

SYLLABI OF ELECTRONICS & COMMUNICATION ENGINEERING

EEC-301

ELECTRONIC DEVICES AND CIRCUITS

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Basic material properties of semi-conductors; Governing factors for Fermi-Level; Carrier concentration and carrier mobility; Recombination and carrier life time; Carrier drift; Diffusion and continuity equation.

UNIT-II

Quantitative analysis of p-n diode characteristics and equivalent circuit; Schottky barrier diode; Ohmic contact; BJT models-low-frequency and high frequency hybrid models, Ebers-Mill model.

UNIT-III

Transients in diodes and transistors; low and high frequency models of JFET; MOS devices NMOS, PMOS and CMOS.

UNIT-IV

Transistor biasing schemes and operating point stabilization; coupling schemes for multistage amplifiers; Wide band amplifiers; Power amplifier.

UNIT-V

Feedback concepts; Analysis of negative feedback amplifiers; Condition for oscillation; Analysis of various oscillators.

BOOKS RECOMMENDED :

1. Millman, J, and Halkies, c.c.---Integrated Electronics-McGraw Hill.
2. Ryder, J.D.---Electronic Fundamentals & Applications-Prentice Hall.
3. Millman J., and Tanb H.---Pulse, Digital and Switching Waveforms-McGraw Hill.

EEC-302
DIGITAL ELECTRONICS

Time –3 Hrs
L T P
3 1 0

MM - 100
Sessional - 30
Theory - 70
Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction to Boolean Algebra, Identities logic functions, Truth table verification of various gates, Realization of Switching functions with gates.

UNIT-II

K. Map representation upto 4 variables simplification and realization of various functions using various gates, Combinational logic and design procedure.

UNIT-III

Combinational logic with MSI and LSI: Magnitude Comparator, Decoder, Multiplexer's, demultiplexers Encoders.

UNIT-IV

Flip Flops and Timing circuits, S-R latch gated latches, Edge triggered flip flops, Master-slave flip flops, conversion of flip flops, shift registers.

UNIT-V

Counters : Asynchronous and Synchronous Counters Two bits and four bits up and down counters and their design, Design of asynchronous counters.

BOOKS RECOMMENDED :

1.

EEC-401
SEMICONDUCTOR DEVICES & CIRCUITS

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Basic material properties of semi conductors, Governing factors of for Fermi-level, Carrier concentration and carrier mobility, continuity equation, Quantitative analysis of p-n-diode characteristics Schottky barrier diode, Ohmic contact.

UNIT-II

BJT models, Low frequency and high frequency models, Ebers-model.

UNIT-III

Transients in diodes and transistors, Low and high frequency models of JFET.

UNIT- IV

MOS devices, NMOS, PMOS and CMOS Transistor biasing schemes and operating point stabilization.

UNIT- V

Coupling Schemes for multistage amplifiers, Wideband amplifiers, Power amplifiers feedback amplifiers, Analysis of various oscillators.

BOOKS RECOMMENDED :

1. Millnian & Halkias---Electronic Devices and Circuits-McGraw Hill.
2. Ryder J.D.---Electronic Fundamentals and Applications-Prentice Hall.

CONTROL SYSTEM ENGINEERING

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Review of models of dynamic systems---transfer function and state variables, Signal Flow graphs.

UNIT-II

Feed back characteristics of Control system, reduction of parameter & variation by use of feedback, Time domain analysis—standard test inputs and response; Performance specification, Control system and components, Response Analysis.

UNIT-III

Stability – Root locus studies, Frequency domain analysis --- open and closed loop frequency response plots, Stability in frequency domain.

UNIT- IV

Correlation with time response, Classical design methods in s- and ω planes, State variable approach to analysis and design.

UNIT- V

Introduction to non-linearity; Describing function and phase plane techniques, Control system components.

BOOKS RECOMMENDED :

1. Nagrath and Gopal---Control system Engineering.
2. B.C. Kuo---Automatic Control System.

ECS-402

COMPUTER ARCHITECTURE & ORGANIZATION

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Basic Computer System, Architecture, Architecture and advanced Architecture, inter register data transfer, Arithmetic, logic and shift micro instructions, control function.

UNIT-II

Introduction, Assembly language, addressing methods, Computer instructions, Codes, timing, Control and execution, stock handling.

UNIT-III

CPU organization, Processor bus organization, ALU multi bus control unit-sequencing of control signals.

UNIT- IV

Control memory, Micro programs, and instructions, peripheral devices, I/O interfaces, synchronous and asynchronous data transfers, synchronous and asynchronous data transfers, I/O processors, multiprocessors, and data communication systems.

UNIT- V

Hardwired and Micro program control Main memory organization, Hierarchical structures, Virtual memory, Memory management, Hardware, CISC and RISC machines.

BOOKS RECOMMENDED :

1. M. Morris Mano---Computer System Architecture.
2. Hays---Computer Architecture and Organization.
3. Hwany---Computer Architecture and Parallel Processing.

COMMUNICATION SYSTEMS AND TECHNIQUES

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Signals and its Representation : Review of Fourier transform, Signal transmission through linear system, Signal distortion in transmission, Time domain versus Frequency Domain, Application of Delta function in Fourier Transform calculations Fourier transform of periodic signals.

UNIT-II

Linear Modulation, Amplitude modulation, generation and demodulation of AM, Wave, suppressed carrier modulation, DSB-SC modulation, and its generation and demodulation, SSB-SC modulation, Exponential modulation, modulation F.M. waves, generation of F.M. waves, De-emphasis and Pre-emphasis filtering.

UNIT-III

A.M. and F.M. transmitters, SSB transmission, F.M. transmitter, IC AM and FM standard transmitter,

UNIT- IV

A.M. and F.M. Receivers, Superhetrodyne receivers, the complete A.M. receiver system, SSB receiver, F.M. receiver.

UNIT- V

Pulse Analog Modulation, Practical Sampling, Analog pulse modulation, Time Division multiplexing (TDM) Synchronization in pulse modulated system, Noise in Continuous-wave modulation, baseband system, noise calculation in communication system noise in A.M and angle modulated system.

BOOKS RECOMMENDED :

1. Chakrabarti----- Analog and digital Communication-Dhanpatrai & Com..
2. Wayne Tomasi---Electronic Communications Systems-Pearson Education Asia Publisher..
3. Taub, H., Shillmg D.L.---Principles of Communication Systems-Tata-McGraw Hill, N.D.

CIRCUIT ANALYSIS & NETWORK SYNTHESIS

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction: basic circuit analysis, solutions of mesh and nodal equations, Elementary graph theory trees, links, co-trees, cutsets, analysis of resistive circuits with D.C. sources-series, Parallel networks star-delta and delta star conversion.

UNIT-II

Steady state analysis of circuits with sinusoidal sources, sine wave, complex representation of phasors, inductively coupled circuits, Analysis of three phase circuit.

Network functions and theorms; concept of steady-state impedance and admittance function one and two port networks, Network theorms, and applications.

UNIT-III

Transient response of simple circuits, Differential equations for simple single and two elements circuits and their solutions, Laplace transforms and applications to simple circuits.

UNIT- IV

Signal representation, unit step, ramp, sinusoidal Fourier series and Fourier integral and transform, convolution, Elements of realizability theory, positive real functions. Genralized network function and theorms poles and zeros, relationship between time domain behaviour and pole-zero plot.

UNIT- V

Introduction to network Synthesis problems, Properties of reactive networks, Foster and Cauer Synthesis procedures, Classical design of filters.

BOOKS RECOMMENDED :

1. Van Valkenburg, M.E.---Network Analysis-Prentice Hall
2. Kuo,F.F.---Network Analysis and Synthesis-John Wiley & Sons.
3. Scott, R.E.---Linear Circuits, Part I and II-Addison Wesley Pub.Co.
4. Vanvalkenburg, M.E.---Introduction to Modern Network Synthesis-Wiley International.
5. Kuo,F.F.---Network Analysis & Synthesis-John Wiely, Sons.

MICROPROCESSORS AND INTERFACING

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Microcomputers and microprocessors; 8-bit microprocessors; Instructions and timings, 8085 instruction set and programming, stacks subroutines.

UNIT-II

Interrupt structure and I/O techniques; Interfacing concepts and devices; Programmable interfacing devices; Serial I/O; 16-bit microprocessors.

UNIT-III

Architecture of 8086, Addressing modes, overview of arithmetic and looping instructions in 8086; Micro controllers and their applications.

UNIT- IV

Simple experiments on 8085 programming using kit; Interfacing of switches and LED's; Interfacing of ADC and DAC; Use of programmable peripheral interfaces.

UNIT- V

Use of counters and timer chips; Interfacing of keyboard and display controller; Serial communication; Interfacing of printer; Programming of 8086 using kit.

BOOKS RECOMMENDED :

1. Gaonkar R.G.---Microprocessor Architecture, Programming & Application-Wiely Eastern ltd.
2. Ram, B.---Microprocessor and Application-Dhanpatrai Pub.
3. Mathur, A.P.---Introduction to Microprocessor.
4. Short, K.L.---Microprocessors and Programmed Logic-Prentice hall.
5. Leventhal, L.A.---Introduction to Microprocessors, software, hardware, programming-Prentice Hall, Inc.

ECS-502
SIGNALS AND SYSTEMS

Time –3 Hrs
L T P
3 1 0

MM - 100
Sessional - 30
Theory - 70
Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Clarification and representation of signals and systems, Transformation of the independent variable, continuous and discrete time systems. Basic theorem of Fourier transform, application to LTI networks frequency response, Fourier series representation of periodic non-sinusoidal signals, application to analysis of LTI networks.

UNIT-II

Review a Laplace transform, Convolution integral and system transfer function, System properties, Magnitude-phase representation of Fourier transform, time domain properties of ideal frequency selective filter, time domain and frequency domain aspect of non-ideal filter, 1st order and 2nd order continuous and discrete time system. Sampling theorem, reconstruction of signals from samples, effect of under sampling, discrete time processing of continuous time signals.

UNIT-III

Network functions and theorem, positive real functions and Hurwitz polynomial, random variable, random process, correlation functions, cumulative distribution function, probability density function joint cumulative and distribution and probability density.

UNIT- IV

Z-transform and its property—convergence, inverse of z-transform, properties—linearity, time shifting, scaling, reversal, expansion, conjugation, convolution, differentiation in Z-domain, initial value theorem, discrete time Fourier transform and its properties, difference equation.

UNIT- V

Representation of a periodic signals, Fourier transform a periodic signals, properties of discrete Fourier transform, convolution property, multiplication property, duality.

BOOKS RECOMMENDED :

1. A.V. Oppenheim---Signals and system'-Prentice hall
2. B.P. Lathi---Modern Analog and digital communication system.
3. Simon Haykin --- Communication system
4. Taub & Schilling --- Principles of Communication Systems.

PRINCIPLES OF DIGITAL COMMUNICATION

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction, Analog signals, digital signals, analog to digital and digital to analog conversion, Elements of digital communication system, Various pulse modulation and demodulation.

UNIT-II

Digital coding of analog signals; Elements of PCM, Sampling, quantization of Signals, Companding, coding, channel bandwidth, decoding, DPCM, DM, ADM, Time division multiplexing.

UNIT-III

Baseband Digital Data transmission baseband transmission of binary data (PAM) intersymbol interference, Correlative coding, modified duobinary signaling, m-array data eye pattern, adaptive equalization problems.

UNIT- IV

Digital modulation techniques, ASK, PSK, DPSK, FSK, QPSK, MSK, Systems and their detections.

UNIT- V

Optimum receivers for data communication, maximum signal to noise ratio, matched filter, Probabilistic approach for optimum receiver design, Probability error in PCM comparison of noise performance of digital systems.

BOOKS RECOMMENDED :

1. P. Chakrabarti---Text book of Analog & Digital Communication-Dhanpat Rai & Co.
2. Taub & Schilling---Principles of Communication System-McGraw Hill.
3. Hykin---Communication Systems-Wiley Eastern Ltd.

APPLIED ELECTROMAGNETICS FIELD THEORY

Time –3 Hrs	MM	- 100
L T P	Sessional	- 30
3 1 0	Theory	- 70
	Pass Marks-	40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Maxwell's equations, Wave equation, transmission lines, Poynting vector, Standing waves, VSWR, impedance, Smith charts problems.

UNIT-II

Waveguides, Parallel plate waveguides, TEM, TE and TM modes, wave impedance, rectangle, Cylindrical wave guides, excitation of waveguides.

UNIT-III

Resonators rectangular and cylindrical and their application, wave propagation in an isotropic media, ferrites, Faraday rotation ferrite devices, isolators, Circulators, and phase shifters.

UNIT- IV

Microwave components, S-parameters and their applications to Tee network, Magic Tee Directional Couplers- isolators, Attenuators, Wave meters.

UNIT- V

Microwave filters, matching networks, Quarter and half wave filters, Measurement of low and high microwave powers.

BOOKS RECOMMENDED :

1. Krauss E.---Electromagnetic Theory-Mc-Graw Hill.
2. Leo S.---Solid State Microwave Devices-Prentice Hall.

DIGITAL SIGNAL PROCESS & APPLICATION

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Advantages and typical applications of digital signal processing, discrete-time description of signals and systems, Stability criterion, Fourier transform of discrete time signals, Z-transform and Fourier Transform, Inverse Z-transform.

UNIT-II

Digital processing of continuous-time signals. Linear convolution using DFT; FFT and DCT algorithms, Algorithms using decimation in time, infrequency techniques.

UNIT-III

Digital filter design techniques, IIR filter design techniques, FIR filter design, windowing methods, Computer aided design techniques.

UNIT- IV

Multirate DSP, MPEG coding of audio and video signals. Adaptive filtering techniques and algorithms.

UNIT- V

Architecture of digital signal processors, Implementation of echo canceller; modem and speech coders on digital signal processors, Software radio.

BOOKS RECOMMENDED :

1. Fabinet L.R. and Gold D---Theory and application of digital signal processing-Prentice Hall of India, 1989.
2. Kuo.R.---Introduction to Digital Signal Processing-McGraw Hill, 1988.
3. Oppenheim, A.V. and Schafer R.N.---Discrete time Signal Processing-Prentice Hall, EnglewoiŕÁM ð¿aÝbjbjâ=â= -lEW€Wa×ÿÿÿÿÿlúüüüüüümmmtiŕÁM ð¿aÝbjbjâ=â= -lEW€Wa×ÿÿÿÿÿlúüüüüüümmmtlding block for operational amplifier; Operational Amplifier: Characteristics, linear and nonlinear Applications.

UNIT-II

Schemitt Trigger; Half and full wave rectification; Square wave and triangular wave generators; Voltage to frequency conversion.

UNIT-III

Function generators; Log and Antilog amplifiers; Low pass, High pass, Band pass and Band Reject filters.

UNIT- IV

State variable filters; Higher order filters; A/D-D/A converters; analog switches.

UNIT- V

Multiplexers; Voltage Regulators; Three terminal regulators; Switching regulators; Data Acquisition system.

BOOKS RECOMMENDED :

1. Boyles and Stued---Electronic Devices & Circuits.
2. Gayakwad, R.A.---Op-Amp and Linear Integrated Circuit.

EEC-602
MICROWAVE ENGINEERING

Time –3 Hrs
L T P
3 1 0

MM - 100
Sessional - 30
Theory - 70
Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Microwave Tubes : UHF limitation in conventional vacuum tubes, Klystron Amplifier and Reflex Klystron, Admittance diagrams of Klystron Amplifiers.

UNIT-II

Analysis of travelling tube (TWT), m type TWT and O type TWT, study of the effect of electron beam on the helix, estimation of gain of TWT amplifier, Backward wave oscillator (BWO), and applications.

UNIT-III

Magnetron, operation of magnetron oscillator, cavity magnetron, mode jumping in magnetron, application of magnetron.

UNIT- IV

Solid-state microwave, devices, varactor diode parametric Amplifiers, PUC, PDC, PIN diode Tunnel diode, V-I characteristics of T.D., T.D. amplifiers, and oscillator, Transferred electron devices, Gunn effect devices, Avalanche Transit time devices.

UNIT- V

Microwave Communication Systems, Analog microwave communication, LOS microwave system, Derivation of field strength of a Tropospheric wave, Fading in Troposphere and its effects, Digital microwave Communication and its system, Bandwidth efficiency.

BOOKS RECOMMENDED :

1. Watson, H.A.---Microwave Semiconductor Devices-McGraw Hill.
2. Collin, R.E.---Fundamental of Microwave Engineering.
3. Leo, Sanuer---Microwave & Solid state devices-Prentice Hall.

SWITCHING THEORY & LOGIC DESIGN

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Arithmetic circuits, Half and Full adder and circuits, parallel binary adder, IC 7483-4 bit parallel binary adder, and 4 bit parallel binary subtractor, 4 bit serial adder/subtractor, BDC adder, Binary multiplier, and Binary divider.

UNIT-II

4 bit magnitude comparator (IC-7485), Cascading of IC 7485, Synchronous Sequential logic, analysis of clocked sequential circuits, state reduction and assignment, Design procedure of counters, using IC's, Design with state equations.

UNIT-III

Sequential Machines, Finite state model, memory elements, D,T, S-R, J,K, F.F., Synthesis of Synchronous Sequential circuits, serial binary adders sequential detectors, Counters, iterative networks, analogy between iterative networks, and sequential machines, design of sequence detector using iterative networks.

UNIT-IV

A synchronous sequential circuits, design of fundamental mode Asynchronous sequential circuits, and realization using D Flip Flops, T,K, f, F, Design of Pulse Mode Asynchronous Sequential circuits.

UNIT-V

Algorithmic State Machines (ASM) ASM chart, Timing consideration, control implementation, Design with multiplexer, Asynchronous, Sequential logic circuits.

BOOKS RECOMMENDED :

1. Morris Mano---Digital design-Prentice Hall International Edition.

EEC-702
POWER ELECTRONICS

Time –3 Hrs
L T P
3 1 0

MM - 100
Sessional - 30
Theory - 70
Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Power electronic devices—DIAC, TRIAC, SCR, BJT, IGBT, GTO, UJT, SSS and Comparator circuits, Different scheme of commutation of SCR, terminal chara of thyristor, Rating, Protection, Heating waling and mounting of thysistor, Gate circuit requirement, single pulse and carrier frequency gating, series-parallel operation of thyristars, Firing circuits of Thysisters.

UNIT-II

Principles of phase controlled, Half wave rectifier, Analysis of a single phase controlled rectifiers with different types of loads, effect of transformer leakage inductance, Three phase converter and line commutated inverters, single and three phase converter with interphase reactor, Dual converter, Regulated D.C. power supplies using thyreistars and triac.

UNIT-III

Principle of inverter, half and full bridge single phase inverter, analysis with resistance and inductive loads, feedback diodes, Three phase inverter, MC-Murray-Nbefard hay bridge invertors, PWM inverter. Effect and reduction of Harmonies in inverter, O/P voltage.

UNIT- IV

Principle of choppers, analysis of chopper ckts, Multiquardant choppers, parallel voltage and current commutated choppers, principle of cydoconverter operation, single phase ckt. Step up and step down cycloconveter.

UNIT- V

Converter and chopper control of AC motors, Control of universal motor with half wave converter and A.C. controller, A.C. motor speed control, Controller ICs.

BOOKS RECOMMENDED :

1. M.H. Rasid --- Power Electronics ckts, devices & application
2. J. Michael Jakob ---Power Electronics : Principle & Applications
3. P.C. Sen ---Power Electronics
4. Dr. P.S. Bimbhra --- Power Electronics
5. Vithayathi I.J. --- Power Electronics : Principle & Electronics
6. Cyril W. Laudir --- Power Electronics

ANTENNAS AND WAVE PROPAGATION

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Physical concept of radiation, Retarded potentials, Radiation from an oscillating current element, Short monopole and dipole Radiation pattern, Power radiated, Radiation resistance, Antenna thermos, super, position, Reciprocity, Isotropic radiator, Directives gain, power gain, Efficiency, Effective area, Effective length, Bandwidth, Bandwidth and polarization, Directional patterns, Directivity, Effective Antenna Impedance.

UNIT-II

Radiation from dipoles of arbitrary length, Arrays of point sources, uniform linear arrays-Broadside array, End fire, Collinear, Parasitic, Binomial array, pattern multiplication, Array synthesis.

UNIT-III

VLF, LF & MF transmitting antennas-vertical radiator, effect of ground, Grounded Antennas, Grounding system, Effect of Antenna Height, Antenna Top loading and Tuning, Antenna arrays in MF band, Antenna coupling at medium frequency, Travelling wave antenna, long wire harmonic antennas, Rhombic antenna, VHF & UHF antenna-folded dipoles, Yagi corner reflector, Mellical-frequency independent log periodic antenna, Microwave antennas—parabolic reflectors feed systems, lines antennas, slot and horn antennas.

UNIT- IV

Parabolic antenna, Microstrip antennas, Cell-site and mobile antennas, ground wave and surface wave propagation, Effect of earth & Terrain, Space wave propagation range, Effect of earth's curvature, Iropaspheric propagation, Duct propagation.

UNIT- V

Ionospheric propagation, Structure of ionosphere, Sky-wave propagation, Critical frequency, Effect of earth magnetic field, Virtual height maximum usable frequency, Skip distance, Noise, Precipitation, Static fading, Multi-top propagation.

BOOKS RECOMMENDED :

1. R. Collin---Antennas and radiowave propagation.
2. Krauss J.D.---Antennas.
3. Mayt Jr William---Engineering Electromagnetic.

CELLULAR AND SATELLITE COMMUNICATION

Time –3 Hrs	MM	- 100
L T P	Sessional	- 30
3 1 0	Theory	- 70
	Pass Marks-	40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Review of mobile radio propagation and multiple access techniques; Spread spectrum multiple access, Mobile personal Communication.

UNIT-II

Cellular concept and digital cellular mobile system, GSM architecture and technologies, Analog cellular systems.

UNIT-III

Microcellular systems; CDMA standard (IS-95), Third generation mobile communication systems. PCS, Orbital mechanics and look angle determination of a satellite, Mobile Data Communication.

UNIT- IV

Spacecraft subsystems; Communication subsystem and transponder, Satellite link design, Multiple access techniques for satellite communication.

UNIT- V

Multibeam and regenerative satellite, Earth station and VSAT terminals, INTELSAT; INMARSAT and INSAT systems and their applications, Global mobile satellite systems.

BOOKS RECOMMENDED :

1. Raj Pandya---Mobile and Personal Communication Services and Systems-Prentice Hall of India, 2001
2. A Mehrota---Cellular Radio, Analog and Digital Systems-Artech House, Boston, 1994.
3. W.C.Y.Lee---Mobile Communication Engineering –McGraw Hill, Newyork, 1997.

EEC-
**TELECOMMUNICATION SWITCHING : NETWORKS &
PROTOCOLS**

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction to Electronic Switching Systems, Single stage and multistage switching system, Blocking and non-blocking switching networks, Signalling and Switching techniques, Switching arrangements.

UNIT-II

Space division and time division switching, Traffic engineering and queuing theory, Design of Switching Networks, Design of Switching Centres, SPC, distribution SPC, Traffic calculation in Network.

UNIT-III

Subscriber loop and signaling techniques, Telephone Networks, Building Hierarchy and routing transmission.

UNIT- IV

Digital subscriber loop and high speed digital transmission over subscriber line. ISDN standards; Architecture and protocol, Link to link and End to End layers.

UNIT- V

Signalling system Number 7, Broadband ISDN architecture and SONET/ SDH, Frame relay and ATM protocols, LAN and data networks.

BOOKS RECOMMENDED :

1. Bear, D.---Principles of Telecommunications Traffic Engineering-IEE Series, Peter Perginus Ltd., 1983.
2. Flowers, T.Hr.---Introduction to Exchange Systems-John Wiley & Sons, 1978.
3. Grinesey---Electronic Switching-Elestver Science Pub., 1983.
4. Hills. M.T.---Telecommunication Principles-Ellen George and Unwing, 1979.

EEC-
MULTIMEDIA TECHNOLOGY

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction, Objects class hierarchy; Object composition.

UNIT-II

Compression techniques & standards; Multimedia interface design and applications, Multimedia storage systems.

UNIT-III

Multimedia Networks and ATM Network Characteristics, Multimedia Synchronization.

UNIT- IV

Multimedia Information system, Scheduling in Multimedia Systems, Multimedia databases.

UNIT- V

BOOKS RECOMMENDED :

- 1.
- 2.

EEC-604
DIGITAL CONTROL SYSTEMS

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction to digital control; Features, Review of z-transform and system representation in discrete form, Sampled data digital control system, multivariable control system.

UNIT-II

Time and frequency responses, Correlation between time and frequency response Polar Plots, Bode plots, Stability in frequency domain.

UNIT-III

Stability analysis, Design of digital controllers, necessary conditions for stability criterion, Relative stability analysis.

UNIT- IV

Microcomputer implementation and its programming, Special purpose Microcomputers, Single chip, Numerica, I/O and digital signal processors.

UNIT- V

Application of digital Control systems, in Defence and various industries.

BOOKS RECOMMENDED :

1. Kuo---
2. Nagrath---

EEC-703
FIBRE OPTIC SYSTEM

Time –3 Hrs
L T P
3 1 0

MM - 100
Sessional - 30
Theory - 70
Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Wave propagation in planar optical wave guides; Ray theory; Electromagnetic mode theory; Phase and group velocity, dispersion.

UNIT-II

Wave propagation in cylindrical fibers; Modes and mode coupling; Step and graded index fibers; Single-mode fibers. Transmission characteristics of fibers; Attenuation; Material absorption and scattering loss; bend loss.

UNIT-III

Intramodal and intermodal dispersion in step and graded fibers; Overall dispersion in single and multi-mode fibers.

UNIT- IV

Preparation of different types of fibers; Optical fiber cables; Stability of characteristics; Fiber alignment; Fiber aplices; Connectors; Couplers, Optical sources: Absorption and emission of radiation; population inversion and laser oscillation, p-n junction.

UNIT- V

Recombination and diffusion; stimulated emission and lasing; Hetero junctions, single-frequency injection lasers and their characteristics; Light emitting diode structures and their characteristics, Optical detection principles, p-n, p-I-n, and avalanche photodiodes. System description of an optical fibre communication system.

BOOKS RECOMMENDED :

- 1.
- 2.

WIRELESS COMMUNICATION LINKS AND MOBILE ANTENNAS

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Basic properties of transmitting and receiving antennas; Gain; bandwidth and polarization; Effective aperture.

UNIT-II

Friss transmission formula. Theory of array antennas; Array synthesis techniques; Adaptive antennas.

UNIT-III

Predictive models in land mobile communication; Multi path fading and distance-power relationship; Doppler shift.

UNIT- IV

Scattering model; Cell site and bandwidth budget; Cell coverage for signal and traffic; Introduction to basic modulation techniques such as FSK; BPSK; DPSK; QAM etc.

UNIT- V

Requirements for mobile antennas, Antennas near conducting body; Diversity techniques; performance evaluation in mobile environments; Land mobile antenna systems; propagation problems, base station antenna; Mobile station antennas; pagers, Portable phones and safety aspects, Antennas for mobile satellite system; Antennas for aeronautical mobile systems.

BOOKS RECOMMENDED :

1. Krauss, J.---Antenna-McGraw Hill.
2. W.C.Y. Lee---Mobile Communication Engineering-McGraw Hill, NY
3. Mehrotra, A.---Cellular radio, Analog & Digital System-Artech House, Boston, 1994.

EEC-606
RADAR SYSTEMS

Time –3 Hrs
L T P
3 1 0

MM - 100
Sessional - 30
Theory - 70
Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction, Block diagram of Radar, Types of Radar display-A-Scope and PPI, Radar resolution, Theory of Radar detection of range, in terms of S/N ratio, false alarm, Radar cross section of targets.

UNIT-II

PRF and range ambiguities, Search radar equation CW Radar and FMCW Radar, Doppler principle FM-CW Radar, Multiple frequency CW Radar.

UNIT-III

MTI : Principle sources of clutter, delay line cancellors and their characteristics, blind speed.

UNIT- IV

Staggerd PRF, MTI using range gates, digital MTI, Tracking, various tracking techniques conical monopulse calculation of error signals tracking of other parameters like range and Doppler, Acquisition of targets.

UNIT- V

Electronic Scanning Radar, Principle of phase array, Electronic counter measures, ECCM, system study in an actual Radar.

BOOKS RECOMMENDED :

1. S. Kolnik, M.L.---Introduction to Radar Systems-McGraw Hill,1980.
2. Berkowitz, R.S.---Modern Radar Analysis, Evaluation & System Design-John Wiley, 1967.
3. Hovermessian---Radar System Design & Analysis-Artech House, 1984.

ECS601/ECS-701
COMPUTER NETWORK

Time –3 Hrs
L T P
3 1 0

MM - 100
Sessional - 30
Theory - 70
Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction : Uses of networks (goals and applications), OSI reference model, TCP/IP Reference Model, Example Network – ARPANET, NSFNET, The Internet .

The Physical Layer : Transmission media : Twisted pair, Baseband and Broadband coaxial cable, Fiber optics; Wireless Transmission : Radio transmission, Microwave transmission, Infrared and light wave transmission; Narrowband ISDN: services. architecture, interface; Communication Satellite: Geosynchronous Satellites, Low Orbit Satellites.

UNIT-II

The Data Link Layer : Design Issues: Services provided to the Network Layer, Framing, Error control, Flow control; Error detection and Correction; Simplex , Sliding window protocol, Using Go-Back n, Example : The Data Link Layer in the Internet.

The Medium Access Sub layer : Static and Dynamic Channel Allocation in LANs and MANs; IEEE standard 802.3 and Ethernet; IEEE standard 802.4 and Token Bus, IEEE standard 802.4 and Token Ring; Bridges : Bridges from 802.x to 802.y, Transparent Bridges, Source Routing Bridges.

UNIT-III

The Network Layer : Network layer design issues, shortest path routing, Flooding, Flow- based routing, Broadcast routing, Congestion control and prevention policies; Internetworking : connectionless Interworking, Firewalls, IP protocols, IP address, Internet control protocols.

UNIT- IV

The Transport Layer :QOS, The transport service; Transport protocols : Addressing, Establishing and releasing a connection; TCP/UDP :Standards, Definitions, Specification of header, Fields in header.

Session Layer-RPC, Synchronization, dialog management

UNIT- V

The Application Layer : Network Security, FTP, SNMP, Telnet, E- mail, X.400, X.500, Multimedia, WWW, DNS.

Presentation layer: ASN, data compression, encryption.

BOOKS RECOMMENDED :

1. Andrew S. Tenenbaum---Computer Network (Third Edition)-PHI
2. Black U.---Computer Network-PHI

EEC-801
ARTIFICIAL INTELLIGENCE

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction : Meaning of Artificial Intelligence, Architecture of Intelligence Systems, problem spaces and problem characteristics.

UNIT-II

Basic Problem Solving Methods : Generate and Test Hill climbing, Best first search, Problem reduction constraint propagation, Means-end-analysis, Genetic Algorithm, Game playing; procedure, Mini Max, Negmax.

UNIT-III

Knowledge Representation : Metrics for accessing knowledge, Representation schemes; The first order predicate Logic, Production systems, Semantic Nets, Frames and Scripts, Resolution in predicate logic, Unification, Resolution by unification, question answering, conceptual dependency.

UNIT- IV

What is reasoning, forward and backward reasoning, Reasoning with uncertainty; non-monotonic reasoning (Truth Maintenance System), Probabilistic reasoning, Certainty factors, Fuzzy reasoning , reasoning by analogy, case-based reasoning (this will require introduction to Fuzzy logic).

UNIT- V

Latest trends in A.I.

(a) Natural Language Understanding : Need of natural language understanding, syntactic analysis; grammar, transition networks context, sensitive grammars, Augmented transition network, Semantic analysis, Semantic grammars, case grammars, Pragmatic analysis.

(b) Computer Vision : Phases of Computer vision, digitizing and signal procession : Digitizing images, thresholding, digital filters, Edge detection, Region detection, identifying objects.

(c) Expert Systems : basic concepts of E.S. Technology, Applications of E.S., Components of an E.S., Tools, Real time E.S.---MYCIN, PROSPECTOR, XCON, DEMDRAL.

(d) Brief introduction to Neural networks and Fuzzy logic.

BOOKS RECOMMENDED :

1. Eline and Ritch---Artificial Intelligence-Seed Edn. 1992.
2. M.W. Firebaugh---Artificial Intelligence.
3. Finaly and Alan Dix.---An Introduction to A.I. Janet-UCL, 1996.

EEC-605

PROCESS INSTRUMENTATION

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Sensors and transducers for the measurement of process variables (Temperature Force Pressure)

UNIT-II

Transducer basics and static and dynamic characteristics, Measurement of displacement strain, position, velocity, acceleration etc.

UNIT-III

Transducers for vibration measurement and its measurement, measurement of speed force and torque.

UNIT- IV

Active and passive transducers, Feed back transducer systems, Measurement of noise and interference.

UNIT- V

Actuators (analog and digital), Control valves Hydraulic and pneumatic amplifiers and other components.

BOOKS RECOMMENDED :

1. Prenskey, S.D.---Electronic Instruments-Prentice Hall, 1971.
2. Cooper, S.W.D.---Electronic Instrumentation and Measurement Techniques.
3. Lion, S.---Instrumentation in Scientific Research-McGraw Hill, 1959.
4. Bartholonov, D.---Electrical Measurements Instr.-Allyn & Bacon, 1963.

EEC-801
FIBRE OPTIC SYSTEM

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Wave propagation in planar optical wave guides, Ray theory, Electromagnetic mode theory, phase and group velocity.

UNIT-II

Dispersion, wave propagation in cylindrical fibers, Modes and mode coupling, step and graded index fibers, single mode fibers.

UNIT-III

Transmission characteristics of fibers, Attenuation, material absorption and Scattering loss, bend loss intra modal and intra model dispersion in single and multimode fibers.

UNIT- IV

Preparation of different types of fibers, Optical fiber cable, stability of characteristics, Fiber alignment, fiber splices, connectors, couples, optical sources, Absorption and emission radiation, population inversion, and laser oscillation, p-n junction.

UNIT- V

Recombination and diffusion, Stimulated emission and lasing, Hetero junction, single frequency injection lasers and their characteristics, Light emitted diode structures and their characteristics, optical detection principles, p-n, p-I-n and avalanche photo diodes, System description of an optical fiber communication system.

BOOKS RECOMMENDED :

1. John. M. senior---Optical Fiber Communication-Prentice Hall, 1998.
2. Robert G. Seipple---Opto Electronics-Reston Pub. Co., Prentice Hall.
3. Grd Keiser---Optical Fiber Communication-McGraw Hill.
4. Marian A. Herman---Semi Conductor Opto Electronics-John Willey & Sons.
5. John Gowar---Optical Communication-Prentice Hall, 1998.

MICROWAVE & MILLIMETER-WAVE IC'S

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Evolution of Microwave integrated circuits, various techniques used in development of integrated circuits. Properties of materials used in IC's. Hybrid technology.

UNIT-II

Monolithic technology, and its requirements in development of this technology, Design and fabrication of various components and devices of MIC's.

UNIT-III

Planar transmission lines, its different types and their design and characteristics, Materials used in fabrication of such planar transmission lines discuss the various steps and process involved.

UNIT- IV

Different types of losses associated in microwave integrated components and devices and the remedy to overcome, Discussion of details analysis of such devices.

UNIT- V

Components and resonators, computer aids to design for MIC's, Monolithic MIC's component devices, and materials used, Discussion fabrication techniques.

BOOKS RECOMMENDED :

1. O.P. Gandhi---Microwave Engineering & Applications-Pergamon Press

WIRELESS COMMUNICATION LINKS AND ANTENNAS

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Basic properties of transmitting and receiving antennas, Gain, bandwidth and polarization, Effective apertures, Friss transmission formula.

UNIT-II

Theory of array antennas, Array synthesis techniques, Adaptive antennas.

UNIT-III

Technologies in mobile communication systems, Predictive models in land mobile communication, Multi path fading and distance power relationship, Doppler shift scattering model, indoor and urban radio propagation modeling.

UNIT- IV

Cell site and bandwidth, budget, cell coverage for signal and traffic, Introduction to basic modulation, techniques, such as FSK, BPSK, DPSK, QAM etc.

UNIT- V

Requirements for mobile antennas, antennas near conducting bodies, Diversity techniques, performance evaluation in mobile environments, land mobile antenna system, propagation problems, base station antennas, mobile station antennas, pagers, portable phones and safety aspects, antennas for mobile satellite systems.

BOOKS RECOMMENDED :

1. Ulrich L. Rohde, David P. ---R.F. Microwave Circuit Design for Wireless Applications.
2. J. Lesurt---Millimeter Wave, Optic Devices & Systems-Adam Hilger, Bristol
3. Tatusuo Itoh---Numerical Techniques for Microwave & Millimeter wave passive structures.-John Wiley & Sons, Inc.

EEC-802
VLSI DESIGN TECHNIQUE

Time –3 Hrs	MM	- 100
L T P	Sessional	- 30
3 1 0	Theory	- 70
	Pass Marks-	40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Basic VLSI design issues, strategies and styles, Introduction to Monolithic Integrated Circuit technology, Bipolar & MOS IC, Silicon wafer propagation thermal oxidation.

UNIT-II

Diffusion of dopants diffusion, dopant profiles, Ion implantation, Epitaxy and apparatus for its growth, photolithographic techniques, Masking etching etc.

UNIT-III

Vacuum deposition & sputtering apparatus, Metallization, CVD process and its application in IC laboratory, Basic IC fabrication techniques, DTL, TTL, ECL, & IIL circuits.

UNIT- IV

MOSFET and CMOS fabrication techniques, Metal gate, Poly silicon gate, P-Channel, N-Channel devices, Properties of NMOS and (MOS inverters), design rules, stick diagram and layout, inverter design considerations, Basic building blocks of VLSI circuits, VLSI CAD tools.

UNIT- V

BOOKS RECOMMENDED :

1. S.A. Campbell---The Science of Engineering of Microelectronics Fabrication-Oxford Press, 1996.
2. S. Gandhi---VLSI fabrication principles-John Wiley, 1994 2nd edition.
3. S.M. SZE---VLSI Technology-M. Hill, 1988.

COMPUTER LOCAL AREA NETWORK

Time –3 Hrs

L T P

3 1 0

MM - 100

Sessional - 30

Theory - 70

Pass Marks- 40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

UNIT-I

Introduction to Computer Network, Local Area Networks, Types of networks, Network topologies, Communication techniques within network, LAN components, Network operating system.

UNIT-II

Data Communication, Communication Hardware and procedure, Processing, Channels, Sharing data files.

UNIT-III

Topologies and Transmission media, choosing topology, Different media, Protocols, LAN protocols, Carrier sense multiple access, Polling.

UNIT- IV

Network Architecture and standards, Open systems interconnection model, planning and installing a LAN, Utilizing a LAN.

UNIT- V

Main frame connection, PCs as mainframe workstations, main frame products for the PC Network, Novell Network, File servers, work stations, Network interface cards, Ethernet and its modification, Digital Network Architecture I to V phases, System Network architecture, Internetworking and Connecting.

BOOKS RECOMMENDED :

1. S.K. Basandra, Jaiswal---Local Area Networks-Galgotia Pub., 2000.
2. William Stallings---Business Guide to LAN-Howard W. Sams & Co.
3. Brendan Tangeny, Donald Omahnoy-Local Area Network-Prentice Hall.
4. William Stalling-Local Networks-Macmillan Pub. Co., NY

MULTIMEDIA TECHNIQUES

Time –3 Hrs	MM	- 100
L T P	Sessional	- 30
3 1 0	Theory	- 70
	Pass Marks-	40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

Unit I Introduction to multimedia, presentation, storage, information, transmission modes, data streams.

Unit II Computer representation of sound and audio, MIDI standards, Speech generation, analysis, compression Image capture

Unit III CCD camera, scanner, digital representation and processing, graphic animation. Video from grapher, full motion video picture compression, basic compression technique

Unit IV Multimedia operating System, real time systems resource and process management, Multimedia communication and networks, transport and session management, ISDN & ATM quality of service

Multimedia databases using relational and object oriented models.

Unit V Multimedia authoring and user interface, hyper text and hypermedia, integrated document management, Multimedia synchronization, reference model, case studies. Multimedia abstraction libraries, tool kits, web based programming, Application in communication and document services.

BOOKS RECOMMENDED :

1. Halsall, Fred---Multimedia Communication.
2. Stalling, William---ISDN, Broadband-ATM.
3. Handel, Rainer---ATM Networks, Concepts, Protocol, Applications.
4. Atul Puri, Tsuhan chen---Multimedia Systems Standards & Networks, Marcel Kekker, Inc.-Signal Processing & Communication Sons.

EEC-803
E-COMMERCE

Time –3 Hrs	MM	- 100
L T P	Sessional	- 30
3 1 0	Theory	- 70
	Pass Marks-	40

OBJECTIVE :

NOTE- Two questions are to be set from each unit. The students shall be required to attempt one question from each unit. All questions shall carry equal marks.

Unit I **Electronic Commerce:** Frameworks, E-Commerce and Convergence, Anatomy of E-Commerce Applications, Consumer Applications, Organization Applications.
Network Infrastructure For E-Commerce: Market forces influencing, Components of I-Way, Network Access Equipment, Global Information Distribution Network.
Internet as Network Infrastructure: Internet Terminology, History of Internet, NSFNET, National Research and Educational Network, Globalization of Academic Internet, Internet Applications.

Unit II **E-Commerce and WWW:** Architectural Framework of E-Commerce, WWW as the Architecture, Hypertext Publishing, Technology and Security of Web
Consumer Oriented E-Commerce: Consumer Oriented Application, Mercantile Process Model, Mercantile Model from consumer and Merchant's Perspective.
Electronic Payment System: Types of EPS, Digital Token-Based EPS, Smart Cards and EPS, Credit card based EPS, Risk and EPS, Designing EPS.

Unit III **Inter Organizational Commerce and EDI:** EDI, EDI Applications in Business, EDI: Legal, Security and Privacy Issue, EDI and E-Commerce, Standardization and EDI, EDI Software implementation, EDI Envelop for Message Transport, Value Added Networks, Internet Based EDIs.
Intra Organizational E-Commerce: Internal Information System, Macroforces and Internal Commerce, Work-Flow Automation and Coordination, Customization and Internal Commerce.

Unit IV **Supply Chain Management:** SCM Fundamentals, Managing Retail Supply Chain, Supply Chain Application Software, Future of Supply Chain Software
E-Commerce and Banking: Changing Dynamics in Banking industry, Home Banking History and Implementation Approaches, Open Versus Closed Models, Management Issues in Online Banking.
Network Security and Firewalls: Client-Server Network Security, Emerging Client Server Security Threats, Firewalls and Network Security, Data and Message Security, Challenge Response System, Encrypted Documents and E-Mail.

Unit V **Advertising and Marketing on the Internet:** Information based Marketing, Advertising on Internet, Charting on-Line Marketing Process.

Consumer Search and Resource Discovery: Search and Resource Discovery Paradigms, Information Search and retrieval, E-Commerce Catalogs, Information Filtering, Consumer-Data Interface.

Software Agents: History, Characteristics and Properties of Software Agents, Technology behind Software Agents, Telescript Agent Language, Safe-Tcl, Applets, Browser and Software Agents.

References:

1. Frontiers of Electronic Commerce Ravi Kalokaota and A.B. Whinston

(Addison-Wesley 2000).

2. Electronic Commerce A Manager's Guide Ravi Kalokaota and A.B. Whinston
(Addison-Wesley).