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

1. ECE-420E Image Processing
2. ECE-422E Advanced Control Systems
3. 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 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.

Suggested Books:

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

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

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

4. 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.

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.

SUGESSTED BOOKS:

1. 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

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

B.TECH VIII SEMESTER
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.

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.

Suggested Books:

1. Anil Jain, Digital Image Processing , PHI.
2. 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 2^{nd} 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.

Suggested Books:
1. Gopal M, Digital Control and State Variable Methods, TMH
2 Kuo,BC, Digital Control systems,
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.

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.

Suggested Books:

1. KLIR & YUAN, Fuzzy Sets and Fuzzy Logic .
2. CHIN-TENG LIN & C.S. GEORGE LEE, Neural Fuzzy Systems, Prentice Hall International, 1996.
3. 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.

Suggested Books:

2. Thiagarajan Viswanathan, Telecommunication Switching Systems & Networks, PHI
3. Hui, J.Y., Switching & Traffic Theory for integrated broadband networks.
4. 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.

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.