rate.

UNIT – III:
LIGHT SOURCES : LEDS, Laser Action in semiconductor Lasers, Semiconductor Lasers for optical communication – Laser modes, Spectral Characteristics, Power Voltage Characteristics, Frequency response.
DETECTORS : P-I-N Photodiode, APD Noise Analysis in detectors, Coherent and non-coherent detection, The fiber-optic Communication System, Infrared sensors(eg: TSOP 1738).

UNIT – IV:
OPTICAL NETWORKS: Optical coupler,space switches,linear divider-combiners,wavelength division multiplexer and demultiplexer,optical amplifier,optical link network-single hop ,multi-hop, hybrid and photonic networks.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

John Power, An Introduction to Fiber optic systems, McGraw Hill International.
John Gowar , Optical communication Systems.
R. Ramaswamy, Optical Networks, Narosa Publication

B.TECH VII SEMESTER
MICROWAVE ENGINEERING
(ECE-407E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:
MICROWAVE RESONATORS: Brief deacription of waveguides, coplanar waveguides,
cavity resonators: rectangular, cylindrical, spherical and coaxial , excitation and coupling of cavities, Q factor.
MICROWAVE MEASUREMENTS: Measurement of frequency, impedance (using slotted section) attenuation, power, dielectric constant, measurement of V.S. W. R., insertion loss and permeability

UNIT – II:
MICROWAVE GENERATORS**:**Construction, characteristics, operating principle and typical applicationsof Klystron(two cavity, multicavity), Reflex Klystron, magnetron(Cylindrical magnetron and description of Π mode applications) and Traveling Wave Tube(TWT).

UNIT – III:
MATRIX DESCRIPTION OF MICROWAVE CIRCUITS: Scattering matrix-its properties, measurement of scattering coefficients, scattering matrices for common microwave systems.
MICROWAVE COMPONENTS: Waveguide tees- E-plane, H-plane, magic tee, rat race, directional coupler, tuning screws and stubs, isolators and circulators-their constructional features and applications. Microwave filters, Phase shifters, attenuators, Wavemeters.

UNIT-IV.
SOLID STATE MICROWAVE DEVICES:
Tranferred electron devices- GUNN EFFECT; negative diffrerential resistance phenomenon, field domain formation , GUNN diode structure.
Avalanche transit time devices: , IMPATT, TRAPATT, BARITT diodes, Parametric amplifiers

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Samuel Y. Liao, Microwave Devices and Circuits, Prentice-Hall of India.
David M. Pozar, Microwave Engineering, John Wiley and sons Inc.
Das, Annapurna & Sisir K. Das, Microwave Engineering, Tata McGraw-Hill.
POZAR DM, Microwave Engg, John Wiley & Sons Inc.

B.TECH VII SEMESTER
DIGITAL SIGNAL PROCESSING PRACTICAL
(ECE-409E)

L	T	P			
-	-	3	Viva-voce	:	25
			Sessional	:	50
			Time	:	3 hrs.

LIST OF EXPERIMENTS:

Define a function to compute DTFT of a finite length signal. Plot the magnitude and phase plots using subplots. Use this function to obtain DTFT of a 21 point triangular pulse over the domain $-10<n<10$. Plot the results over $-\pi<w<\pi$.

Write a program to plot the following functions : a)impulse function b)unit step c)unit ramp d) exponential e) sinusoidal

Verify the Symmetry, time shifting and modulating properties of DTFT with a rectangular pulse of length 21.

Study the aliasing effect by using a Sinusoidal Signal. Show the plots of continuous time Signal. Sampled Signal and reconstructed signals by using subplot.

Study different window functions available in signal processing toolbox and their controlling parameters.

Write a program to plot real, imaginary phase and magnitude of exponential function.

Verify the properties of Discrete Fourier Transform (DFT).

Write a program to find the convolution of two sequences using in built convolution function

Study of Digital Signal Processing Kit (TMS/ADSP)

Implementations of FIR/digital filter using DSP Kit.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

B.TECH VIII SEMESTER
WIRELESS AND MOBILE COMMUNICATION
(ECE-402E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3 Hrs

UNIT – I:
Radio Propagation Characteristics, Models for Path loss, Shadowing & Multipath fading-delay spread, Coherence bandwidth, Coherence Time, Doppler Spread Jake's Channel model.

UNIT – II:
Digital Modulation for Mobile radio, Analysis under fading channel, diversity techniques and Rake demodulator. Introduction to Spread Spectrum Communication Multiple Access Techniques used in Mobile Wireless Communications: FDMA/TDMA/CDMA.

UNIT – III:
The Cellular concept, Frequency Reuse basic theory of hexagonal cell layout, spectrum efficiency, FDM/TDM, Cellular System, channel allocation schemes, Handover Analysis, cellular CDMA, Soft capacity, Erlang capacity comparison.

UNIT – IV:
Wireless standards-GSM, IS-95, UMTS-IMT-2000, Signaling, Call Control, Mobility Management and location Tracing.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Theodore S.Reppeport, Wireless Communications Principles and Practice, IEEE Press, Prentice Hall.

William C.Y.Lec, Mobile Cellular Telecommunications, Analog and Digital Systems, Mc-Graw Hill Inc.

Kamilo Feher, Wireless Digital Communications, Modernization & Spread Spectrum Applications, Prentice Hall of India, New Delhi.

Kaveh Pahlavan and Allen H. Levesque " Wireless Information Networks", Wiley Series, John Wiley and Sons Inc.

B.TECH VIII SEMESTER
RADAR ENGINEERING
(ECE-404E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3 Hrs

UNIT 1.
RADAR BASICS: Radar Block Diagram & operation, Applications of Radar.
RADAR EQUATION: Simple form of Radar Equation, Minimum detectable signal, Receiver noise, Signal to Noise ratio, Transmitter Power, Pulse repetition frequency & range ambiguities, System losses, Propagation effects.

UNIT 2.
CW & FREQUENCY MODULATED RADAR: The Doppler effect, CW Radar, FM- CW Radar, Multiple Frequency CW Radar.
MTI & PULSE DOPPLER RADAR: Introduction, Delay Line Cancellors, Multiple or staggered, Pulse repetition frequencies, range-Gated Doppler Filters, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI Pulse Doppler Radar, MTI from a moving platform.

UNIT 3.
TRACKING RADAR:
Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

UNIT 4.
RECEIVERS, DISPLAYS & DUPLEXERS:
Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

TEXT BOOK:
1. Introduction to Radar Systems: Merrill I. Skolnik, ; MGH

REFERENCE BOOK:
Electronic Communication Systems : Kennedy; TMH

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

B.TECH. VIIth SEMESTER
MULTIMEDIA COMMUNICATIONS
(ECE-406E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3 Hrs

UNIT-1
Multimedia communications: Introduction, multimedia networks, multimedia applications.
Multimedia information representation: Introductiion, digitization principles, representation of text, images, audio & video.

UNIT-2
Text & Image compression: Various compression principles.
Text compression: Static Huffmann coding, dynamic Huffman coding, arithmetic coding, Lempel-ziv coding
Image compression: Graphics Interchange format, tagged image file format, digitized document, digitized pictures, JPEG (Introduction)

UNIT-3
Audio & Video compression:
Audio compression: Differential PCM, Adaptive diffential PCM, Code excited LPC, MPEG audio coders, Dolby audio coders.
Video Compression: Basic principles, Video compression standard H.261, h.263, MPEG(Basic introduction)

UNIT-4
Internet applications: Domain name system, name structure and administration, DNS resource records, Electronic mail message structure, content transfer, Basic concept of internet telephony, World Wide Web.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

SUGESSTED BOOKS:

Multimedia communications: Fred Halsall; Pearson Education Asia.
2. Multimedia Systems-Design: K. Thakkar; PHI
3. Multimedia: Computing, Communications & Applications: Ralf Stein Metz & Klara Nahrstedt; Pearson
4 . Advanced Multimedia Programming: Steve Rimmer; MBI
5. Multimedia: Making it Work IIIrd edition: Tay Vaughan; TMH

B.TECH VIII SEMESTER
MICROWAVE (PRACTICAL)
(ECE-408E)

L	T	P			
-	-	3	Sessional	:	25
			Viva	:	25
			Time	:	3 Hrs

LIST OF EXPERIMENTS

To study the microwave components.
To study the characteristics of the reflex Klystron tube and to determine its electronic tuning range.
To determine the frequency and wavelength in a rectangular waveguide working in TE IO mode.
To determine the standing wave ratio and reflection coefficient.
To study the I-V characteristics of Gunn diode.
To study the magic tee.
To study the isolator and attenuator.
To measure the coupling coefficient and directivity of a wave guide directional coupler
To measure the polar pattern and the gain of a waveguide horn antenna.
To measure the insertion loss and attenuation.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

AUDIO VISUAL ELECTRONICS (PRACTICAL)
(ECE-410E)

L	T	P			
-	-	3	Sessional	:	25
			Viva	:	25
			Time	:	3 Hrs

LIST OF EXPERIMENTS

1. Familiarization of PCBs and Mechanical Components of Tape recorder/ CD Player/VCD Player/Colour TV.
2. Study of tuner section of a Colour T.V.
3. Study of VIF section of a Colour T.V.
4. Study of Sound section of a Colour T.V.
5. Study of Chroma section of a Colour T.V
6. Study of Mechanical portion of VCD player.
7. Study of Sound processing of VCD player.
8. Study of Camcorder's mechanical portion.
9. Study of Camcorder's Electronic portion.

NOTE: At least 09 experiments are to be performed with atleast 7 from above list, remaining 2 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

DEPARTMENTAL ELECTIVES-I

B.TECH VIIth SEMESTER
MICROCONTROLLERS
(ECE-415E)

L	T	P				
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1:
INTRODUCTION :Comparing Microprocessors and Microcontrollers. Technological trends in Microcontrollers development. Survey of microcontrollers- 4 bit, 8 bit, 16 bit, 32 bit microcontrollers. Applications of microcontrollers.

UNIT 2:
8051 ARCHITECTURE :Block diagram, pin. Diagram of 8051. Functional descriptions of internal units,
registers, PSW, internal RAM, ROM, Stack, Oscillator and Clock. I/O Pins, Ports and Circuits Connecting external memory. Counters and timers. Serial data interrupt. Serial data transmission /reception and transmission modes. Timer flag interrupt. External interrupt, software generated interrupts. External memory and memory space decoding, expanding I/Os, memory mapped I/O Reset & CLK Circuits.

UNIT 3:
8051 INSTRUCTION SET AND PROGRAMMING :8051 Instruction syntax, addressing modes, Data transfer instructions, logical instructions, arithmetic instructions, Jump and Call instructions. Interrupts and interrupt handler subroutines. Writing assembly Language programs. Time delays. Pure S/W time delays. S/W polled timer. Pure H/W delay. Lookup tables. Serial data transmission using time delays and polling. Interrupt driven serial transmission and reception.

UNIT 4:
8051 APPLICATIONS: Interfacing Keyboards Programs for small keyboards and matrix keyboards. Interfacing multiplexed displays, numeric displays and LCD displays. Measuring frequency and pulse width. Interfacing ADCs & DACs. Hardware circuits for handling multiple interrupts. 8051 Serial data communication modes- Mode 0, Mode 1, Mode 2 and Mode 3.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

K.J.Ayala, The 8051 Microcontroller – 2nd ed. Penram International.
Intel's manual on " Embedded Microcontrollers"

DEPARTMENTAL ELECTIVE-I

B.TECH VIIth SEMESTER
BIOMEDICAL SIGNAL PROCESSING
(ECE-417E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I :
Introduction: Importance of Computers in Signal Processing, Basic Electrocardiography ECG lead System, ECG Signal Characteristics, Signal Sampling. Signal conversion.
Digital Filters : Z- transform, elements of digital filters, Types of digital filters, Transfer function of a difference equation Z-plane pole-zero plot.
FIR Filters : Characteristics, Smoothing Filters, Notch Filters, Derivatives, Window Design, Frequency Sampling, Minimax Design.
IIR Filters : Generic Equations, One pole and two pole filters Integrators.

UNIT-II:
Integer Filters: Basic Design Concept, Low Pass, High Pass, Band Pass, Band reject filters, Effect of cascading of filters, fast operating design techniques.
Adaptive Filters : Principal noise canceller model, GO Hz. Adaptive Canceling, Applications.

UNIT-III:
Signal Averaging : Signal averaging as a digital filter, a typical averager, Software for signal averaging, limitations, Data Reduction Techniques – Turning Point Algorithm, AZTEC Algorithm, Fan Algorithm, Huffman Coding. Fourier Transform, Correlation, convolution, Power Spectrum Estimation.

UNIT-IV:
ECG QRS Detection: Power Spectrum of ECG, Band Pass Filtering Techniques, Differentiation Techniques, Template Matching, QRS Detection Algorithm.
ECG Analysis System : ECG Interpretation, ST Segment Analyzer, Portable Arrhythmia Monitor.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

WJ.Tompkin, Biomedical Signal Processing edition , PHI
JG Proakis, Digital Signal Processing , PHI
Salivahanan, Digital Signal Processing, Tata Mc-Graw Hill.

DEPARTMENTAL ELECTIVES-I

B.TECH VIIth SEMESTER
RELIABILITY
(ECE-419E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1:

INTRODUCTION: Definition of reliability, failure data analysis, mean failure ratio, MTTF, MTBF, graphical plot, MTTF in terms of failure density, generalization, reliability in terms of failure density (integral form), reliability in other situation.

HAZARD MODELS: Introduction, constant hazard linearly increasing hazard, Weibull model, on density function and distribution function, and reliability analysis, important distribution and its choice, expected value, standard deviation and variance, theorem concerning expectation and variance.

UNIT 2:

SYSTEM RELIABILITY: Introduction, series system with identical component, reliability bounds-classical approach Bayesian approach application of specification hazard models, an r-out-of-an structure methods for solving complex system, systems not reducible to mixed configuration, mean time to failure system, logic diagrams, Markov model and graph.

RELIBILITY IMPROVEMENT AND FAULT TREE ANALYSIS: Introduction, improvement by component, redundancy, element redundancy, unit redundancy, optimization, stand by redundancy, reliability-cost trade off, fault tree construction, calculation of reliability from fault tree.

UNIT 3:

MAINTAINABILITY, AVAILABITY AND REPAIRABLE SYSTEM:Introduction, maintainability, availability, system down time, reliability and maintainability trade off, instantaneous repair rate MTTR, reliability and availability function.

BAYESIAN APPROXIMATION AND RELIABITY ESTIMATION: Introduction, Lindley's expansion, reliability estimation, normal, Weibull, inverse gaussian and Rayleigh.

UNIT 4:

RELIABILITY ALLOCATION AND APPLICATION: Reliability allocation for a series system, approximation of reliability in a computer system and nuclear power plant, failure models and effects analysis (FMEA)

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

S.K.Sinha, Reliability and life testing, (WEL New Delhi).
L.A.Srinath, Reliability engineering, (EWP New Delhi).
Bal Guru Swami, Quality control and Reliability, (Khanna publisher New Delhi).

DEPARTMENTAL ELECTIVES-I

B.TECH VII SEMESTER
NANOTECHNOLOGY
(ECE- 421E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1
Introduction to Nanotechnology, review of various techniques and tools, future prospects of nanotechnology, applications.

UNIT 2
Synthesis techniques of clusters, nanoparticles : classical nucleation theory for cluster formation, sputtering and thermal evaporation and laser methods for nanoparticles' synthesis, particle synthesis by chemical routes.
Synthesis of semiconductor nanoclusters.

UNIT 3
Properties of nanostructured materials :
Magnetic properties, electrical transport properties, non-linear optical properties.

Special nanomaterials
Porous silicon nanostructures – formation, optical properties; Fullernes – synthesis, properties and application.

UNIT 4.
Nano electronics – Nanodevices, nanotransistors, nanoelectro optics, Nano structures in electronics.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

1. Camarata, R.C, Nanomaterials synthesis, properties and application . Institute of Physics Publication.
2. Madou, Fundamentals of microfabrication, Mcgraw Hill.
3. Sibelia, J.P , A Guide to material characterization, Prentice Hall.

DEPARTMENTAL ELECTIVES-II

B.TECH VIIth SEMESTER
ADVANCED MICROPROCESSORS
(ECE-423E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I

INTEL'S X86 FAMILY :Introduction, Register set, data formats, addressing modes, interrupts, memory hierarchy, pipelining, segmentation, paging, real and virtual mode execution, protection mechanism, task management.

UNIT-II

ARCHITECTURE OF INTEL X86 FAMILY :CPU block diagrams, Pin diagrams and internal descriptions of -80286,386,486 and Pentium. Instruction formats. Intel X86 Instruction set. Assembler directives.

UNIT-III

ARITHMETIC CO-PROCESSORS : Data formats; 80287 architecture – Pin diagram, internal architecture, status register, control register; tag register. Instruction set – data transfer, arithmetic, omparison, transcendental operations, constant operations and control instructions. Interfacing 80287 with 80286 Programming examples.

UNIT-IV

HIGHER- CO-PROCESSORS :Introduction to 80387,80487.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggeted Books:

Daniel Tabak, Advanced Microprocessors (2nd ed) Mc Graw Hill Pub.
Barry B.Brey, The Intel Microprocessors (4th ed) PHI Pub.
DV-Hall , Microprocessors & Interfacing (2nd ed) Mc Graw Hill Pub.

DEPARTMENTAL ELECTIVES-II

B.TECH VII SEMESTER
ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS
(ECE- 425E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I

Introduction: - Definition of AI, evolution of Computing, History of AI, Classical, Romantic and Modern period, subject area, Architecture of AI machines, logic family, conclusion.

Production System: - Production rules, the working memory, Recognize-act cycle, conflict resolution strategies, refractoriness, Regency, specificity, alternative approach for conflict resolution, Architecture of production system, conclusion.

UNIT-II

Prepositional Logic: - Proposition, tautologies, Theorem proving in prepositional logic, Semantic method of theorem proving, forward chaining, backward chaining, standard theorems in prepositional logic, method of substitution, theorem proving using Wang's algorithm, conclusion.

Predicate Logic: - Alphabet of First order logic (FOL), predicate, well formed formula, clause form, algorithm for writing sentence into clause form, inflict of predicates, unification algorithm, resolution Robinson's inference rule, conclusion.

UNIT-III

Logic Programming and Prolog: - Logic program, Horn clause, program for scene interpretation, unification of goals, definite perform clause, SLD resolution, SLD tree, controlling back tracking, common use of cut, implementation of backtracking using stack, risk of using cuts, fail predicate, application of cut-fail combination, replace cut-fail by not, conclusion.

Default & Non monotonic reasoning: - Axiomatic theory, non-atomic reasoning using NML-I, problems with NML-I, reasoning with NML-II, truth maintenance system with example, conclusion.

UNIT-IV

Imprecision & Uncertainty: - Definition, Probabilistic technicians, Fuzzy reasoning, certainty factor based reasoning conditional probability, Baye's Theorem and its limitations, Bayesian belief network, propagation of belief, Dempster-Shafer theory of uncertainty management, belief interval, Fuzzy ration, inverse Fuzzy relations, Fuzzy post inverse, Fuzzy Inversion scope of neural network, EX-OR classifier, clustering by neural network, function approximation by neural net, retrieval of content, Fuzzy association memory, cognitive reasoning using fuzzy neural net, Hebbian learning, stability analysis.

Intelligent Search Technique: - Heuristic function, AND-OR graph, Heuristic search, A* algorithm and examples.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit Each question will be of equal marks.

Suggested Book:

1. E.Charniak & D. McDermott , Introduction to Artificial Intelligence , Addison Wesley Longman.

DEPARTMENTAL ELECTIVES-II

B.TECH VIIth SEMESTER
POWER ELECTRONICS
(ECE-427E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-1.

INTRODUCTION :Role of power electronics, review of construction and characteristics of power diode, Schottky diode, power transistor, power MOSFET, SCR, DIAC, Triac, GTO, IGBT & SIT.

SCR: Ratings and protections, series and parallel connections, R, RC and UJT firing circuit and other firing circuits based on ICs and microprocessors

UNIT-2.

CONVERTERS :One, two, three, six and twelve pulse converters, fully and half controlled converters, load voltage waveforms, output voltage equation, continuous and discontinuous modes of operation, input power factor of converter, reactive power demand, effect of source inductance, introduction to four quadrant / dual converter, power factor improvement techniques, forced commutated converter, MOSFET and transistor based converters.

UNIT-3

INVERTERS :Basic circuit, 120 degree mode and 180 degree mode conduction schemes, modified McMurray half bridge and full bridge inverters, McMurray -Bedford half bridge and bridge inverters, brief description of parallel and series inverters, current source inverter (CSI), transistor and MOSFET based inverters.

UNIT-4.

CHOPPERS : Basic scheme, output voltage control techniques, one, two, and four quadrant choppers, step up chopper, voltage commutated chopper, current commutated chopper, MOSFET and transistor based choppers.

CYCLOCONVERTERS : Basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverters.

TEXT BOOK:

1. Power Electronics : MH Rashid; PHI

REFERENCE BOOKS :

1. Power Electronics : PC Sen; TMH
2. Power Electronics : HC Rai; Galgotia
3. Thyristorised Power Controllers : GK Dubey, PHI
4. Power Electronics and Introduction to Drives : A.K.Gupta and L.P.Singh;Dhanpat Rai
5. Power Electronics: P.S Bhimra.

Note:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
IMAGE PROCESSING
(ECE – 420E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:

INTRODUCTION: Image Processing Fourier Transform and Z-Transform Causality and stability Toeplit and Circulate Metrics orthogonal and unitary Matrices and Kronecker product, Markov Processes KI Transform Mean square Estimates and Orthogonal Principles.

IMAGE SAMPLING QUANTIZATION : Band Limited Image Sampling Versus Replication, Reconstruction of Image from samples Sampling Theorem, Sampling Theorem for Random Fields, Optimal Sampling, Nonrectangular Grid Sampling, Sampling Aperture, Display Aperture/ Interpolation Functions, Lagrange Interpolation Moire Effect. Image Quantization Uniform Optimal Quantizer, Properties of Mean Square Quantizer, Commander Design Visual Quantization

UNIT – II:

IMAGE TRANSFORMS: Two Dimensional Orthogonal and Unitary Transforms and their properties. One Dimensional and Two Dimensional DFT Cosine and Sine Transforms. Hadamard, Slant, Harr and KL, Transforms and their properties, Approximation to KI Transforms.

IMAGE REPRESENTATION BY STOCHASTIC MODELS: One Dimensional Causal Models, AR and ARMA models, Non Causal Representation Spectral factorization, Image Decomposition.

UNIT – III:

IMAGE ENHANCEMENT AND RESTORATION: Point Operation, Histogram Modeling, Spatial Operations, Transform Operations, Multispectral Image Enhancement. Image Observation Models, Inverse and Wiener filtering; FIR Wiener Filters, Filtering using Image Transform Causal Models and recursive filtering Maximum entropy restoration. Extrapolation of band limited signal.

UNIT – IV:

IMAGE ANALYSIS AND IMAGE COMPRESSION: Spatial feature extraction, Edge detection and boundary extraction Boundary, region and moment representations structures, Texture, Image Segmentation, Reconstruction from Projections, Pixel Coding, Productive Techniques, Transform Coding Theory, Coding of Image, Coding of two-tone image.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Anil Jain, Digital Image Processing , PHI.
Gonzalez and Woods, Image Processing, Addison Wesley & Sons.

DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
ADVANCED CONTROL SYSTEMS
(ECE- 422E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT1.
State variable representation of systems by various methods, solution of state equations- state transition matrix, Transfer function from state variable model. Controllability and observability of state variable model.

UNIT2.
Phase portrait of linear second systems, Method of isoclines, phase portrait of second order system with non-linearities, limit cycle, singular points.

UNIT3.
Definition, limitations, use of describing function for stability analysis, describing function of ideal relay, relay with hytsteresis and dead zone, saturation/columb friction and backlash. Linear approximation of nonlinear systems: Taylor series, Liapunov's 2nd method.

UNIT4.
Sampling process, impulse modulation, mathematical analysis of sampling process, application of Laplace transform, Shanoon's theorem, reconstruction of sampled signal o order and first order hold, Z-transform, definition, evaluation of z-transform, inverse Z-transform pulse transfer function, limitation of Z-transform, state variable formulation of discrete time systems. Solution of discrete time state equations, stability, definition, the Schur-Cohn stability criterion, Jury's test of stability of extension of Routh-hurwitz criterion to discrete time systems.
NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
1. Gopal M, Digital Control and State Variable Methods, TMH
Kuo,BC, Digital Control systems,
3. Slotine JE & Li WP, Applied Non-Linear Control , Prentice Hall, USA.

DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
EMBEDDED SYSTEMS DESIGN
(ECE-424E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1 : INTRODUCTION:
Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor Architectures: Harvard V/S Princeton , CISC V/S RISC; microcontrollers memory types; microcontrollers features : clocking, i/o pins, interrupts, timers, peripherals.

UNIT 2 : MICROCONTROLLER ARCHITECTURE:
Introduction to PIC microcontrollers, Architecture and pipelining, program memory considerations, Addressing modes, CPU registers, Instruction set, simple operations.

UNIT 3 : INTERRUPTS AND I/O PORTS:
Interrupt logic, Timer2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial pheriphal device, O/p port Expansion, I/p port expansion, UART.

UNIT 4 : PROGRAMMING WITH MICROCONTROLLERS:
Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing, state machines, Oscillators, Timer Interrupts, Memory mapped I/O.
DESIGNING USING MICROCONTROLLERS:
Music box, Mouse wheel turning, PWM motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

TEXT BOOK:
1. Design with PIC Microcontrollers by John B. Peatman , Pearson.

REFERENCE BOOKS :
1. Programming and Customizing the 8051 Microcontroller : Predko ; TMH.
2. Designing Embedded Hardware : John Catsoulis ;SHROFF PUB. & DISTR. ND.
3. Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR. ND.

DEPARTMENTAL ELECTIVES-IV

B.TECH VIIIth SEMESTER
NEURO-FUZZY SYSTEMS
(ECE-426E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I :
INTRODUCTION TO FUZZY AND NEURO-FUZZY SYSTEMS: Merits of Fuzzy and Neuro Fuzzy systems. Introduction to Architecture of a Fuzzy systems, fuzzification Rule Base, Inference engine, defuzzizication.
FUZZY MATHEMATICS: Fuzzy sets and operations of fuzzy sets, properties of fuzzy sets, fuzzy relations, fuzzy graphs & Fuzzy arithmetic.

UNIT-II :
ARCHITECTURE AND DESIGN ISSUES : - Fuzzification , fuzzy Rule – Base and Fuzzy – Rule Based models – implication process, defuzzification Techniques.
ANALOG DESIGN OF FUZZY PROCESSORS: Modular design, design of a fuzzifier, knowledge base and inference engine, defuzzifier design.

UNIT-III :
IMPLEMENTATION OF A COMPLETE ANALOG FUZZY SYSTEMS : Design and microprocessor based implementation of Fuzzy systems.
FUZZY MODEL IDENTIFICATION: Structure Specifications, Parameter estimation, model validation.

UNIT-IV :
NEURO FUZZY SYSTEMS: Introduction to Neural Networks, Neuro Fuzzy Architecture, Learning methodologies. Genetic Algorithms, neural networks in communications.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit Each question will be of equal marks.

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Suggested Books:

KLIR & YUAN, Fuzzy Sets and Fuzzy Logic .
CHIN-TENG LIN & C.S. GEORGE LEE, Neural Fuzzy Systems, Prentice Hall International, 1996.
N.K.Bose, P.Liang, Neural Networks Fundamentals with graphs, Algorithms and Applications, Tata McGraw Hall, Ed. 1998.

DEPARTMENTAL ELECTIVES-IV

B.TECH VIII SEMESTER
ELECTRONIC SWITCHING SYSTEMS
(ECE-428E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:

INTRODUCTION: Statistical Bandwidth Sharing, Switching, network Configurations, Elements of switching systems, Electronic exchange, PBX.

TELEPHONE NETWORKS: Subscriber loop, Switching Hierarchy & Routing Transmission systems, Numbering Plan, Charging plan, Signaling techniques Common Channel Signaling.

UNIT – II:

ELECTRONIC SPACE DIVISION SWITCH: Stored Program Control (SPC): Centralized & Distributed SPC, Software Architecture, and n-stage networks.

TIME DIVISION SWITCHING: Space Switching, Time Switching, Time multiplexed space switching & Time Switching, n-stage combination switching.

UNIT – III:

TRAFFIC ENGINEERING: Traffic load, Grade of service, blocking Probability models of switching systems, Markov processes, Birth-Death processes, delay systems, Models for packetized sources (voice and video), models for traffic flow in packet networks.

CELLULAR MOBILE TELEPHONY: Analog Switch System for Cellular Mobile, Cellular digital switching, centralized & remote controlled small switching system.

UNIT – IV:

TELEPHONE NETWORK PROTOCOLS: Protocols stacks, Digital Transmission hierarchy, SONET/SDH Signaling system. Multi Media Communication over global telephone N/W Introduction to Datagram switches, ATM Switches.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Thiagarajan Viswanathan, Telecommunication Switching Systems & Networks, PHI
Hui, J.Y., Switching & Traffic Theory for integrated broadband networks.
Keshav, S., Engineering. Approach to Computer Networking, Addison Wesley.

DEPARTMENTAL ELECTIVES-IV

B.TECH. VIIIth SEMESTER
TRANSDUCERS AND THEIR APPLICATIONS
ECE-430E

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I

Definition of transducer. Advantages of an electrical signal as out-put. basic requirements of transducers, Primary and Secondary Transducer ,Analog or digital types of transducers.
Resistive, inductive, capacitive, piezoelectric, photoelectric and hall effect tranducers.

UNIT-II

Measurement of pressure – Manometers, Force summing devices and electrical transducers
Measurement of temperature – Metallic resistance thermometers, semi conductor resistance sensors (Thermistors), thermo-electric sensors, pyrometers.

UNIT-III

Measurement of displacement – Potentiometric resistance type transducers, inductive type transducers, differential transformer (L.V.D.T), capacitive transducers, Hall effect devices, strain gage transducers.
Measurement of velocity – variable reluctance pick up, electromagnetic tachometers, photoelectric tachometer, toothed rotor tachometer generator..

UNIT-IV

Measurement of Force – Strain-gage load cells, pneumatic load cell, LVDT type force transducer.
Measurement of Torque – Torque meter, torsion meter, absorption dynamometers, inductive torque transducer, digital methods.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit Each question will be of equal marks.

Suggested Books:

1. B.C. Nakra, K.K. Chaudhry, “Instrumentation Measurement and Analysis,” Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Thomas G. Beckwith etc. all, “Mechanical Measurements (International Student Edition), Addison-Wesley Longman, Inc. England.
3. A.K. Sawhney, “ A Course in Electrical and Electronic Measurements and Instrumentation,” Dhanpat Rai & Sons, Delhi-6.