GONDWANA UNIVERSITY, GADCHIROLI

TEACHING AND EXAMINATION SCHEME (SEMESTERPATTERN CHOICE BASED CREDIT SYSTEM)

PROGRAM : MASTER OF TECHNOLOGY IN ELECTRONICS & COMMUNICATION ENGINEERING **PROGRAM CODE : EC**
FACULTY : ENGINEERING & TECHNOLOGY **DURATION : TWO YEARS**

I– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								ESE	MSE	IE			TW	PEE		
PECS11	**C**	Probability Theory and Stochastic Processes	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
PECS12	**C**	Data Communication and Networking	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
PECS13	**C**	Advanced Digital Signal Processing	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
PECS14x	**P**	Elective – I	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
Laboratories/ Practical																
PECS15	**C**	Lab Practice – I	-	-	2	1	-	-	-	-	-	-	50	50	**100**	50
PECS15	**E**	Seminar - I	**C**	-	2	1							**50**	**-**	**50**	25
		TOTAL	12	08	4	18	-	**400**					**150**			
		SEMESTER TOTAL	**20**			**18**	**550**									

Elective – I (x) : (A) Information Theory and Coding (B) VLSI Technology (C) Image Processing & Analysis

GONDWANA UNIVERSITY, GADCHIROLI

TEACHING AND EXAMINATION SCHEME (SEMESTERPATTERN CHOICE BASED CREDIT SYSTEM)

PROGRAM : MASTER OF TECHNOLOGY IN ELECTRONICS & COMMUNICATION ENGINEERING PROGRAM CODE : EC
FACULTY : ENGINEERING & TECHNOLOGY DURATION : TWO YEARS

II– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								ESE	MSE	IE			TW	PEE		
PECS21	**C**	Embedded System	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
PECS22	**C**	Advanced Optical Communication	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
PECS23	**C**	Cellular & Mobile Communication	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
PECS24x	**P**	Elective – II	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
Laboratories/ Practical																
PECS25	**C**	Lab Practice – II	-	-	2	1	3	-	-	-	-	-	50	50	**100**	50
PECS26	E	Seminar - II			2	1	3						**50**	**-**	**50**	25
		TOTAL	12	08	4	18	-	**400**					**150**			
		SEMESTER TOTAL	**24**			**18**	**550**									

Elective – I (x) :(A) Advanced Audio & Video Communication (B) Fuzzy logic and and Neural Networks (C) Microwave Devices & Amplifier Design

GONDWANA UNIVERSITY, GADCHIROLI

TEACHING AND EXAMINATION SCHEME (SEMESTERPATTERN CHOICE BASED CREDIT SYSTEM)

PROGRAM : MASTER OF TECHNOLOGY IN ELECTRONICS & COMMUNICATION ENGINEERING PROGRAM CODE : EC
FACULTY : ENGINEERING & TECHNOLOGY DURATION : TWO YEARS

III– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								ESE	MSE	IE			TW	PEE		
PECS31	**P**	Elective – III	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
PECS32	**P**	Elective – IV	3	2	-	4	3	70	10	20	**100**	50	-	-	-	-
Laboratories/ Practical																
PECS33	**E**	Grand Seminar/Industrial Training	4	-	10	5	-	-	-				100-	-	**100-**	50-
PECS34	**E**	Pre DissertationI			10-	5							250	-	**250**	125
		TOTAL	06	04	20-	18	-	**200**					**350**			
		SEMESTER TOTAL	**30**			**18**	**550**									

Elective – I (x) : (A) Wireless Sensor Network (B) Real Time Signal Processing (C) RF Circuit
D)CNC and Robotics E) PLCs and Scada
Elective – II (x) : (A) Advanced Satellite Communication (B) Micro Electro Mechanical System (C) Network Security & Cryptography
(D) Artficial Intelligence (E) Soft Computing

Note: 1) In grand Seminar students are required to deliver a seminar on any topics based on all courses of second semester of the program.

2) Dissertation (Project Phase-I): Student has to submit the report and deliver a seminar based on dissertation topic. It is to be evaluated by three members panel of examiners headed by HOD where in Guide should be one of the member of the panel. Last date of submission of report shall be one week before the end of semester.

GONDWANA UNIVERSITY, GADCHIROLI

TEACHING AND EXAMINATION SCHEME (SEMESTERPATTERN CHOICE BASED CREDIT SYSTEM)

PROGRAM : MASTER OF TECHNOLOGY IN ELECTRONICS & COMMUNICATION ENGINEERING PROGRAM CODE : EC
FACULTY : ENGINEERING & TECHNOLOGY DURATION : TWO YEARS

IV– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme								
			Hours per week			No. of Credits	Theory					Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								ESE	MSE	IE			TW	PEE		
PECS41	**E**	Final DissertationI	-	24	-	18		-	-	-	**-**	-	150	200	350	175
TOTAL			-	24	-	18	-	**-**				-	**350**			-
SEMESTER TOTAL			**24**			**18**	**350**									

Note: Dissertation (Project phase-II): Internal assessment of dissertation is to be carried out by the committee constituted by HOD , where in Guide should be one of the member. External assessment of dissertation (Complete work) is to be carried out by panel of Examiner consisting of (Guide) and External Examiner. Candidate shall present the entire work of dissertation, followed by viva-voce. Last date of submission of dissertation shall be end of semester.

GONDWANA UNIVERSITY, GADCHIROLI
TWO YEAR POST GRADUATE DEGREE COURSE IN THE FACULTY OF ENGINEERING AND TECHNOLOGY
ELECTRONICS AND COMMUNICATION ENGINEERING SYLLABUS

I - SEMESTER M.TECH (EC)

PECS11 PROBABILITY THEORY & STOCHASTIC PROCESSES

UNIT I

Random variables, Probability distribution function, Probability density function, Conditionalprobability, Statistical Independence, Bayes formula. Moments of random variables: Expectedvalue and moments, Mean and variance of random variable, Coefficients of variation, Skewnessand kurtosis, Moments, Covariance and Correlation coefficient, Mean and variance of sum andProduct of two random variables. Conditional mean and variance, Application of conditional meanand variance.

UNIT II

Discrete Random Variables and their Distributions Moment Generation Function, CharacteristicsFunction, Cumulants, Probability generating function, Binomial Distribution, Negative BinomialDistribution, Hypergeometric distribution, Multinomial, Poisson Distributions, Relationshipbetween various Discrete-Type distributions

UNIT III

Continuous Random Variables and their Distributions Normal, Log - Normal, MultivariateNormal, Gamma, Exponential, Chi-square, Weibull, Rayleigh distributions. Relationship betweencontinuous distributions.

UNIT IV

Transformation of Random Variables Transformation of Single, Several Random Variables,Function of Random Variables, Sum, Differences, Product and Ratio of Two Random Variables,Transformation through characteristic Functions.

UNIT V

Stochastic Processes Introduction- Classification of stochastic process, Stationary process (SSSand WSS) Stationary process, Ergodic Process, Independent increment Process, MarkovProcess, Counting Process, Narrow- Band Process, Normal Process, Wiener-Levy Process,Poisson, Bernoulli, Shot noise Process, Autocorrelation Function.

Reference Books:

1. Michel K. Ochi , "Applied Probability and Stochastic Processes," John Wiley & Sons .
2. Papoulis, A. "Probability, Random variables and Stochastic Processes," Tata McGrawHill.
3. Kishor S. Trivedi, "Probability and Statistics with Reliability, Queuing and ComputerScienceApplication," John Wiley & Sons, 2002.

PECS12 DATA COMMUNICATIONS AND NETWORKING

UNIT I

Data Communications and Networks Overview: Data Communications Model Communication Tasks, Basic concepts of Networking and Switching, Networking configurations, Protocols and Architecture, Key Elements of a Protocol, Protocols in Simplified Architecture, Protocol Data Units (PDU), Operation of a Protocol Architecture, Standardized Protocol Architectures, OSI and TCP/IP Architectures, Comparisons between OSI and TCP/IP, TCP/IP Addressing Concepts, concepts of Frequency, Spectrum and Bandwidth, Modem, Codec and Shannon Capacity.

UNIT II

Line Configuration, Interfacing, Characteristics of Physical Layer Interface, Flow Control, Sliding Window Flow Control, Error control, CRC, ARQ Protocols, Data Link Control, Bit stuffing, HDLC Operation; Hierarchy of FDM schemes, WDM Operation, TDM Link Control, Hierarchy of TDM, DS-1 Transmission Format, SONET/SDH Frame Formats. Asymmetrical Digital Subscriber Line, xDSL.

UNIT III

Circuit Switching and Packet Switching, Circuit Switching concepts, Circuit Switching applications, Circuit Switch Elements, Three Stage Space Division Switch, Blocking and Nonblocking switching, Time Division Switching, Control Signaling Functions, In Channel signaling, Common Channel Signaling, Introduction to Signaling System Number 7 (SS7), Packet Switching Principles, Datagram and Virtual Circuit switching.

UNIT - IV

LAN Architecture. Topologies, Choice of Topology, Ring and Star Usage, MAC and LLC, Generic MAC Frame Format, Bridge, Bridge Operation, Bridges and LANs with Alternative Routes, Spanning Tree, Loop resolution in bridges, Hubs, Two Level Star Topology, Layer 2 Switches, Wireless LAN, Multi cell Wireless LANs, IEEE 802.11 Architecture, IEEE 802.11, Medium Access Control logic.

UNIT - V

ATM, Architecture of ATM, Congestion Control and Quality of Service in ATM, Internetworking, IPv4, IPv6 comparison , Transport layer protocols, UDP Operation, TCP features, Flow Control, Error Control, Congestion Control, Network Management System, SNMP, SIP, and H.323 architectures, Security in the Internet, IP Security, Firewalls.

Reference Books:

1. William Stallings, “Data and Computer Communications”, Eigth Edition, Pearson Prentice Hall, 2007.

2. Behrouz A. Forouzan, “Data Communications and Networking”, Fourth Edition, Tata McGraw Hill, 2007.

PECS13 ADVANCED DIGITAL SIGNAL PROCESSING

UNIT I

Z-transform, Region of convergence, Stability and ROC, Inverse z-transform, Discrete Fourier transform, Time domain aliasing, Properties of DFT, Fast Fourier transform, Decimation in time algorithm, IDFT using FFT algorithm, Design of IIR low pass and High pass Digital filters.

UNIT II

Analog filter design, Discrete time IIR filter from analog filter, IIR filter by impulse invariance, Bilinear transformation, approximation of derivatives, (HPF, BPF, BRF), filter design using frequency translation, structures of FIR, Linear phase, FIR filter, filter design using windowing techniques and frequency sampling techniques. Implementation of filter using filter structure.

UNIT III

Adaptive systems, Definition and characteristics, General properties, open and closed loop adaptation, Performance function and performance surface, Gradient and minimum MSE, Methods of searching the performance surface, Simple gradient search algorithm, Gradient search by method of steepest descent, The LMS adaptive algorithm.

UNIT IV

Digital Signal Processors, Multiplier and Multiplier Accumulator, Modified bus structure and Memory access scheme in PDSPs, Multiple access memory, Multiported memory, VLIW architecture, Instruction pipelining, Architecture and Assembly language instructions of TMS320C5X processor.

UNIT V

Implementation of Digital Filters: Introduction to filter structures (IIR & FIR), Frequency sampling structures of FIR, Lattice structures, Forward prediction error, Backward prediction error, Reflection coefficients for lattice realization, Implementation of lattice structures for IIR filters, Advantages of lattice structures.

Parametric Methods of Power Spectrum Estimation: Autocorrelation & Its Properties, Relation between auto correlation & model parameters, AR Models - Yule-Walker & Burg Methods, MA &ARMA models for power spectrum estimation, Finite word length effect in IIR digital Filters – Finite word-length effects in FFT algorithms.

Reference Books:

1. Alan V Oppenheim, Ronald W Schafer “Digital Signal Processing” PHI, 2000
2. Sanjit K Mitra “Digital Signal Processing” Tata Mc Graw-Hill Third Edition
3. Theory and applications of DSP Rabiner and B.Gold.
4. Digital signal processing: Princoples, Algorithms, Applications, John G Proakis and D G Manolakis.
5. Digital signal processing, E.C.Ifeachor, B.W.Jrevitions, Pearson education.

PECS14A INFORMATION AND CODING THEORY

UNIT I

Concept of Information and Entropy, Shanon's theorems, Channel Capacity Self information, Discrete and Continuous entropy, Mutual and joint information, Redundancy.

UNIT II

Coding Theory, Source encoding, channel encoding, Coding of discrete memoryless sources, Discrete memory sources, Shanon-Fano, Huffman, Lempel-Ziv encoding algorithm, Coding of analog sources, Rate Distortion functions, Channel encoding, Error Detection &Correction.

UNIT III

Various types of Channel coding, Linear block codes, Systematic linear codes &optimum coding for Binary symmetric channel, The Generator & parity check matrices, Syndrome decoding & Symmetric channels, Hamming codes, Weight enumerator, Perfect codes, BCH codes, Idempotent & Mattson Solomon polynomials, Reed Solomon codes, Justeen codes, MDS codes & generalized BCH codes.

UNIT IV

Convolution and Turbo Codes ,Linear convolution encoders, Structural properties of Convolution codes, Viterbi decoding technique for convolution codes – Soft / Hard decision, concatenation of block codes and convolution codes, performance analysis, concept of Trellis coded modulation. Turbo Codes - Parallel concatenation, Turbo encoder, Iterative decoding using BCJR algorithm, Performance analysis.

UNIT V

Performance of codes ,Performance of linear block codes, convolution codes, and other codes, code incurable error probability, Upper & lower bounds.

Reference Books:

1. Wilson, Digital Modulation and coding, Pearson Education
2. B.P. Lathi, Communication System, Oxford Publications
3. Ranjan Bose, Information Theory, Coding & Cryptography, TMH Publication
4. Error Control Coding, Shu Lin, Daniel J Costello Jr., II Edition, Pearson Education
5. Digital Communication, J.G.Proakis, Fourth edition, Mc GrawHill

PECS14 B VLSI TECHNOLOGY AND DESIGN

UNIT I

Review of Microelectronics and Introduction to MOS Technologies: MOS, CMOS, BiCMOS Technology. Basic Electrical Properties of MOS, CMOS & BiCMOS Circuits: Ids – Vds relationships, Threshold Voltage VT, Gm, Gds and ωo, Pass Transistor, MOS, CMOS & Bi CMOS Inverters, Zpu/Zpd, MOS Transistor circuit model, Latch-up in CMOS circuits.

UNIT II

Layout Design and Tools: Transistor structures, Wires and Vias, Scalable Design rules, Layout Design tools.Logic Gates & Layouts: Static Complementary Gates, Switch Logic, Alternative Gate circuits, Low power gates, Resistive and Inductive interconnect delays.

UNIT III

Combinational Logic Networks: Layouts, Simulation, Network delay, Interconnect design, Power optimization, Switch logic networks, Gate and Network testing.

UNIT IV

Sequential Systems: Memory cells and Arrays, Clocking disciplines, Design, Power optimization, Design validation and testing.

UNIT V

Floor planning methods, Global Interconnect, Floor Plan Design, Off-chip connections.

Reference Books

1.Essentials of VLSI Circuits and Systems, K. Eshraghian Eshraghian. D, A. Pucknell,2005, PHI.

2.Modern VLSI Design – Wayne Wolf, 3rd Ed., 1997, Pearson Education.

3. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BOLin, CRC Press, 2011

4. Principals of CMOS VLSI Design – N.H.E Weste, K. Eshraghian, 2nd Ed., Addison

5. Behzad Razavi, “Design of Analog CMOS integrated circuits”.

PECS14 C IMAGE PROCESSING & ANALYSIS

UNIT I

Image Enhancement in the Spatial Domain: Spatial and Frequency methods, Basic Gray Level Transformations, Histogram Equalization, Histogram Processing, Local Enhancement, Image Subtraction, Image Averaging, Basicsof Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

UNIT II

Transforms : Introduction to the Fourier, Transformation, Discrete Fourier Transformation, Fast Fourier Transformation, Fourier Properties, 2D FT, inverse Fourier transform, Wavelet transform and multi resolution processing.

UNIT III

Image Enhancement in the frequency Domain: Filtering in the Frequency Domain, Correspondence between Filtering in the Spatial and Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering, Implementation.

UNIT IV

Image Compression: Fundamentals, Coding redundancy, interpixel redundancy, fidelity criteria , image Compression model, lossless predictive coding, Lossy predictivecoding, DCT compression.

UNIT V

Morphological Image Processing: Preliminaries, Dilation and Erosion, Opening and Closing, hit-or-miss Transformation, Some Basic Morphological Algorithms, Extension to Gray-Scale Images.

Image Segmentation: Point Detection, Line Detection, Edge Detection, Gradient Operator, Edge Linking and Boundary Detection, Thresholding, Region-oriented Segmentation.

Reference Books

1. Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", 2nd edition, Prentice Hall, 2002.
2. A. K. Jain , " Fundamentals of Digital Image Processing", Prentice Hall.
3. W. K. Pratt , "Digital Image Processing" 3rd Edition , John Wiley and Sons, New York.
4. Chanda , Mazumdar , " Digital Image Processing" , Prentice Hall, India.
5. Digital Image Processing ,S.Jayaraman, S.Esakkirajan, T.Veera Kumar–TMH, 2009

II - SEMESTER M.TECH (EC)

PECS21 EMBEDDED SYSTEMS

UNIT I

Introduction to Embedded Systems: Review of Microprocessors and their features. Differences between Microprocessors and Microcontrollers, Application areas of Embedded Systems, Categories of Embedded Systems. Overview of Embedded System Architecture, Challenges &Trends of Embedded Systems, Hardware Architecture, Software Architecture.

UNIT II

CISC vs RISC, AVR family architectureRegister file,ALU, Memory types ,Memory access and Instruction execution,stack operations,I/O memory, EEPROM, I/O ports, SRAM, timer ,UART, Interrupt structure,Internal watchdog timer, power-down modes

UNIT III

ARM Processor families,AMBA Bus Protocol, Registers,Current Program Status Register, Pipeline, Exceptions,Interrupts, Vector table,ARM5vE Instruction set: Data Processing Instructions, Branch Instructions Load-Store Instructions Software Interrupt Instruction, Program Status Register Instructions, Loading Constrants,ARMv5E Extensions, conditional Execution,THUMB.

UNIT IV

INSTRUCTION SET: Thumb Register Usage, ARM-Thumb Interworking, Branch Instructions, Data Processing Instructions,single, multiple register load- store instructions stack instructions, software interrupt instruction

UNIT V

Introduction to Real time systems: Issues in real time computing, Structure of real time System,Need for RTOS, Task classes,Performance measures for real time system: Properties,raditional performance measures, performability, cost functions and hard deadlines ,Estimating program run times.

Reference Books:

1. David.E.Simon , “An Embedded Software Primer” Pearson Education.
2. Mazidi M.A ,” The AVR microcontroller &embedded system using Assembly & C.”
3. Dhananjay Gadre,”Programming & customizing the AVR microcontroller.”
4. Raj Kamal,Embedded Systems – Architecture, Programming and Design ,2nd dition, TM
5. Jane W. S. Liu,”Real Time Systems .“

PECS22 ADVANCED OPTICAL COMMUNICATION

UNIT I

Introduction to guided optical communication, Optical Fibers, types of fibers & optical Cables, Study of losses during transmission through viz. Attenuation by Absorption &Scattering, Consideration of losses in designing of High Speed / High bandwidth optical communication systems, Selection of fiber for such systems.

UNIT II

Optical Sources: Types of LEDs used in optical communication, their construction &operating principle, Types of Lasers. Principle of working of Lasers, solid state & injection Lasers.

UNIT III

Optical Detectors: Introduction & study of type of detectors characteristics. Spectral spread and availability of detectors for 980 nm, 1.3 µm & 1.55 µm _ systems. Calculation of detector sensitivity and design considerations of suitable receivers for LAN, WAN applications.

UNIT IV

Optical fiber measurements and power budget:Fiber attenuation measurements, Fiber dispersion measurements, Fiber refractive index profile measurements, fiber cutoff wavelength measurements, numerical aperture measurements, Fiber diameter measurements. Optical amplifiers, EDFA, Soliton Systems & design of system required in LAN & WAN type of applications. Calculations of Power budgets and feasibility of system design for above optical sources.

UNIT V

Multiplexing Components & Techniques : Concepts of WDM, DWDM system design parameters, Optical multiplex / Demultiplex design considerations- Angular dispersive devices, Dielectric thin film filter type devices.

Reference Books

1. Optical Communication Systems by John Gowar (PHI)
2. Optical Fiber Communication by Gerd Keiser (MGH) .
3. Optical Fiber Communication Principles & Practice by John M. Senior(PHI pub. 1996.)
4) Reema Thareja : Data Warehousing, Oxford Unviersity Press.
5) Paulraj Ponniah : Data Warehousing Fundamentals, John Wiley.

6) Vikram Pudi and P. Radha Krishna, Oxford University Press.

7) M.H.Dunham : Data Mining Introductory and Advanced Topics,Pearson Education, 2.

8) Han, Kamber : Data Mining Concepts and Techniques, MorganKaufmann, Pieter Adriaans, Dolf Zantinge.

PECS23 CELLULAR AND MOBILE COMMUNICATION

UNIT I

Overview of wireless communication systems: 1G, 2G, 2.5G, 3G and 4G technologies, WLL, WLAN, WLAN and PAN Standards IEEE802.11a/b/g/superG, WiFi, WiMAX, IEEE 802.22, and Bluetooth, Zigbee.

UNIT II

Cellular Concept: Frequency reuse, Channel assignment strategies, handoff strategies, Interference and system capacity, near end and far end interference, effect of near end mobile units. Grade of service, improving coverage and capacity in cellular systems.

UNIT III

Mobile radio propagation: large scale propagation, free space propagation model. Outdoor propagation models: longely Rice model, Durkin's model, Okumura model, Hata model, PCS Extension to Hata model. Indoor propagation models: partition losses(same floor), partition losses(between floors), log distance path loss model, ericsson multiple breakpoint model, attenuation factor model, signal penetration into buildings.

UNIT IV

Small scale fading &multipath: Factors influencing small scale fading, small scale multipath measurements, parameters of mobile multipath channel. Types of small scale fading. Spread Spectrum techniques,Multiple Access techniques: FDMA, TDMA, CDMA, MC-CDMA, OFDMA.

UNIT V

Modulation techniques for mobile radio, constant envelopemodulation AMPS, and ETACS, GSM.Intelligent network for wireless communication advanced intelligent network (AIN), SS7 network for ISDN & AIN. Wireless ATM networks.

Reference Books

1. Rappaport, "Wireless Communication", Pearson Education, 2nd edition, 2002.

2. William C. Y. Lee, "Mobile Cellular Telecommunications: Analog and Digital

+Systems", 2nd edition, McGraw-Hill Electronic Engineering Series, 1995.

3. William C.Y. Lee, "Mobile Communication Engineering", Mc-Graw Hill, 1997.

4. Mike Gallegher, Randy Snyder, “Mobile Telecommunications Networking with IS-41”, McGraw Hill 1997.

5. Kernilo, Feher, “Wireless Digital Communications”, PHI, 2002.

PECS24 A ADVANCED AUDIO AND VIDEO COMMUNICATION

UNIT I

Auditory Psychophysics for coding Application : Introduction, Definition of loudness, pitch, Threshold of Heating , Differential Threshold, Masked Threshold, Critical Bands and Peripherals Auditory Filter, The Human Speech Production Mechanism, LTI Model for Speech Production, Linear Time Varying Model of Speech Production.

UNIT II

Speech Production Models and Their Digital Implementations: Speech Sounds, Speech Display, Geometry of Vocal and Nasal Tracts, Theory of wave propagation in Vocal Tracts, Sources of Excitation, Periodic Excitation, Voice Qualities.

UNIT III

Speech Coding : Speech Coder Attributes, The LPC Speech Production Model, Model of Human Perception for Speech Coding, Types of Speech Coders, Parametric-Speech Coding Techniques, Channel Vocoders, Linear Prediction Based Vocoders.

UNIT IV

Fundamentals of Image Processing: Digital Image Definitions, Common Values, Characteristics of Image Operations, Types of Neighborhoods, Video Parameters.Tools: Convolution, Properties of Convolution, Fourier Transforms and Properties.

UNIT V

Basic steps of Video Processing: Analog Video, Digital Video. Time-Varying Image Formation models: Three-Dimensional Motion Models, Geometric Image Formation, Photometric Image Formation, Sampling of Video signals, Filtering operations.

Reference Books

1. Vijay Madisetti, “Video, Speech, and Audio Signal Processing and Associated Standards”, CRC Press, 2009.

2. Apte, “ Speech and Audio Processing”,Wiely India.

PECS24 B NEURAL NETWORKS & FUZZY LOGIC

UNIT I

Introduction to ANS (Artificial Neural systems) Technology, ANS simulation, Types of Neural Networks: Hopfield, perceptron and related models, Adaline and Madaline: Adaline and the Adaptive Linear Combiner, the Madaline and simulating the Adaline. Essential vector operations, Lateral Inhibition and Sensory Processing.

UNIT II

Probabilistic Models, Fuzzy ARTMAP and Recurrent Networks:-Probabilistic Neural Networks, General Regression Neural Networks, Fuzzy ARTMAP, Recurrent Back propagation Neural Networks, Hybrid Learning Neural Networks:- Counter propagation Network, Radial basis Function Networks.

UNIT III

Application of Neural Networks:- Design and optimization of Systems: Non-Linear optimization, Inverse design problems, Pattern Recognition Applications: Control Chart pattern Recognition, Recognition of Machine-Cells in a group technology layout. Complex pattern Recognition tasks: Pattern mapping, Temporal patters, pattern variability, Neocognitron, Addition of lateral inhibition and Feedback to the Neocognitron.

UNIT IV

Introduction to Fuzzy systems, Fuzzy sets and operations on Fuzzy sets, Basics of Fuzzy relations, Fuzzy measures, Fuzzy integrals, Transform Image coding with Adaptive Fuzzy systems, Adaptive FAM systems for Transform coding.

UNIT V

Comparison of Fuzzy and Kalman-Filter Target, Tracking control systems, Fuzzy and MathModel Controllers, Real Time Target Tracking, Fuzzy Controller, Kalmaln-Filter Controller, Fuzzified CMAC and RBF – Network based self learning Controllers.

Reference Books

1. James A. Freeman and David M. Skapura,Neural Networks; Algorithms Applications and Programming Techniques, Pearson Education, India,2008.

2. James A. Anderson ,An introduction to Neural Networks ,PHI,2003.

3. B.Yegnanarayana,Artificial Neural Networks, PHI Publications India,2006.

4. M.Ananda Rao and J.Srinivas, Neural Networks: Algorithms and Applications, Narosa Publications 2009.

PECS24 C MICROWAVE DEVICES & AMPLIFIER DESIGN

UNIT I

Microwave Semiconductor Devices: VARACTOR diode, GUNN diode, TUNNEL, PIN diode, IMPATT diode, TRAPATT diode, Parametric amplifier, High electron mobility transistors, MASER: working principle, solid state RUBY MASER.

UNITII

Representation of Two Port Networks: Introduction, Impedance, Admittance, Hybrid and ABCD Matrices, Travelling Wave Tubes and transmission line concept, Scattering Matrix and the chain Scattering Matrix, Shifting reference planes, Properties of Scattering Parameters, Two port network parameters Conversion, Scattering parameters of transistors.

UNIT III

Microwave Tubes and Measurements: Limitations of vacuum tubes at microwave frequency, Microwave tubes amplifiers: Klystron - Two cavity and multi cavity, Travelling Wave Tube, Microwave tubes oscillators: Reflex klystron, Magnetron, Backward Wave Oscillator.

Microwave measurement: power, frequency, wavelength (free space, guided and cutoff), VSWR, attenuation.

UNITIV

Microwave Amplifier Design: Introduction, Two-Port Power Gains, Stability Consideration, Single-Stage Transistor Amplifier Design, Broadband Transistor Amplifier Design, High power Amplifiers Design.

UNIT V

Microwave Oscillators and Mixers: RF oscillators, Microwave Oscillators, Oscillator Phase Noise, Frequency Multipliers, Mixer Characteristics, Single-Ended Diode Mixer, Single-Ended FET Mixer, Balanced Mixer, Image Reject Mixer, Differential FET Mixer and Gilbert Cell Mixer.

Reference Books

1. David M Pozar, “Microwave Engineering”, John Wieley & Sons,Inc. Hobokenh, New Jersey, Fourth Edition, 2012.
2. Samuel Y Liao, “Microwave Devices and Circuits”, Pearson Education, Third Edition
3. Annapurna Das and Sisir K Das, Microwave Engineering, Tata McGraw Hill,New Delhi, Second Edition, 2009
4. K. T. Matthew, Microwave Engineering, Wieleyindia, ,2011
5. Solid-State electronic devices, B. Streetman, Upper Saddle River, Prentice Hall, 2001