ADVANCED MICROPROCESSOR & MICRO CONTROLLERS

EC-501
L T P Cr
4 - - 4

Unit 1
Design of basic microprocessor architectural Concepts :Microprocessor architecture, word Lengths, addressable memory, Microprocessor's speed architectural characteristics, registers, instruction, memory addressing architecture ,ALU, GPR's Control logic & internal data bus.

Unit 2
Microprocessor Instructions & Communication: Instruction Set ,Mnemonics, Basic Instruction Types , Addressing modes ,Microprocessor I/O connecting I/O put to Microprocessor ,Polling and Interrupts, Interrupt and OM. Controllers.

Unit 3
Microcontroller: Introduction 8051 architecture and programming model. Internal RAM and registers, I/O ports, Interrupt system & Instruction sets.

Unit 4
Advanced Micro processors: lntel X86 family of advanced Microprocessor, programming model for 86 family. X86 addressing modes, instruction set, hardware of 186, 286, 386, 486 & Pentium processors. Motorola 68 XXX family of microprocessor, 68 XXX addressing modes, instruction set, hardware.

Unit 5
Microprocessor 110: Data Communication, parallel I/O serial communication, Serial interface and UART, modems, I/O devices, D/A,A/D interface, special I/O devices.

Unit 6
Developing Microprocessor Based Products: Introduction to the Design Process, Preparing the specifications, Developing a design, Impler:lenting and Testing and design, Regulatory Compliance Testing, design tool for Microprocessor Development.

Text Books:

1. C.M. Gilmore, "Microprocessors Principals and Application", MGH
2. Rajkamal, "Embedded System, Architecture & Programming", TMH

Reference Books:

1. Berry B. Berry, " Inter Series of microprocessors", PHI
2. D. V. Hall, "Microprocessor & Interfacing", TMH
3. Peatman, "Microprocessor Based System Design", Pearson

Course Coordinator
Munish Vashisth
Sangeeta Dhal
Pradeep Kumar

SATELLITE AND SPACE COMMUNICATION

EC-503

L T P Cr
4 - - 4

Unit 1

Introduction: Satellite communication, Brief History.

Unit 2

Orbits of satellite: Low, medium and Geo synchronous mam characteristics, Angle period, Returning period, Angle of Evaluation, Propagation Delay, Orbital Spacing.

Unit 3

Satellite Links: Delay transponders, Earth Stations, Antennas and Earth coverage, Altitude and eclipses.

Unit 4

Earth space propagation effects: Frequency window, Free space loss, Atmospheric absorption, Rainfall Attenuation, Ionospheric scintillation, Telemetry, Tracking and command of satellites.

Unit 5

Detection: QPSK offset QPSK and MSK. Coherent and non-coherent detection, Error rate performance.

Unit 6

Synchronization: Principle and techniques, Multiple Access Techniques, FDMA, SPADE system, TDMA system, concept and configuration, system timing frames format, SSMA-Basu Principles, YSAT, Random access, space communication, link design description of operational in TELSA T and INSA T system.

Text Books:

1. J. Martin: Communication Satellite System, PH Englewood.
2. D.C.Aggarwal: Satellite Communication, Khanna Publishers.

Reference Books:

1. Tri Ha Digital Satellite Communication Tata Mc Graw Hill.
2. Harry and Yam Trees: Satellite Communication, IEEE Proceedings, 1979.

Course Coordinator
Preet Kaur
Priyanka

INFORMATION & COMMUNICATION THEORY

EC-505

L T P Cr
4 - - 4

Unit 1

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

Unit 2

Coding Theory: Source encoding & channel encoding, Error detection & Correction, Various codes for channel coding, Rate Distortion functions.

Unit 3

Codes used in Information Theory: 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, Convolution codes & Viterbi decoding algorithm.

Unit 4

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

Text books:

1. Blahut R.E., Theory and practice of error control codes, A WL1983.
2. Wilson, Digital Modulation and coding,
   Pearson

Reference Books:

1. B.P. Lathi, Communication System, Oxford
2. Ranjan Bose, Information Theory, Coding & Cryptography, TMH
3. Dass. , S.K. Malik & P.K. Chatterjee, Principles of digitals communication

Course Coordinator
Shailza Agarwal
Pooja

ADVANCED DIGITAL SIGNAL PROCESSING

EC-507

L T P Cr

4 - - 4

Unit 1

Introduction of DSP: Introduction to Signal Processing, Discrete Linear Systems, superposition Principle, Unit-Sample response, stability & causality Criterion.

Unit 2

Fourier Transform & inverse Fourier transform: Frequency domain design of digital filters, Fourier transform, use of Fourier transform in Signal processing. The inverse fourier transform, Sampling continuous function to generate a sequence, Reconstruction of continuous -time signals from Discrete-time sequences.

Unit 3

DFT & FFT & Z transform with Applications: Discrete Fourier transform, properties of DFT, Circular Convolution, Fast Fourier Transform, Realizations of OFT. The Ztransform, the system function of a digital filter, Digital Filter implementation from the system function, the inverse Z- transform, properties & applications, Special computation of finite sequences, sequence of infinite length & continuous time signals, computation of fourier series & time sequences from spectra.

Unit 4

Digital Filter Structure & Implementation: Linearity, time- invariance & causality, the discrete convolution, the transfer function, stability tests, steady state response, Amplitude & Phase characteristics, stabilization procedure, Ideal LP Filter, Physical reliability & specifications.FIR Filters, Truncation windowing & Delays, design example, IIR Filters: Review of design of analog filters & analog frequency transformation. Digital frequency transformation. Design of LP filters using impulse invariance method, Bilinear transformation, Phase equalizer, digital all pass filters.

Unit 5

Implementation of Filters: Realization block diagrams, Cascade & parallel realization, effect of infinite-word length, transfer function of degree 1&2, Sensitivity comparisons, effects of finite precision arithmetic on Digital filters.

TextBooks

1. Alam V. Oppenheim & Ronald W. Schafer, "Digital Signal Processing" PHI.
2. JG Proakis, "Digital Signal Processing", (PHI) 3rd Edition.

Reference Books

1. Rabiner & Gold, "Theory & application of digital Signal Processing", PHI 1992. 2. Roman kuc, "Introduction to Digital Signal Processing," McGraw hill Edition.
2. Roman Kuc, "'Introduction to Digital Signal Processing", McGraw hill Edition

Course Cordinator

Dushyant Shukla

Shailender Gupta

Preet Kaur

ADVANCED DIGITAL COMMUNICATION TECHNIQUES

EC-509

L T P Cr
4 - - 4

Unit 1

Vector quantization, sub band coding of speech, audio and video signals, linear predictive coding of speech, CELP coders, and MPEG standards for audio and video.

Unit 2

Characterization of band pass signals, and systems, ortho-normal expansion of signals, representation of digitally modulated signals, non-linear modulation methods, with memory. Optimum demodulation for known signals in additive Gaussian noise.

Unit 3

Probability of error fir binary and Mary signaling, DPSK demodulator, carrier and symbol synchronization techniques, characterization of band limited channels and ISI, signal design for zero ISI, and controlled IS I, optimum demodulator, for ISI and A WGN.

Unit 4

Linear equalization and decision feedback, equalization, adoptive equalize, fading dispersion channels, and tapped delay line model optimum demodulation for binary signals over fading disperse channels, RAKE recover.

Text Books:

1. Proakis, J.G, "Digital Communication", Mc Graw hill 1995
2. Haykin, S., "Digital Communication", Wiley.

Reference Books:

1. Bhattachary, "Digital Commnication Electrical & Electronic Series", TMH
2. Couch, "Digital & Analog Commnication System", Pearson

Course Coordinator

Archana Agarwal
Neetu Gupta
Neelam Mehla

ADVANCED MATHEMATICS FOR ENGINEERS

EC-511

L T P Cr
4 - - 4

Unit 1

Fourier Transforms: Introduction, Fourier Integral Theorem, Fourier Sine and Cosine Integral, Complex form of Fourier Integrals, Fourier Transforms, Inverse Fourier Transform, Properties, Modulation Theorem, Convolution Theorem for Fourier Transforms, Parseval's Identity, Fourier Transforms of derivative of functions, Relation between Fourier and Laplace transform.

Unit 2

Z -Transform: Introduction, Properties of Z- Transform, Evaluation of inverse Z Transform.

Unit 3

Matrices and Linear System of Equations: Solution of linear simultaneous equations by Gaussian elimination and its modification, Crout's triangularization method, Iterative methods- Jacobins method, Gauss-Seidal method, Determination of Eigen values by iteration.

Unit 4

Conformal Mapping: Conformal mappmg, liriear transformations, Bi-linear transformations, Schwarz's-Christoffel transformations.

Unit 5

Calculus Of Variations: Euler-Lagrange's differential equation, The Brachistochrone problems and other applications. Isoperi-metric problem, Hamilton's Principle and Lagrange's Equation. Rayleigh-Ritz method, Galerkin method.

TextBook:

1. Dr. B.S. Grewal; "Higher Engineering Mathematics", Khanna Publishers
2. Churchill, "Fourier Series and Boundary Values Problems", McGraw Hill.
3. Galfand & Fomin, "Calculus of Variations", Prentice Hall.

Reference Books:

1. Churchill, "Complex Variables & Applications", McGraw Hill.
2. Elsgole, "Calculus of Variations", Addison Wesley.
3. LN. Sneddon.The Use ofIntegral Transforms", Tata McGraw Hill.

Course Coordinator
Shailnder Gupta

COMPUTATIONAL METHODS

EC-513

L T P Cr
4 - - 4

Unit 1

Computational complexity, Error analysis in science and engineering, Fourier series, Fourier Integral, example of transforms' and orthogonal polynomials, Time series calculation of power spectra, convolution and correlation using FETs, introduction to wavelets.

Unit 2

Evaluation of integrals, Elementary Analytical methods, Trapezoidal and Simpson's rules, Summation of series, Gaussian Quadrature and orthogonal polynomials, Multidimensional integrals.

Unit 3

Ordinary differential equations, solution in closed form, Power series methods, approximate methods, Predictor and corrector methods, Numerical differentiation, and estimation of errors, extermination of functions, optimization and simple search, simplex method of NeIder and Mend, Gradient based method, Finite elements method.

Unit 4

Vectors and. matrices, solution of .linear and algebraic equations by direct and interactive methods, Gaussian elimination, minimal residual and conjugate gradient methods, and preconditioning techniques.

Text Books:

1. Kreyszig F: Advanced Engineering Mathematics, John Wiley seventh ed 1993.
2. Dr. B.S. Grewal, "Numerical Methods in Engg. & science", Khanna Publisher

Reference Books:

1. Gerald/ Wheatley: Applied Numerical Analysis, Pearson Education Asia, 2002.
2. S.S Sastry, "Introduction methods of Numerical analysis",PHI
3. J.B. Scarborough, Numerical Mathematical Analysis, oxford
4. M.K. Jain, "Numerical Solution of differential Equations", Wiley Eastern

Course Cordinator

Neetu Gupta

J. C. Arya

DATA COMMUNICATION NETWORKS

EC-515
L T P Cr
4 - - 4

Unit 1
Introduction to Data Transmission: Overview of Data Communication and networking,

Analog and Digital Data Transmission, Transmission Impairments, Various Transmission Media, Data Encoding.

Unit 2
Digital Data Communication Techniques: Asynchronous And Synchronous Transmission, Error Detection and correction techniques, Physical interfaces

Unit 3
Data Link Control: Link Configurations, Protocol principles (Error control, Flow control), Bit Oriented and character oriented protocol, Data link layer services, Link Control.

Unit 4
Multiplexing: F.D.M. Synchronous TDM, Statistical TDM

Unit 5

Communication Networking Techniques: Communication Networks, Circuit Switching, Message Switching, Packet Switching, Local Networking Technology, The bus / tree topology, the ring topology, Medium Access control protocols *(CSMAICD,* Token ring, FDDI, DQDB).

Unit 6

Computer Communication Architecture: OSI and TCP/IP Model, Protocol And Architecture, Networking Access protocols, Inter Networking, Transport layer Protocols,

Session Service And Protocols, and Presentation! Application protocols

Unit 7

ISDN Networks: Concepts & Architecture, Protocols

Text Books:

1. William Stallings, "Data and Computer Communication", PHI, 4th Ed.
2. Forouzan, "Data communications and networking",TMH

Reference Books:

1. Andrew Tanenbaum, "Computer Networking", PHI
2. Godbole, "Data communications and network", TMH

Course Coordinator
Shailnder Gupta
Priyanka

SATELLITE LAB

EC-517
L T P Cr
- - 2 1

(A few experiments may be designed & included in this list depending upon the infrastructure available in the institute)

1. To Study the process of Transmitting Signal.
2. To Study the Base band Signal in a Satellite Link.
3. To estimate *CIN* Ratio.
4. To estimate SIN Ratio.
5. To setup digital satellite Communication Link.
6. To Study Black & White and Color T.V.
7. To plot radiation pattern of parabolic reflector.
8. To Study Satellite Communication Receiver.
9. To set up a PC to PC Sat. Ctlm.Link using RS -2~2 port.
10. To measure the propagation delay of signal in a Sat.Com. Link.

II. To transmit & receive the function generator waveform through a Sat.Com. Link.

12. To set up a active & passive satellite communication link & study their difference.

Course Coordinator

Preet Kaur

Priyanka

ADVANCED MICROPROCESSOR & MICRO CONTROLLER LAB

EC-519
L T P Cr
- - 2 1

(A few experiments may be designed & included in this list depending upon the infrastructure available in the institute)

1. To study the architecture of 8086 Kit
2. Write an ALP to convert a hexadecimal No. to decimal No. in single step execution (DEBUG)
3. Write an ALP to enter a word from keyboard and to display
4. Write an ALP for addition of two one digit Numbers.
5. Write an ALP to display a string
6. Write an ALP reverse a string
7. Write an ALP to check whether the No. is Palindrome
8. To study the Microcontroller Kit
9. Write an ALP to generate 10 KHz frequency square wave
10. Write an ALP to generate 10 KHz & 100KHz frequency using interrupt
11. Write an ALP to interface intelligent LCD display
12. Write an ALP to interface intelligent LED display
13. Write an ALP to Switch ON alarm when Microcontroller receive interrupt
14. Write an ALP to interface one microcontroller with other using serial/parallel communication.

Course Coordinator

Munish Vashisth

Sangeeta Dhal

Pradeep Kumar

ELECTRONICS SYSTEM DESIGN

EC-502

L T P Cr
4 - - 4 II Sem

Unit 1

Review of Digital Electronics concept

Unit 2

MSI and LSI Circuits And Their Applications: Arithmetic Circuits, Comparators, Multiplexers, Code Converters, XOR And AND-OR INVERTER Gates, Wired Logic, Bus Oriented Structures, Tri-State Bus System, Propagation Delay.

Unit 3

Sequential Machines: The Concept Of Memory, The Binary Cell, The Cell And The Bouncing Switch, Set *I* Reset, D, Clocked T, Clocked JK Flip Flop, Design Of Clock *FIF,* Conversion, Clocking Aspects, Clock Skew, State Diagram Synchronous Analysis Process, Design Steps For Traditional Synchronous Sequential Circuits, State Reduction, Design Steps For Next State Decoders, Design Of Out Put Decoders, Counters, Shift Registers and Memory.

Unit 4

Multi Input System Controller Design: System Controllers, Design Phases And System Documentation, Defining The System, Timing And Frequency Considerations, Functional, Position And Detailed Flow Diagram Development, MDS Diagram, Generation, Synchronizing Two System And Choosing Controller, Architecture, State Assignment, Next State Decoders And Its Maps, Output Decoders, Clock And Power Supply Requirements, MSI Decoders, Multiplexers In System Controllers, Indirect Addressed Multiplexers Configurations, Programmable System Controllers, ROM, PLA And PAL Based Design. Introduction to the CPLD & FPGA.

Unit 5

Asynchronous Finite State Machines: Scope, Asynchronous Analysis, Design Of Asynchronous Machines, Cycle And Races, Plotting And Reading The Excitation Map, Hazards, Essential Hazards Map Entered Variable, MEV Approaches To Asynchronous Design, Hazards In Circuit Developed By MEV Method.

Text Books:

1. Fletcher, "An Engineering Approach to Digital Design" PHI 1990
2. Z. Kohavi, "Switching and Finite Automata Theory", TMH

Reference Books

1. Markovitz, "Introduction to Logic Design", TMH
2. Mano, "Digital Design", PHI

Course Cordinator
Pradeep Kumar
Preet Kaur

OPTICAL COMMUNICATION

EC-504
L T P Cr
4 - - 4

II Sem

Unit 1

Introduction: Advantage of optical fiber communication, Elements of fiber communication link, Ray theory and electromagnetic mode theory for optical propagation, step index and graded index fibers, Numerical Aperture.

Unit 2

Optical fibers, Losses & Dispersion: Attenuation, Absorption, Linear and non-linear scattering losses, Dispersion, overall fiber dispersion, polarization, fiber bending losses, multimode step index and graded index fibers, single mode fiber, plastic clad and all- plastic fibers, optical fiber cables, dispersion shifted and dispersion flattered fibers, practical fiber profiles.

Unit 3

Optical Sources: Basic concepts: LED for Optical Communication, Burrus type double hetro-structure, Surface emitting LEDs, Shape geometry, Edge emitting LEDs, LED to fiber launch systems semiconductor Lasers Theory, modulation and characteristics, Fabry-Perot lasers quantum well lasers and distributed feedback lasers.

Unit 4

Photo Detectors: P.I.N Photo Diodes: Theory and their characteristics, Avalanche photo diode detectors, Theory and their band width noise in APD.

Unit 5

Optical fiber 'communication System: Optical transmitter circuit: LED and laser drive circuits, optical receiver circuit; Structure, Pre amplifier, AGC, Equalization, Optical power budgeting line loading, analog systems: analog modulation, direct modulation, sub carrier modulation, distribution system, Optical TDM sub-carrier multiplexing, WDM .

Unit 6

Coherent Systems :Coherent receiver, Homodyne and heterodyne detection, noise in coherent receiver, polarization control, Homodyne receiver, Reusability and laser line width, heterodyne receiver , synchronous, Asynchronous and self synchronous demodulation, phase diversity receivers.

Text books :

1. John Gowar, "Optical Communication Systems", PHI.
2.Gerd Keiser, "Optical Fiber Communication", TMH

Reference Books:

1. Franz JH & Jain VK, "Optical Communication", Narosa Pub Ins
2. John M. Senior, "Optical Communication", PHI

Course Coordinator
Archana Aggarwal
Priyanka

VLSIDESIGN

EC-506
L T P Cr
4 - - 4 II Sem

Unit 1
Review of MOS technology :Basic MOS Transistors,Enhancementand Depletion mode NMOSCMOS & BICMOS fabrication process, thermal aspects of processing, Production of masks.

Unit 2
Electrical properties of MOS circuit: Parameters of MOS transistors, pass transistors, NMOS inverter, Pull-up to pull down ratio for an NMOS inverter, CMOS inverters, MOS transistor circuit model, Latch up on CMOS circuits.

Unit 3
Design processes: MOS Layers, stick diagrams, Design rules & layouts, lambda based design rules, CMOS lambda based design rules, 2um double metal double poly CMOSIBICMOS rules, 1.2um double metal single poly design rules.

Unit 4
Basic circuit concepts: Sheets resistance, area capacitance, delay unit, inverter delay, super buffers, propagation delays.

Unit 5
Subsystem Design & Layout: Architectural issues in VLSI, switch logic, gate logic, CMOS logic gate circuits, pseudo NMOS logic circuits, pass transistor logic circuits, dynamic logic circuits, domino logic circuit. Examples of Combinational logic, clocked sequential circuit.

Unit 6
Scaling of MOS circuits: Scaling factor, limitations, scaling of wires and interconnection, other system consideration.

Unit 7
Design Examples: Design of an ALU subsystems, carry look ahead adders, parallel adders.

Text Books:
1. Pucknell D. A. and Eshrachain K, "Basic VLSI Design System & Circuits". (PHI), 1988.
2.Geiger, Rr, Allen P. E. Strader N. R., "VLSI Design Techniques for Analog and Digital Circuit", MGH1990
3. Sedre Smith 4th Edition" Micro Electronics Circuits". (OXFORD)

Course Coordinator
Nitin Sachdeva
Munish Vashistha

WIRELESS MOBILE COMMUNICATION

EC-508 II Sem

L	T	P	Cr
4	-	-	4

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Unit 1

Introduction to mobile radio systems: Paging systems, cordless telephone system, Cellular telephone systems- Cellular concept, frequency reuse, channel assignment strategies, Interference and system capacity, trunking and grade of service, cell splitting, sectoring, microcell zone concept, HO strategies

Unit 2

Mobile radio propagation: mechanism, free space path loss, log-distance path loss models, Okumara model, Hata model, PCS model, Wideband PCS microcell model, indoor propagation models, Jake's channel model, Multi path characteristics of radio waves, signal fading, Time dispersion, Doppler spread, coherence time LCR, fading statistics, diversity techniques

Unit 3

Introduction to spread spectrum communication, multiple access techniques used in mobile wireless communication: FDMAffDMA/CDMA, Cellular CDMA, packet radio protocols, CSMA, reservation protocols, capacity of cellular CDMA, soft HO

Unit 4

Wireless systems and standards: GSM standards, signaling and call control, mobility management, location tracing, wireless data networking, packet error modeling on fading channels, Performance analysis of link and transport layer protocols over wireless channels, mobile data networking (mobile IP), wireless data services, IS-95, GPRS

Text Books:

1. T. S. Rappaport, "wireless Communications: Principles and practices", PHI 1996.

2.William C. Y. Lee, " Mobile Cellular Telecommunications, Analog and Digital Systems", 2nd ed, MGH-1995.

Reference Books:

1. Kaveh Pahlavan & Allen H. Levesque, "Wireless Information Networks", Wiley series in Telecommunications and signal processing.

2. Kamilo Feher: Wireless Digital communications, Modulation and Spread Spectrum Applications PHI 2001.

Course Coordinator
Neelam Mehala
Pooja .

EC-512 **SWITICHING SYSTEMS**

L T P Cr II Sem optional
4 - - 4

Unit 1

Introduction: Basic line circuits in telephony and telegraphy; long-haul communication circuits; statistical bandwidth sharing, principles of traffic switching, & signaling: schemes, CCS7.

Unit 2

Review of Switching System: Strowger's and crossbar switches; switching system hierarchy, SPC switching, basic call processing, Level I, 2 & 3 controls, interface controller, network control processor, central processor, switching fabric-SDS, TDS, STS, TST, TIT, single stage and multi-stage switching network, principles of large-scale, switch design.

Unit 3

Traffic Engineering and Tele-traffic Theory: Markov processes representing traffic. Calculation of blocking probability, stationary probability measures for Ergodic Markov processes. Combinatorial interpretation, calculation of blocking probability.

Unit 4

Switching Network Control and management: Data networks and protocols, ISDN. Message handling systems/intelligent networks, multi service broadband switching fabrics ATM., current trends in digital switching systems.

Text Books:

1. Thiagarajan Viswanathan, "Telecommunication Switching Systems and Networks", PHI
2.Syed Riffat Ali, "Digital switching Systems, system reliability and analysis", Tata MC Graw,2002.

Reference Books:

1. Keshav S, "An Engineering Approach to Computer Network Networking", Addison Wesley, 1998.
2. Martin, "Telecommunication & Computer 3e", PHI

Course Coordinator

Munish Vashistha

MULTIMEDIA SYSTEMS

EC-514

L	T	P	Cr
4	-	-	4

II Sem optional

Unit 1

Introduction: Concept of Multimedia, Emerging Applications, Multimedia Systems and Appliances. Distributed Multimedia Systems, Synchronization, Orchestration and QOS Architecture standards.

Unit 2

Digital audio representation and processing: Audio in computer applications, its digital representation, transmission and digital processing, speech recognition and generation.

Unit 3

Digital video and image compression: Video compression techniques and standardization of algorithms, JPEG, MPEG, DVI technology.

Unit 4

Multimedia Information Systems: Workstation OS, New OS support, Real Time Mach, Multimedia system service architecture, Media Stream Protocol, service and window system, client control of continuous media, Hyper applications. Multimedia Information systems, File system support, Data Models.

Unit 5

Multimedia communication systems: Public Network services and N/W Protocols, Quick time Movie File (QMF), format, OMFI, MHEG, Format function Real time Interchange, Track Model and Object Model Teleconferencing systems, Shared Amlication Architectures, Embedded Distributed objects, Multimedia conferencing architecture, architecture of team workstation.

Unit 6

Multimedia and Internet: The internet, client server technology, Communication Protocols, Internet Addressing, WWW, HTML, and Web Authorizing, Web page browsers and development, bandwidth .and applications considerations, Design Considerations for Web pages, Accessing Content on internet

TextBooks:

1 John F. Koegel Bufod, "Multimedia Systems", Addison Wesley, Edition. 2000

2.David Hillman, "Multimedia Technology and Application", Galgotia Publication - Edition 1998.

Reference Books:

1. Fred Halsall, "Multimedia Communications", Pearson

2. Rao, Bojkovic & Milovanovic, "Multimedia Comm. System: Techniology , Std. & Network", PHI

Course Coordinator
Shaliender Gupta

STATISTICALMODELS

EC-516

II sem optional

LTPCr

4- - 4

Unit1

Random variables and distribution function. Probability mass and probability density function, Two dimensional random variables: joint, Marginal and conditional distributions, Independence of random variables. Moments, Expectation, Variance covariance, conditional expectation.

Unit 2

Probability generating and Moment generating functions, Characteristic function. Inversion and uniqueness theorems of characteristic function.

Unit 3

Probability distributions; Binominal, Poisson, Geometric, Negative Binomial, Uniform, Exponential, Beta, Gamma, Weibull and Normal

Unit 4

General/Stochastic Process, definition, classification and examples, compound distribution, Random walk Gambler's ruin problem.

Unit 5

Markov chains, higher transition probabilities. Classification of states and chain, determination of higher transition probabilities, Stability of Markov systems, limiting behavior.

Unit 6

Poisson process and related distribution, Generalization of Poisson process. Birth process. Generalized Birth death processes, Linear Birth death processes.

Unit 7

Queueing systems, general concepts, Queueing models *IMIM/I, MIMII/R, MIMIC,* MIM/<XJ, MIM/C/C, MlE_k models. Machine interference problem.

TEXTBooks:

1. Bailey, N.T.J: Elements of Stochastic Process
2. K.S Trivedi : Probability and Statistics, PHI, 3rd edition

Reference Books:

I. Medhi, J , New International publication

2. Bhatt B.R, Stochastic models

3. Kashyap, B.R.K and Chaudhary, M.L.: An introduction to Queuing Theory

Course Coordinator

Sakshi

Munish Vashistha

EC-518 **VLSI LAB** II Sem

L T PCr

- - 2 1

(A few experiments may be designed & included in this list depending upon the infrastructure available in the institute)

1. Write a spice programme for CMOS inverter with following details:
   pmos L=.8um W=12.0um, nmos L=.8um W=2.4um, nmos (kp=60u Vto=0.6v) pmos (kp=20u Vto=-0.8v)

2. Write a spice programme for CMOS nand gate with following details:
   Vdd=5volt, pmos L=.8um W=20um, nmos L=.8um W=8um, nmos (kp=45u Vto=1.0v) pmos (kp=25u Vto=-1.2v)

3. Write a spice programme for CMOS nor gate with following details:
   Vdd=5volt, pmos L=:8um W=20um, nmos L=.8um W=8um, nmos (kp=45u Vto=1.0v) pmos (kp=25u Vto=-1.2v)

4. Design a d- latch with c1k time period =6ns using nand gates with following specifications:
   L=2U W=100U for n&p-mos, For n-mos Kn'=60U Vto =0.6V)
   for p-mos Kp =20U Vto=-0.8V)

5. Design a half adder using nand gates with following specifications:
   for n-mos: L=2U W=100U, for p-mos L=2U W=550U, For n-mos Kn'=60U
   for p-mos Kp =20U Vto=-0.8V)

6. Design a full adder using half adder designed above.

7. Design the layout for PMOS in layout editor.
8. Design the layout for NMOS in layout editor.
9. Design the layout for CMOS inverter with equal rise and fall time in layout editor.
10. Design the layout for 2-Input and 3-Input NAND gate.
11. Design the layout for 2-Input and 3-Input NOR gate.
12. Design the layout for clocked S-R flip-flop.

Vto =0.6V)

Course Coordinator

Nitin Sachdeva

Munish Vashistha

OPTICAL COMMUNICATION LAB
II Sem

EC520
LTP Cr
- - 2 1

(A few experiments may be designed & included in this list depending upon the infrastructure available in the institute)

1. Study of optical devices.
2. Study of fiber optical detector.
3. Study of fiber optical transmitters
4. Determination of numerical aperture of optical fiber
5. Study of characteristics of LED.
6. Study of characteristics of LASER diode.
7. Setting a fiber optic analog link.
8. Setting a fiber optic digital link.
9. Study of modulation demodulation of light source by direct amplitude modulation techniques.
10. Forming a PC to PC communication link using optical fiber & RS 232.
11. Setting up a fiber optic voice link.
12. Study of modulation & Demodulation of light source by PPM technique.
13. Study of modulation & Demodulation of light source by PWM technique.
14. Study of Propagation loss & sending loss in optical fiber.

Course Coordinator

Archana Aggarwal

Priyanka

NEURAL NETWORKS & FUZZY LOGICS

EC-601 III Semester

LTP Cr
4 - - 4

Unit 1

Introduction: Neural networks characteristics, History of development In neural networks principles, Artificial neural net terminology, Model of a neuron, Topology.

Unit 2

Learning Methods & Neural network models: types of learning, Supervised, Unsupervised, Re-inforcement learning. Knowledge, representation and acquisition. Basic Hop field model, Basic learning laws, Unsupervised learning, Competitive learning, Kmeans clustering algorithm, Kohonen's feature maps.

Unit 3

Artificial Neural Networks: Radial basis function neural networks, Basic learning laws in REF nets, Recurrent back propagation. Introduction to counter propagation networks, CMAC network, and ART networks.

Unit 4

Applications of neural nets: Applications such as pattern recognition, Pattern mapping, Associative memories, speech and decision-making

Unit 5

Fuzzy Logic: Basic concepts of fuzzy logic, Fuzzy vs. Crisp set, linguistic variables, Membership functions Fuzzy sets & Operations of fuzzy sets Fuzzy IF-THEN rules, Variable inference techniques,De-Fuzzification, Basic fuzzy inference algorithm ,Fuzzy system design, Antilock Breaking system(ABS),Industrial applications.

Text Books:

1. B. Yegnanarayana, " Artificial Neural Networks"PHI
2. J.M. Zurada, "Introduction to artificial neural systems", Jaico Pub.
3. ROSS J.T , "Fuzzy logic with engineering application", TMH

Reference Books:

1. Simon Haykin, "Neural Networks", PHI
2. Ahmad M.Ibrahim, "Introduction to applied Fuzzy Electronics", (PHI)
3. P.D. wasserman, "Neural computing theory & practice", (ANZA PUB).

Course Coordiantor

Shalendra Gupta

Shailza Aggarwal

CDMA SYSTEMS

EC-603

III Semester

LTP Cr
4 - - 4

Unit 1

Direct sequence and frequency hopped spread spectrum, spreading sequence and their correlation functions, Acquisition and tracking of spread spectrum signals.

Unit 2

Error probability for OS-COMA, on A WGN channels, OS-COMA on frequency selective fading, channels, Performance analysis of cellular COMA.

Unit 3

Capacity estimation, Power control, effect of imperfect power control on OS COMA performance, Soft Handoffs.

Unit 4

Spreading /coding tradeoffs, multi-carrier COMA, IS-95 COMA system, third generation COMA systems, multi-user detection.

TextBooks:

1. Andrew J. Viterbi, "COMA Principles of spread spectrum communications", Addison Wesley 1995.

2. J .S. Lee and L.E. Miller, " COMA system Engineering handbook", Artech house 1998.

Reference Books:

1. Garg, "COMA: 2000 : Cellular/ PCS system Implementation", Pearson

2. Steve Lee, "Spread spectrum COMA", TMH

Course Coordinator

Neelam Mehala

Pooja

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EMERGING NETWORK TECHNOLOGIES

EC-605

LTP Cr
4 - - 4

Unit 1

Foundations: virtual circuits, PVC, SVC, SPVC, connection oriented and connectionless systems, variable bit rate and constant bit rate applications, flow control and connection management, addressing and identification schemes, multiplexing methodologies, network interface.

Unit 2

System & topology: TVIE I CARRIER systems, topology, X.25, layers, POUs, ISONtypical topology, layers, and PDUs, SS7, FOOl, Frame relay, standards, topology, layers, OSI and ANSI layers. frame relay protocol data unit Frame relay network to network interface.

Unit 3

Fast and switched Ethernet: generation of LANs, switched Ethernet, architecture, store and forward and Cut through switches, virtual LAN, Fast Ethernet, 100BASET.

Unit 4

ATM standards & topology: ATM standards, topology, VPI and VCI Labels, ATM layers, A TM and B-ISDN model, cells, A TM switching, AAL types, traffic management in ATM network, SONET/ SDH: synchronous networks, standards, topology, automatic protection switching, multiplexing structure, payloads and envelopes, payload pointers, Introduction to broad band signaling networks.

Text Books:

1. Uyless Black, " Emerging Communication Technologies", 2nd Ed, Prentice hall 1997.

2.Sum it Kasera and Pankaj Sethi, "ATM Networks, Concepts and Protocols", TMGH 2001

Reference Books:

1. Behrouz Forouzan: Introduction to Data Communication and Networking, Tata Mc-Graw hill 1999.

Course Coordinator

Shalendra Gupta

DIGITAL SIGNAL PROCESSORS AND APPLICATIONS

EC-607
LTP Cr
4 - - 4

Unit 1

SDP 56002: Architecture, CPU, ALU, Program Controller, Address Generation Unit,

Addressing Modes, Interrupt, Priority register.

Unit 2

DSP 56002 Instruction Set: Instruction Formats Parallel move operating parallel move types,

instructions set, move arithmetic logic, bit manipulation, loop, programmed control instructions.

Unit 3

Applications: Designing and implementing FIR, IIR filters, implementing Fast Fourier.

Transforms with DSP 56002.

Unit 4

TMS - 320 Architecture, and Instruction Set.

TEXTBOOK:

1. Mohammed EL. Sharkawy: Digital Signal Processor Applications with Motorola's DSP

56002. PTR.

2. Yenkat Ramani, "Digital Signal Processor :Theory, Programming & Applications", TMH

Course Coordinator

Dushyant
Shalendra Gupta

IMAGE PROCESSING

EC-609
L T P Cr

4 - - 4

Unit 1

Introduction: Elements of Storage, Processing Communication Display.

Unit 2

Digital Image Fundamentals: Visual Perception, simple image models, concept of uniform and nonuniform sampling & quantization, Relationships between pixels-neighbors of pixel, connectivity labeling of connected components. Relations, equivalence and Transitive closure, Distance measures, Arithmetic/ Logic operation, Imaging Geometry Basic and perspective transformation stereo imaging.

Unit 3

Image Transforms: Discrete Fourier transform, 2-D Fourier Transforms and its properties. Fast Fourier transform and its uses. Walsh, Hadamard Discrete cosine, Heir and slant transforms hostelling their algorithms and computer implementations.

Unit 4

Image Enhancement: Spatial and frequency domain methods point processing, intensity transformation, Histogram processing image substation and Averaging spatial filtering, LP, HP and homo-morphic felling, generation of spatial marks, Color image processing.

Unit 5

Image Restoration: Degradation model, digitalization of circulate and block circulate metrics, Algebraic approved invoice filtering, wiener filter, constrained least square restoration, Interactive restoration in spatial domain geometric transformation.

Unit 6

Image Compression: Redundancy models, error free compression, Lossy compression, Image compression standards.

Unit 7

Image Segmentation: Detection of Discontinuity, Edge detection, Boundary detection, Thresholding, Regional oriented segmentation use of motion in segmentation.

Unit 8

Representation and Description: Image analysis, Pattern and their classes, Decision theoretical methods, Structural methods, Interpretation.

TextBooks:

I. Anil K Jain, "Fundamentals of Digital Image Processing", PHI Edition 1997.
II. Keenneth R Castleman, " Digital Image Processing",
Pearson Reference Books:
III. Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing",
Pearson 2. Chanda & Majumder, "Digital Image Processing & Analysis",
PHI

Course Coordinator

Dushyant
Shalender Gupta

COMPUTER COMMUNICATIONS

EC-611
LTP Cr
4 - - 4

Unit 1

Data communication: Introduction to data communication. Concept of analog and digital signals. Bandwidth. Transmission media. Wired and wireless connectivity. FDM, TDM and CDMA. Circuit and packet switching. Frame relay and ATM switching. ISDN.

Unit 2

Network architecture: Basics of OSI and TCP/IP reference models. Example architecture of other reference models.

Unit 3

Network protocols: Local area network protocols. IEEE standards for LAN. Fibre optic networks. Satellite networks. Data link layer design issues: its functions and protocols.

Unit 4

Internet Protocol: Internet protocol. Routing algorithms. Congestion control algorithms. IP addressing schemes. Internetworking and sub-netting.

Unit 5

Transport and application layer: Transport and application layer design Issues. Connection management. Transport protocol on top of X.25. File transfer and access management.

Unit 6

cryptography: Traditional cryptography. The Data Encryption Standard. Key distribution problem. Public cryptography. Authentication and digital signatures.

Unit 7

Modelling and Analysis: Modelling and Analysis of Computer Communication Networks: Pure Birth and Birth-Death Process. Bernoulli Trials-Markov Chains. Poisson Process. Calculation of Delay-Little's Formula, Burke's Theorem. Queueing Models: MIMIl, M/M/1/N, M/M/S, M/M/S/N queues. Imbedded Markov Chains-M/O/1 queue. Network layout and reliability considerations.

Text Books

1. Stallings, "Data communication & Networking", PHI
2.Tanenbaum, "Computer Networks", PHI

References Books:

3. Jeremiah F. Hayes: Modelling and Analysis of Computer Communication Networks, PHI
4. Forouzan, "Data communications and networking", TMH
5. Oodbole, "Data communications and network", TMH

Course Coordinator
Shalendra Gupta
Preet Kaur
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RELIABILITY ENGINEERING

EC- 619
L T P Cr
4 - - 4

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Unit 1

Introduction: Definition for Reliability, Need for reliability engineering, Causes of failures, catastrophic failures and degradation failures. Characteristic types of failures, useful life of components, Exponential case of chance failures, Reliability measures, Derivation for exponential distribution function, other kinds pf distributions, Binomial, Poisson uniform, Rayleigh, Weibull, Gamma distributions, Markov chains, failures data analysis.

Unit 2

Reliability in Systems: Reliability Block Diagrams, series systems, parallel systems, Kout of - M systems, Open and short circuit failures, standby systems. Reliability Analysis of Non-series Parallel system, Cut-set approach, Bayes Theorem Method.

Unit 3

Reliability Prediction: Objective of reliability Prediction, Classification, information sources for failure rate data, prediction methodologies, general requirement, role and limitations of reliability prediction.

Unit 4

Reliability Allocation: Subsystems reliability improvement, Apportionment for new units, criticality.

Unit 5

Redundancy Techniques for reliability: Forms of maintenance, measures of maintainability and availability, maintainability function, availability function, two unit parallel system with repair, Markov model for two unit systems, preventive maintenance, provisioning of spares.

Unit 6

Reliability Testing: Kinds of testing, component reliability measurements parametric methods, confidence limits, accelerate testing, equipment acceptance testing.

Unit 7

Economics of Reliability Engineering: Reliability cost, effect of reliability on cost. Reliability achievement cost models, reliability utility cost models, replacement policies.

Unit 8

Integrated performance measures for communication systems: Integration of reliability and capacity, Delay related reliability.

Text Books:

I. KK Aggarwal, "Reliability Engineering", Kluwer Academic Netherlands.
II. B Singh, "Quality Control and Reliability Analysis", Khanna Publishers. 3.Balaguruswamy:Reliability Engineering

Reference Books

1. KB Mishra: Reliability Prediction & Analysis: A Methodology oriented treatment ,Elseveir,Netherlands
2. Ebeling, "Introduction to Reliability & Maintainability", TMH

Course Coordinator
V.K Sharma
Shailza Aggarwal
Preet Kaur

SEMINAR

EC-613

L T P Cr

- - 2 1

Every student will be required to present a seminar talk on a topic approved by the Deptt. except on hislher dissertation. The committee constituted by the Head of the Deptt. will evaluate the presentation and will award one of the grades out of A,A(-),B,B(-),C,C(-), D&F.

A Student who is awarded the 'F' grade will be required to repeat the seminar on the same topic.

DISSERTATION

EC-602
L T P Cr
- -24 12

The Dissertation Phase-l will be continued as dissertation in 4th Semester.

The award of sessional grades out of A, A (-), B, B(-),C, C(-), D & F will be done by an internal Committee constituted by the Head of the Deptt. This assessment shall be based on presentation (s), report, etc. before this committee. In case a student scores 'F' -grade in the sessional, failing which *hel* she will not be allowed to submit the dissertation.

At the end of the semester, every student will be required to submit three bound copies of his/her Master's dissertation of the office of the concerned Department. Out of these, one copy will be kept for department record & one copy shall be for the supervisor. A copy of the dissertation will be sent to the external examiner by mail by the concerned department, after his/her appointment and intimation from the university. Dissertation will be evaluated by a committee of examiners consisting of the Head of the Department, dissertation supervisor(s) and one external examiner. There shall be no requirement of a separate evaluation report on the Master Dissertation from the external examiner.

The external examiner shall be appointed by the University from a panel of examiners submitted by the respective Head of Deptt., to the Chairman, Board of Studies. In case the external examiner so appointed by the University does not turn up, the *Directorl* Principal of the concerned college, on the recommendation of the concerned Head of the Deptt. Shall be authorized, on behalf of the University.~ to appointed an external examiner from some other institution.

The student will defend his/her dissertation through presentation before this committee and the committee will award one of the grades out of A, A(-), B, B(-), C, C(-), D & F. A Student scoring 'F' grade in the exam shall have to resubmit his/her Dissertation after making all correction / improvements and this dissertation shall be evaluated as above.

Note: The Scheme of awarding the Grades to the student in the course will be supplied by the University to the examiner(s).

M.D.UNIVERSITY, ROHTAK (HARYANA) SCHEME OF STUDIES & EXAMINATION FOR MASTER OF TECHNOLOGY DEGREE COURSE IN ELECTRICAL ENGINEERING (ELECTRONICS ENGG)

SEMESTER-I

Course No.	Course Title	Teaching Schedule			Marks			Credits	Duration of Exam
		L	T	P	Sessional	Exam	Total		
EC-501	Advanced Microprocessor & Micro Controllers	4	-	-	60	90	150	4	3
EC-50	Satellite & Space communication	4	-	-	60	90	150	4	3
EC-505	Information & Communication Theory	4	-	-	60	90	150	4	3
EC-507	Advanced Digital Signal Processing	4	-	-	60	90	150	4	3
	Elective-l	4	-	-	60	90	150	4	3
EC-517	Satellite Lab	-	-	2	60	40	100	1	3
EC-519	Advanced Microprocessor & Micro Controllers Lab	-	-	2	60	40	100	1	3
Total		20	-	4	420	530	950	22	

ELECTIVE-l

Advanced Digital Communication Techniques (EC-509)
Advance Mathematics for Engineers (EC-511)
Computational methods (EC-513)
Data Communication Networks (EC-5l5)

M.D.UNIVERSITY, ROHTAK (HARYANA) SCHEME OF STUDIES & EXAMINATION FOR MASTER OF TECHNOLOGY DEGREE COURSE IN ELECTRICAL ENGINEERING (ELECTRONICS ENGG)

SEMESTER-II

Course No.	Course Title	Teaching Schedule			Marks			Credits	Duration of Exam
		L	T	P	Sessional	Exam	Total		
EC-502	Electronics System Design	4	-	-	60	90	150	4	3
EC-504	Optical Communication	4	-	-	60	90	150	4	3
EC-506	VLSI Design	4	-	-	60	90	150	4	3
EC-508	Wireless Mobile Communication	4	-	-	60	90	150	4	3
	Elective-II .	4	-	-	60	90	150	4	3
EC-518	VLSI Lab	-	-	2	60	40	100	1	3
EC-520	Optical communication lab	-	-	2	60	40	100	1	3
Total		20	-	4	420	530	950	22	

ELECTIVE -2

Switching Systems **(EC-512)**

Multimedia System **(EC-514)**

Statistical Models **(EC-516)**

M.D.UNIVERSITY, ROHTAK (HARYANA) SCHEME OF STUDIES & EXAMINATION FOR MASTER OF TECHNOLOGY DEGREE COURSE IN ELECTRICAL ENGINEERING (ELECTRONICS ENGG)

SEMESTER-III

Course No.	Course Title	Teaching Schedule			Marks			Credits	Duration of Exam
		L	T	P	Sessional	Exam	Total		
EC-601	Neural Networks & fuzzy Logic	4	-	-	60	90	150	4	3
EC-603	CDMASystem	4	-	-	60	90	150	4	3
	Elective-III	4	-	-	60	90	150	4	3
EC-613	Seminar	-	-	2	50	-	50	1	-
EC-615	Project	-	-	4	30	50	100	4	3
Total		12	-	6	280	320	600	17	

ELECTIVE III

Reliability Engineering (EC-619)
Emerging Network Technologies (EC-605)
Digital Signal Processors & Applications (EC-607)
Image Processing (EC-609)
Computer Communications (EC-611)

M.D.UNIVERSITY, ROHTAK (HARYANA) SCHEME OF STUDIES & EXAMINATION FOR MASTER OF TECHNOLOGY DEGREE COURSE IN ELECTRICAL ENGINEERING (ELECTRONICS ENGG)

SEMESTER-IV

Course No.	Course Title	Teaching Schedule			Marks			Credits
		L	T	P	Sessional	Exam	Total	
EC-602	Dissertation	-	-	24	100	400	500	12
Total		-	-	24	100	400	500	12

Syllabus for M. Tech

Electrical Engineering

(Electronics Engineering)

Department of Electrical Engineering

YMCA Institute of Engineering

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