Syllabus & Scheme for

M.Tech. (ECE)

Department of Electronics Engineering

YMCA University of Science & Technology, Faridabad
(Haryana)
M.Tech. (Electronics and Communication Engineering) Syllabus

Total Credit requirement of the course: 71                      Max Marks:  2250
Core Courses                                             :  10                       labs             :  06
Elective Courses                                       :   02                      Seminar      :  01
Project/Dissertation                                :   02

First Semester

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Credit(L-T-P)</th>
<th>Marks Theory (Ext.)</th>
<th>Weightage Sessional (Int.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E501C</td>
<td>Advanced Microprocessor &amp; Micro Controllers</td>
<td>4 (4-0-0)</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>E503C</td>
<td>Satellite &amp; Space communication</td>
<td>4 (4-0-0)</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>E505C</td>
<td>Data Communication &amp; Networking</td>
<td>4 (4-0-0)</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>E507C</td>
<td>Information &amp; Communication Theory</td>
<td>4 (4-0-0)</td>
<td>60</td>
<td>40</td>
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<tr>
<td>E509C</td>
<td>Satellite Communication Lab</td>
<td>1 (0-0-2)</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>E511C</td>
<td>Advanced Microprocessor &amp; Micro Controllers Lab</td>
<td>1 (0-0-2)</td>
<td>20</td>
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<tr>
<td>E513C</td>
<td>Data Communication &amp; Networking Lab</td>
<td>1 (0-0-2)</td>
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<td><strong>Total:</strong></td>
<td></td>
<td><strong>19 (16-0-6)</strong></td>
<td><strong>300</strong></td>
<td><strong>250</strong></td>
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Second Semester

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Credit (L-T-P)</th>
<th>Marks Theory (Ext.)</th>
<th>Weightage Sessional (Int.)</th>
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<tbody>
<tr>
<td>E502C</td>
<td>Advanced Digital Signal Processing</td>
<td>4 (4-0-0)</td>
<td>60</td>
<td>40</td>
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<tr>
<td>E504C</td>
<td>Optical Communication</td>
<td>4 (4-0-0)</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>E506C</td>
<td>Wireless Communication</td>
<td>4 (4-0-0)</td>
<td>60</td>
<td>40</td>
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<td></td>
<td>Elective 1 *</td>
<td>4 (4-0-0)</td>
<td>60</td>
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<tr>
<td>E518C</td>
<td>Optical Communication Lab</td>
<td>1 (0-0-2)</td>
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<td>30</td>
</tr>
<tr>
<td>E520C</td>
<td>Advanced Digital Signal Processing lab</td>
<td>1 (0-0-2)</td>
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<tr>
<td>E522C</td>
<td>Seminar</td>
<td>1 (0-0-2)</td>
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<td>19 (16-0-6)</td>
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Third Semester

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<th>Subject Code</th>
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<th>Marks Theory (Ext.)</th>
<th>Weightage Sessional (Int.)</th>
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<td>E601C</td>
<td>Electronic System Design</td>
<td>4 (4-0-0)</td>
<td>60</td>
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<tr>
<td>E603C</td>
<td>Digital Communication</td>
<td>4 (4-0-0)</td>
<td>60</td>
<td>40</td>
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<tr>
<td>E605C</td>
<td>Security in Communication Network</td>
<td>4 (4-0-0)</td>
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<td>Elective II *</td>
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<tr>
<td>E617C</td>
<td>MATLAB</td>
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<td>E619C</td>
<td>Minor Project</td>
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<td>21 (16-0-10)</td>
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Fourth Semester

<table>
<thead>
<tr>
<th>Subject code</th>
<th>Subject</th>
<th>Credit (L-T-P)</th>
<th>Marks Theory (Ext.)</th>
<th>Weightage Sessional (Int.)</th>
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<tbody>
<tr>
<td>E702C</td>
<td>Dissertation</td>
<td>12 (0-0-24)</td>
<td>200</td>
<td>300</td>
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<tr>
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<td>Total:</td>
<td>12 (0-0-24)</td>
<td>200</td>
<td>300</td>
</tr>
</tbody>
</table>

*The students will have to select subject from list of electives as given below:
<table>
<thead>
<tr>
<th>CODE</th>
<th>SUBJECT</th>
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</thead>
<tbody>
<tr>
<td>E508C</td>
<td>VLSI</td>
</tr>
<tr>
<td>E510C</td>
<td>Nano Technology</td>
</tr>
<tr>
<td>E512C</td>
<td>Data Structure &amp; Programming Language</td>
</tr>
<tr>
<td>E514C</td>
<td>Multimedia System</td>
</tr>
<tr>
<td>E516C</td>
<td>Statistical Method</td>
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<table>
<thead>
<tr>
<th>CODE</th>
<th>SUBJECT</th>
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</thead>
<tbody>
<tr>
<td>E607C</td>
<td>Image Processing</td>
</tr>
<tr>
<td>E609C</td>
<td>Neural Networks And Fuzzy Logic</td>
</tr>
<tr>
<td>E611C</td>
<td>Embedded System</td>
</tr>
<tr>
<td>E613C</td>
<td>Advanced Mathematics for Engineers</td>
</tr>
<tr>
<td>E615C</td>
<td>Semiconductor Device Modeling</td>
</tr>
</tbody>
</table>
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

Unit 5

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

Text Books:
1. C.M. Gilmore, "Microprocessors Principals and Application", MGH

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
Unit 1
Introduction: Satellite communication, Brief History.

Unit 2
Orbits of satellite: Low, medium and Geo synchronous mam characteristics, Angle period, Returningperiod, 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 TELSAT and INSAT system.

Text Books:

Reference Books:
1. Tri Ha Digital Satellite Communication Tata McGraw Hill.
DATA COMMUNICATION NETWORKING

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

Unit 6

Unit 7
ISDN Networks: Concepts &Architecture, Protocols

Text Books:
2. Forouzan, "Data communications and networking", TMH

Reference Books:
1. Andrew Tanenbaum, "Computer Networking", PHI
2. Godbole, "Data communications and network", TMH
INFORMATION & COMMUNICATION THEORY

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Unit 1
Information Theory: Concept of Information and Entropy, Shannon'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:
2. Wilson, Digital Modulation and coding, Pearson

Reference Books:
1. B.P. Lathi, Communication System, Oxford
2. Ranjan Bose, Information Theory, Coding & Cryptography, TMH
### SATELLITE COMMUNICATION LAB

**E509C**

L  T  P  

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The practical will be based on Satellite communication course.

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### ADVANCED MICROPROCESSOR & MICRO CONTROLLER LAB

**E511C**

L  T  P  

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The practical will be based on Satellite communication course.

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### DATA COMMUNICATION NETWORKING LAB

**E513C**

L  T  P  

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The practical will be based on Satellite communication course.
Unit 1

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 Z transform, 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.

Reference Books
Unit 1
Introduction: General Communication system, Elements of fiber communication link, Advantages and disadvantages of optical fiber communication, Application of optical fiber communications, limitation of optical fiber communications

Unit 2
Optical fiber cross section and index profile, propagation of light wave in optical fiber, Ray theory and electromagnetic mode theory for optical propagation, step index and graded index fibers, critical angle, Acceptance angle, Numerical Aperture.

Unit 3
Attenuation, Material Absorption, scattering losses (Rayleigh Scattering), Fiber bend losses, Core and Cladding losses, Dispersion in optical fiber, Intermodal dispersion, Intermodal dispersion, pulse spread by material dispersion, dispersion shifted and dispersion flattered fiber.

Unit 4
Optical Sources: Principal of light emitting diode (LED), LED Power and Efficiency, Characteristic of LED, LASER, Basic concept: Absorption and Emission of Radiation, population inversion, spontaneous emission, Efficiency of LASER, Laser to fiber Coupling, Advantages of LASER over LED.

Unit 5
Optical Detector: Principal for optical detection, Characteristics of Photo Detectors, P.N Photo Diodes, P.I.N Photo Diodes, Response time of photodiode, Avalanche photodiode, Silicon Reach through Avalanche photodiode, Multiplication factor, Noise in APD.

Unit 6
Introduction of optical communication system, Drive circuits for LED operation, Drive circuits for LASER operation, Optical receiver, Preamplifier, Automatic gain control, Link power Budget, Rise time budget, Homodyne and heterodyne detection, Phase diversity receiver, Optical TDM, WDM.

Text books:
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
Unit 1
Introduction to mobile radio systems: Paging systems, cordless telephone system, Cellular telephonesystems- 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, Okumaramodel, 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, Dopplerspread, 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:

Reference Books:
UNIT I REVIEW OF MOS TECHNOLOGY
Evolution of VLSI technology, VLSI Design Flow, Basic MOS Transistor: Enhancement and depletion mode, MOS structure, NMOS, PMOS and CMOS fabrication.

UNIT II ELECTRICAL PROPERTIES OF MOS
Threshold voltage, MOSFET current voltage characteristics, second order effects, MOS inverters: VTC characteristics of NMOS inverter, CMOS inverter and Bi-CMOS inverter. Noise margins, Latch-up in CMOS circuits.

UNIT III DESIGN PROCESS
Physical design of simple and complex logic gates using NMOS and CMOS technology, Stick diagrams, NMOS Design Style, CMOS Design Style, Lambda based Design Rules. Layout.

UNIT IV MOS TRANSISTOR SWITCHING CHARACTERISTICS
Sheet resistance, area capacitance, inverter delay. Switching power dissipation of CMOS inverters.

UNIT V DYNAMIC LOGIC CIRCUITS
CMOS Logic Structure: Complementary CMOS Logic, Pseudo NMOS Logic, Dynamic CMOS Logic, CMOS Domino Logic, Clocked CMOS Logic, Pass Transistor Logic, CMOS transmission gate Logic

UNIT VI SCALING OF MOS CIRCUITS
Scaling models, scaling factor for device parameters, Advantages and Limitations of scaling.

UNIT VII SUBSYSTEM DESIGN
Architectural issues in VLSI, Design of CMOS parity generator, Multiplexer, n-Bit Comparator, Incrementer/Decrementer, ALU subsystem.

TEXT BOOKS:
3. Introduction to Digital Circuits: Rabaey (PH)
NANO TECHNOLOGY

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Unit 1
Atomic structure: Basic crystallography, Crystals and their imperfection, Diffusion, Nucleation and crystallization, metals, Semiconductor & Insulators, Phase transformation, Ceramic materials.

Unit 2
Physical properties of materials: Electrical & Thermal properties, Optical properties of material, magnetic properties of materials, Density of state, Coulomb blockade, Kondo effect, Hall effect, Quantum hall Effect.

Unit 3

Unit 3

Reference Books:
1. Introduction to solid state physics : C. Kittel
2. Introduction to theory of Solids : H.M. Roenberg
3. Physics & Chemistry of materials : Joel I. Gersten
4. Handbook of Nanotechnology : Bharat Bhushan
DATA STRUCTURE & PROGRAMMING LANGUAGE

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Unit 1
Re C/C++ : fundamentals, expressions, selection statements, loops, functions, recursive functions, pointers, introduction to OOPS ; encapsulation, excess modifiers, polymorphism, inheritance overriding methods, abstract classes.

Unit 2
Fundamental Notation: Primitive and Composite data type, time and space complexity.

Unit 3
Data Structure: Stacks, queues, arrays, linked list, trees and graphs.

Unit 4
File Structure: Indexing structure like B-trees, ISAM, hashing technique for direct method files, inverted list, Multilist.

Unit 5
Sorting: Internal and external sorts, searching techniques, merging algorithm.
MULTIMEDIA SYSTEMS

Unit 1

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, Multimediaystem 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 Modeland Object Model Teleconferencing systems, Shared Application 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

Text Books:

Reference Books:
1. Fred Halsall, "Multimedia Communications", Pearson
STATISTICAL METHODS

E516C

Unit 1
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,
MIE\models. Machine interference problem.

TEXTBooks:
1. Bailey, N.T.J: Elements of Stochastic Process

Reference Books:
1. Medhi, J , New International publication
2. Bhatt B.R, Stochastic models
OPTICAL COMMUNICATION LAB
E518C
L T P
_ _ 2
The practical will be based on Satellite communication course.

ADVANCED DIGITAL SIGNAL PROCESSING LAB
E520C
L T P
_ _ 2
The practical will be based on Satellite communication course.
Unit 1
Review of Digital Electronics concept

Unit 2

Unit 3

Unit 4

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
DIGITAL COMMUNICATION

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L T P
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Unit 1
Analog to Digital Conversion: Sampling Theorem, Pulse Amplitude Modulation, Channel bandwidth for PAM signal, Natural sampling, Flat top sampling, quantization of signals, Quantization error, Pulse Code Modulation (PCM), The PCM system, Companding, Multiplexing PCM signals, Differential PCM, Delta Modulation, Adaptive Delta Modulation.

Unit 2
Digital Baseband Transmission: A baseband digital communication system, Digital Data formats, Line coding and its properties, Various PAM formats or line codes, Unipolar RZ and NRZ, Polar RZ and NRZ, Bipolar NRZ, Split Phase Manchester format, Polar Quanternary NRZ format, The Optimum filter, Matched Filter, Calculation of Probability of error for matched filter, Intersymbol Interference (ISI), Cause of intersymbol interference, Nyquist’s criterion for distortion less baseband binary transmission.

Unit 3

Unit 4
Digital Modulation Techniques: Coherent binary modulation techniques, Coherent binary amplitude shift keying, Binary Phase Shift Keying (BPSK), Coherent Binary Frequency Shift Keying (BFSK), Noncoherent binary modulation, Differential Phase Shift Keying (DPSK), Quadrature Phase Shift Keying (QPSK), Minimum shift Keying (MSK), Calculation of probability of error of BPSK, BFSK, QPSK, Relationship between bit error rate, symbol error rate, Comparison of modulation techniques.

Text Books:
1. Taub and Schilling, “Principal of Communication System”, TMH

Reference Books:
UNIT 1

UNIT 2
Symmetric Encryption and Message Confidentiality: Symmetric encryption principles, Algorithms, Stream ciphers and RC4, Cipher block modes of operation, Location of encryption devices, Key distribution.

UNIT 3
Public Key Cryptography and Message Authentication: Different approaches to message authentication, HMAC, public key cryptography principles and algorithm, Digital signature, Key management.

UNIT 4

UNIT 5

Reference Books
2. Computer network and data communication by Frozen
IMAGE PROCESSING

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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 substitution 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:
II. Kenneth 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
NEURAL NETWORKS & FUZZY LOGICS

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Unit 1

Unit 2

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

Text Books:
2. 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)
Unit 1
Introduction to embedded system: Background and History of Embedded System, Definition and Classification, Programming language for embedded system: desirable characteristic of programming language for embedded system, low-level versus high-level language, main language implementation issue: control, typing. Major programming languages for embedded systems. Embedded System on a Chip (SOC) and the use of VLSI designed circuits.

Unit 2

Unit 3

Unit 4
Programming: Assembly Programming. Timer Registers, Timer modes, Overflow flags, clocking sources, timer counter interrupts, baud rate generation. Serial port register, mode of operation, initialization, accessing, multiprocessor communications, serial port baud rate.

Unit 5
Interrupts: Interrupt Organisation, Processing interrupts, Serial port interrupts, External interrupts, interrupt service routines. Microcontroller specification, Microcontroller design, testing, timing subroutines, look up tables, serial data transmission.

Unit 6

Unit 7
Laboratory work: Implementation using Embedded operating systems like RT Linux, WindowsCE, Windows XP Embedded, Assembly language for 8051 on Pinnacle.

Text Books:
2. Predko, “programming and customizing the 8051 microcontroller “, TMH.

Reference Books:
2. Deshukh, “Microcontroller”, TMH.
ADVANCED MATHEMATICS FOR ENGINEERS

E613C
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Unit 1

Unit 2

Unit 3

Unit 4
Conformal Mapping: Conformal mapping, linear transformations, Bi-linear transformations, Schwarz's Christoffel transformations.

Unit 5

TextBook:
1. Dr. B.S. Grewal; "Higher Engineering Mathematics", Khanna Publishers

Reference Books:
2. Elsgole, "Calculus of Variations", Addison Wesley.
3. LN. Sneddon.The Use ofIntegral Transforms", Tata McGraw Hill.
SEMICONDUCTOR DEVICE MODELLING

**Unit 1**
Review of Semiconductor Physics: Basic semiconductor equations: Poisson’s equations, Current continuity and boundary conditions.

**Unit 2**
The Physical Parameter: Doping profiles, carrier mobility, generation – recombination rates, bandgap narrowing effect, other physical parameters.

**Unit 3**

**Unit 4**
Examples of actual device Modeling: numerical treatment of boundary conditions, general procedures of device modeling, short channel effects in MOSFET’s, breakdown voltage in Si-P-Paineu diodes, permeable base transistor (PBT).

**Unit 5**
Monte Carlo Simulation: the Boltzmann transport equation, electron motion in the momentum space, Determination of free-flight time, selection of scattering processes, scattering rates, selection of momentum states after collisions, mean velocity and mean energy, Monte Carlo Simulation of BJT’s, Non isothermal and Hot-Carrier problems heat transfer equation, discretization of energy balance equations, application to hot-carrier phenomenon.

**Unit 6**
Modeling of Hetero devices: bandgap engineering, bandgap offset at abrupt heterojunctions, modified current continuity equations, material parameters, heterojunction bipolar transistor (HBT’s).

**Unit 7**
The Schrodinger – Poissionsolver: Modeling of inversion layer charges in MOS devices.