VINAYAKA MISSIONS UNIVERSITY, SALEM

TAMILNADU, INDIA.

FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.E- ELECTRONICS AND COMMUNICATION ENGINEERING

AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY, PAIYANOOR

&

V.M.K.V. ENGINEERING COLLEGE, SALEM

2009 REGULATION

CURRICULUM

FIRST YEAR

Sl No	Course Title	Dept Offering the Subject	L	T	P
THEORY					
1	Communication Skills / Professional Communication	English	3	0	0
2	Mathematics	Maths	3	2	0
3	Physics	Science	3	0	0
4	Chemistry	Science	3	0	0
5	Basic Electrical and Electronics Engineering	EEE/ECE	3	1	0
6	Basic Computer Programming	CSE	3	1	0
7	Basic Mechanical Engineering	Mechanical	3	0	0
PRACTICAL					
8	Physical Sciences Lab	Science	0	0	4
9	Workshop	Mechanical	0	0	3
10	Computer Programming Lab	CSE	0	0	3
11	Basic Electrical and Electronics Engineering Lab A - Electrical Lab	EEE	0	0	1.5
	B - Electronics Lab	ECE	0	0	1.5

III SEMESTER

Sl No	Course Title	Dept Offering the Subject	L	T	P
THEORY					
1	Advanced Engineering Mathematics	Maths	4	1	0
2	Electronic Devices	ECE	4	0	0
3	Signals and Systems	ECE	4	1	0
4	Electric Circuit Analysis and Synthesis	ECE	4	1	0
5	Electromagnetic Fields	ECE	4	1	0
6	Data Structures	CSE	4	0	0
PRACTICAL					
7	Electronic Devices Lab	ECE	0	0	3
8	Data Structures Lab	CSE	0	0	3

IV SEMESTER

Sl No	Course Title	Dept Offering the Subject	L	T	P
THEORY					
1	Random Processes	Maths	4	1	0
2	Electronic Measurements and Instrumentation	EEE	4	0	0
3	Digital Electronics	ECE	4	0	0
4	Electronic Circuits I	ECE	4	0	0
5	Digital Signal Processing	ECE	4	1	0
6	Communication Engineering	ECE	4	0	0
PRACTICAL					
7	Electronic Circuit Design Lab I	ECE	0	0	3
8	Digital Electronics Lab	ECE	0	0	3

V SEMESTER

Sl No	Course Title	Dept Offering the Subject	L	T	P
THEORY					
1	Information Theory and Coding	ECE	4	0	0
2	Digital Communication	ECE	4	0	0
3	Control Systems	EEE	4	1	0
4	Electronic Circuits II	ECE	4	1	0
5	Transmission Lines and Waveguides	ECE	4	0	0
6	LIC & its Applications	ECE	4	0	0
PRACTICAL					
7	Electronic Circuit Design Lab II & Integrated Circuits Lab	ECE	0	0	3
8	Communication Engineering Lab	ECE	0	0	3

VI SEMESTER

Sl No	Course Title	Dept Offering the Subject	L	T	P
THEORY					
1	Satellite Communication	ECE	4	0	0
2	Antenna and Wave Propagation	ECE	4	1	0
3		ECE	4	0	0
4	Introduction to VLSI Design	ECE	4	1	0
5	Digital Image Processing	ECE	4	0	0
6	Elective I		4	0	0
PRACTICAL					
7	Signal Processing lab	ECE	0	0	3
8	Microprocessor and Microcontroller Lab	ECE	0	0	3

VII SEMESTER

Sl No	Course Title	Dept Offering the Subject	L	T	P
THEORY					
1	Environmental Science and Engineering	Chemistry	4	0	0
2	Optical Communication	ECE	4	0	0
3	Microwave Engineering and Wireless Mobile Communication	ECE	4	0	0
4	Computer Networks	ECE	4	0	0
5	Elective II		4	0	0
6	Elective III		4	0	0
PRACTICAL					
7	Advanced Communication Engineering Lab	ECE	0	0	3
8	Networks Lab	ECE	0	0	3
9	Comprehension	ECE	0	4	0

VIII SEMESTER

Sl No	Course Title	Dept Offering the Subject	L	T	P
THEORY					
1	Engineering Management & Ethics	Management	4	0	0
2	Elective IV		4	0	0
3	Elective V		4	0	0
PRACTICAL					
4	Project Work	ECE	0	0	18

LIST OF ELECTIVES

S.NO.	Course Title	L	T	P
THEORY				
1	Advanced Digital Signal Processing	4	0	0
2	Advanced Microprocessors	4	0	0
3	Embedded Systems	4	0	0
4	Real Time Operating Systems	4	0	0
5	Electromagnetic Interference & Compatibility	4	0	0
6	Medical Electronics	4	0	0
7	Biomedical Signal Processing	4	0	0
8	VLSI Signal processing	4	0	0
9	Speech Processing	4	0	0
10	Multimedia Compression & Communication	4	0	0
11	High Speed Networks	4	0	0
12	Mobile Communication	4	0	0
13	Radar & Navigational Aids	4	0	0
14	Integrated Services Digital Network	4	0	0
15	Optical Networks	4	0	0
16	Cryptography & Network Security	4	0	0
17	Virtual Instrumentation	4	0	0
18	Computer Architecture	4	0	0
19	Robotics	4	0	0
20	Grid Computing	4	0	0
21	Television & Video engineering	4	0	0
22	Wireless Sensor Networks	4	0	0
23	Remote Sensing	4	0	0
24	Nano Electronics	4	0	0
25	Avionics	4	0	0
26	Neural Networks & its Applications	4	0	0
27	Intellectual Property Rights	4	0	0

SEMESTER - III
ADVANCED ENGIEERING MATHEMATICS

(COMMON TO ECE, ETCE, EEE, EIE, CSE, CSSE, IT, CIVIL, MECH, MECHAT, AUTO, AERO, CIVIL, ICE)

1. PARTIAL DIFFERENTIAL EQUATIONS **9**

Formation - Solutions of standard types of first order equations - Lagrange's Linear equation - Linear partial differential equations of second and higher order with constant coefficients.

2. FOURIER SERIES **9**

Dirichlet's conditions - General Fourier series - Half-range Sine and Cosine series - Parseval's identity – Harmonic Analysis.

3. BOUNDARY VALUE PROBLEMS **9**

Classification of second order linear partial differential equations - Solutions of one - dimensional wave equation, one-dimensional heat equation - Steady state solution of two-dimensional heat equation - Fourier series solutions in Cartesian coordinates

4. FOURIER TRANSFORMS **9**

Statement of Fourier integral theorem - Fourier transform pairs - Fourier Sine and Cosine transforms – Properties - Transforms of simple functions - Convolution theorem - Parseval's identity.

5. Z - TRANSFORM **9**

Z-Transform – Elementary Properties – Inverse Z-Transform – Convolution Theorem – Formation of Difference Equations – Solution of Difference Equations using Z-Transform.

TUTORIAL HOURS : 15 **TOTAL HOURS: 60**

TEXT BOOK:

1. T. Veerarajan, “Engineering Mathematics” (for semester III), Third Edition Tata McGraw- Hill Publishing Company limited.

REFERENCES:

1. Grewal, B.S., “Higher Engineering Mathematics” (35th Edition), Khanna Publishers, Delhi, 2000.
2. Kreyszig, E., “Advanced Engineering Mathematics” (8th Edition), John Wiley and Sons, (Asia) Pvt Ltd.,Singapore, 2000.
3. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., “Engineering Mathematics ", Volumes II & III (4th Revised Edition), S. Chand & Co., New Delhi, 2001.

SEMESTER - III
ELECTRONIC DEVICES
(COMMON TO ECE, ETCE, EEE, EIE & BME)

1. BASICS OF SEMICONDUCTORS **9**

Motion of charged particle in electric, magnetic and combined Fields-Semiconductor fundamentals-Fermi Level –Energy Band Diagram-Intrinsic and Extrinsic

semiconductors-Carrier concentration - Drift and Diffusion currents-Space charge effect.

2. CHARACTERISTICS OF DIODES 9

PN junction diode-theory and operation-Diode Equation- Minority carrier Concentration-Varactor diode-Avalanche and Zener breakdown-Zener diode-Tunnel diode-PIN diode – Photo diode - Photo Voltaic cell-LED-LCD-Light dependant resistor-Thermistors.

3. BIPOLAR JUNCTION TRANSISTORS 9

Principle of transistor action-Transistor Current Components- Ebers Moll equation-CE,CB,CC Configurations-input and output Characteristics-'h' parameters- low frequency and high frequency equivalent circuits-Transistor as a switch-RF transistors-Power Transistors.

4. **FET AND UJT 9**

Constructional features of junction field effect transistor-Theory and characteristics of JFET and MOSFET-Depletion and Enhancement type-Threshold voltage-Gate capacitance-MOS as a Charge transferring device-CCD, BBD-Power MOSFET-Theory and characteristics of UJT.

5. SCR AND PRINCIPLES OF IC 9

Working and VI Characteristics Features of silicon controlled rectifier, DIAC, TRIAC, GTO-Device Technology – Planar process-Diffusion-Ion Implementation-Vapour Deposition-NMOS, PMOS Fabrication Concepts-Twin Tub Process of CMOS-Thick film and thin film technology.

TOTAL HOURS: 45

TEXT BOOKS:

1. Millman and Halkias, "Electronic Devices and Circuits ", Tata McGraw Hill, 1991.
2. David A. Bell, "Electron Devices and Circuits ", 3rd Edition, Prentice Hall of India, 1999.
3.Millman J. and Halkias C.C., "Integrated Electronics ", McGraw Hill.
4. Robert Boylestead and Louis Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education, Ninth Edition

REFERENCES:

1. Jaspit Singh, "Semiconductor Devices an Introduction", McGraw Hill International Edition 1994.
2.Sze S.M.,"Physics of Semiconductor devices," Wiley interscience,1981
3.Yang,"Fundamentals of Semiconductor devices", Mc Graw Hill International Edition,1978
4. Street man "Solid State Electron Devices "'Prentice hall of India, IV Edition, 1995

SEMESTER III

SIGNALS AND SYSTEMS
(COMMON TO ECE & ETCE)

1. CLASSIFICATION OF SIGNALS AND SYSTEMS 9

Continuous time signals (CT signals), discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Exponential, Classification of CT and DT signals - periodic and aperiodic, random signals, CT systems and DT systems, Classification of systems - Linear Time invariant Systems.

2. ANALYSIS F C.T. SIGNALS 9

Fourier series analysis, Spectrum of C.T. signals, Fourier Transform and Laplace Transform in Signal Analysis.

3. LTI-C SYSTEMS 9

Differential equation, Block diagram representation, Impulse response, Convolution integral, Frequency response, Fourier Methods and Laplace transforms in analysis, State equations and Matrix.

4. ANALYSISOF D.T. SIGNALS 9

Z Transforms and Properties, Spectrum of D.T. signals, Discrete Time Fourier Transform (DTFT)

5. LTI-DT SYSTEMS 9

Difference equations, Block diagram representation, Impulse response, Convolution SUM, Frequency response, FFT and Z-transform analysis, State variable equation and Matrix.

TOTAL HOURS: 45

TEXT BOOKS:

1. Allan V. Oppenheim et al, “Signals & Systems ", Prentice Hall of India Pvt. Ltd., 1997.

REFERENCES:

1. Douglas K. Lindner, “Signals and Systems ", McGraw Hill International, 1999.
2. Simon Haykin and Barry Van Veen, “Signals and Systems ", John Wiley & Sons Inc., 1999.
3. Robert A. Gabel and Richard A. Roberts, “Signals & Linear Systems ", John Wiley, 3rd Edition, 1987.
4. Roger E. Zeimer et al, " Signals & Systems : Continuous and Discrete ", McMillan, 2nd Edition, 1990.

SEMESTER III
ELECTRIC CIRCUIT ANALYSIS AND SYNTHESIS
(COMMON FOR ECE & ETCE)

UNIT I S-DOMAIN ANALYSIS RESONANCE AND COUPLED CIRCUITS 12

S-domain network – Driving point and Transfer impedance and their properties – Transform network analysis – Poles and Zero of network functions – Time response from pole- Zero plots – Series and Parallel resonance – Quality factor and Bandwidth – Multi resonance circuits – Coupling co-efficient – Frequency response and Bandwidth – Tuned circuits.

UNIT II TRANSIENTS AND NETWORK THEOREMS 10

Transient response of RL, RC and RLC circuits to DC excitation – Natural and Forced oscillations – Thevenin's and Norton's theorems – Super position theorem – Compensation theorem – Reciprocity theorem – Maximum power transfer theorem – Millman's theorem – Tellegen's theorem.

UNIT III TWO-PORT NETWORKS 9

Characterization of two-port network in terms of z, y, h and T- Parameter – Network Equivalents – Relation between network parameters – Analysis of T, Ladder, Bridge – T and Lattice networks – Transfer function of terminated two-port networks.

UNIT IV ELEMENTS OF NETWORK SYNTHESIS 8

Realisability of one-port network – Hurwitz polynomials and properties – p.r.function and Properties – Synthesis of RL, RC and LC one port networks.

UNIT V DESIGN OF FILTERS 6

Filters and attenuators – Design of constant – k, m-derived and Composite filters – Qualitative treatment of active filters – Butterworth and Chebyshev filters.

TUTORIAL HOURS : 15 TOTAL HOURS: 60

Text book:

1. William H.Hayt and Jack E.Kemmerly, "Engineering circuit analysis", McGraw Hill International Edition, 1993.
2. Umesh sinha, "Network Analysis ", Satayaprakasan, New Delhi, 1986.

Reference Books:

1. Soni ML. & Gupta J.C., "A Course in electric circuit analysis ", Dhanpath Rai and Sons, New Delhi, 1981.
2. Chakrabati A., "Circuit Theory (Analysis and Synthesis) ", Dhanpath Rai & Sons, New Delhi, 1999.
3. M.E Van Vallkendurg., "Modern Network Synthesis ", Wiley Eastern.

SEMESTER III

ELECTROMAGNETIC FIELDS

(COMMON FOR ECE & ETCE)

1. STATIC ELECTROMAGNETIC FIELDS 9

Introduction to co-ordinate system, Gradient, Divergence, Curl, Divergence Theorem, Stroke's Theorem, Coulomb's Law, Electric field Intensity, Principle of superposition, Electric Scalar potential, Line charge distribution by Moment method, Electric flux Density, Gauss's Law and its applications, Field Computations and Problems.

2. STATIC MAGNETIC FIELD 9

Magnetic field of a current carrying element, Ampere's Force law, The Biot-Savart Law, Magnetic Flux density, Gauss law for magnetic fields, Torque on a loop, Magnetic moment, Ampere's Law and Magnetic field intensity, Magnetomotive force, Field cells and permeability, Vector potential, Field computation and problems.

3. ELECTRIC FIELD IN DIELECTRICS 9

Permittivity, Polarization, Boundary relation, Capacitance, Dielectric strength, Energy and energy density, Poisson's and Laplace equations and applications, Electric Current, Current Density, Ohms law at a point, Resistance and Conductance, Continuity relations for current problems.

4. MAGNETIC FIELD IN FERROMAGNETIC MATERIALS 9

Magnetic materials, Magnetic dipoles, Loops and Solenoids, Magnetization, Inductance, Energy in an Inductor and Energy Density, Boundary relations, Ferro magnetism, Hysteresis, Reluctance and Permeance, Problems.

5. TIME VARYING ELECTRIC & MAGNETIC FIELDS 9

Faraday's Law, Transformer and Motional Induction, Maxwell's equation from Faraday's Law, Self and Mutual inductance, Displacement current, Maxwell's equation from Ampere's Law and its in-consistency, Boundary relation, Poynting Vector, Comparison of field and circuit theory, Circuit Application of pointing Vector.

TOTAL HOURS: 45

TEXT BOOKS:

1. John D. Krauss, "Electromagnetics ", McGraw Hill, 1992.
2. David K. Chang, "Field and Wave Electromagnetics ", Second edition, Addison Wesley, New Delhi, 1999.
3. Hayt W.H., "Engineering Electromagnetics", McGraw Hill, 1995.

REFERENCES:

1. Narayana Rao N., "Basic Electromagnetics with applications ", Prentice Hall of India, 1988.
2. Harrington R.F., "Field computation by moment methods ", Macmillan, 1988.
3. Stanley V. Marshall, Richard DuBroff, Gabriel G.Skitek, "Electromagnetic Concepts and Applications", Fourth Edition, Prentice Hall International Inc., New Jersey, 1996.
4.Narayana Rao N., "Elements of Engineering Electromagnetics ", Fourth Edition, Prentice Hall of India Pvt. Ltd., New Delhi 1998.
5.David J. Griffiths, "Introduction to Electrodynamics ", Third Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 1999.

SEMESTER III

DATA STRUCTURES

(COMMON FOR CSE,CSSE,ECE, ETCE & BME)

Unit I LINEAR STRUCTURES 9

Abstract Data Types (ADT) – List ADT – array-based implementation – linked list implementation – cursor-based linked lists – doubly-linked lists – applications of lists – Stack ADT – Queue ADT – circular queue implementation – Applications of stacks and queues

Unit II TREE STRUCTURES 9

Tree ADT – tree traversals – left child right sibling data structures for general trees – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT – Threaded Binary Trees.

Unit III BALANCED TREES 9

AVL Trees – Splay Trees – B-Tree - heaps – binary heaps – applications of binary heaps

Unit IV HASHING & SET 9

Hashing – Separate chaining – open addressing – rehashing – extendible hashing - Disjoint Set ADT – dynamic equivalence problem – smart union algorithms – path compression – applications of Set

Unit V GRAPHS 9

Definitions – Topological sort – breadth-first traversal - shortest-path algorithms – minimum spanning tree – Prim's and Kruskal's algorithms – Depth-first traversal – biconnectivity – Euler circuits – applications of graphs

TOTAL HOURS: 45

TEXT BOOK

1. M. A. Weiss, “Data Structures and Algorithm Analysis in C”, Second Edition, Pearson Education, 2005.

REFERENCES

1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, “Data Structures and Algorithms”, Pearson Education, First Edition Reprint 2003.

2. R. F. Gilberg, B. A. Forouzan, “Data Structures”, Second Edition, Thomson India Edition, 2005.

SEMESTER III

ELECTRONIC DEVICES LAB

(COMMON FOR ECE, ETCE & BME)

LIST OF EXPERIMENTS:

1. Half and Full wave Rectifiers
2. Characteristics of CE Transistor
3. Characteristics of CB Transistor
4. Characteristics of CC Transistor
5. FET Characteristics.
6. UJT Characteristics.
7. Design of Zener regulator.
8. Characteristics of Photo diode & Photo transistor.
9. Study of Transient Circuits.

SEMESTER III

DATA STRUCTURES LAB

LIST OF EXPERIMENTS:

Implement the following exercises using C:

1. Exercises using Objects, Classes, Inheritance, Operator Overloading and Polymorphism.
2. Array implementation of List Abstract Data Type (ADT)
3. Linked list implementation of List ADT
4. Cursor implementation of List ADT
5. Array implementations of Stack ADT
6. Linked list implementations of Stack ADT
7. Queue ADT
8. Search Tree ADT - Binary Search Tree
9. Heap Sort
10. Quick Sort

SEMESTER IV
RANDOM PROCESSES
(COMMON FOR ECE & ETCE)

1. RANDOM VARIABLES **9**

Discrete and continuous random variables- Probability mass function – Probability density functions - moments, Moment generating functions and their properties.

2. STANDARD DISTRIBUTIONS **9**

Binomial, Poisson, Geometric, Negative binomial, Uniform, Exponential, Gamma, Weibull distributions, Functions of random variable, Chebychev inequality

3. TWO DIMENSIONAL RANDOM VARIABLES **9**

Marginal and conditional distributions, Covariance, Correlation and regression, Transformation of random variables, Central limit theorem

4. RANDOM PROCESS **9**

Classification, Stationary and Markov process, Binominal process, Poisson process, Sine-wave process, Ergodic processes

5. CORRELATION FUNCTION AND SPECTRAL DENSITIES **9**

Auto correlation for discrete and continuous process, Cross correlation functions - properties, Power spectral density, Cross spectral density – properties

TUTORIAL: 15 **TOTAL HOURS: 60**

TEXT BOOKS:

1. A.Singaravelu, S. Sivasubramanian and R. Ramaa, “Probability and Random Processes”, Revised Edition 2006, Meenakshi Agency, Chennai.

REFERENCE BOOKS

1. P.Kandasamy, K.Thilagavathy, K.Gunavathy “Probability, Random Variables and Random Processes” (First Edition 2003): S.Chand &Company Ltd., New Delhi.
2. Kapur.J.N., Saxena.H.C.”Mathematical Statistics”, S.Chand & CompanyLtd.NewDelhi (1997)

SEMESTER IV

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(COMMON FOR ECE & ETCE)

1. TRANSDUCERS **9**

Measurements, Instrumentation, Errors in measurements, Calibration and standard, Classification and characteristics of Transducers, Digital, Electrical, Electronic Weighing System, AC / DC Bridge measurement and their applications.

2. SIGNAL GENERATOR AND SIGNAL ANALYZERS **9**

A.F. Generator, Pulse Generator, AM/FM Signal generator, Function generator, Sweep frequency generator, wave analyzers, Spectrum Analyzers, Logic Analyzers, Distortion Analyzers.

3. DIGITAL INSTRUMENTS **9**

Digital Voltmeters and Multimeters, Automation in Voltmeters, Accuracy of DVM, Guarding Techniques, frequency, period, time interval and pulse width measurements, automatic vector voltmeter.

4. DATA DISPLAY AND RECORDING SYSTEM **9**

CRO, single beam, dual trace, double beam CRO, Digital storage and Analog storage Oscilloscope, sampling Oscilloscope, Power scope, Curve Tracer, Analog, Digital Recorders and Printers, Introduction to Virtual Instrumentation.

5. COMPUTER CONTROLLED TEST SYSTEM **9**

Testing and Audio amplifier, Testing a Radio Receiver, Instrument used in Computer Controlled Instrumentation, Digital Control Description, Microprocessor based measurements, Case studies in Instrumentation.

TOTAL HOURS: 45

TEXT BOOKS:

1. Rangan C.S., “Instrumentation Devices and Systems ", Tata McGraw Hill, 1998.
2. Cooper, “Electronic Instrumentation and Measurement Techniques ", Prentice Hall of India, 1988.

REFERENCES:

1. Bouwels A.J., “Digital Instrumentation ", McGraw Hill, 1986.
2. Barney C., “Intelligent Instrumentation ", Prentice Hall of India, 1985.
3. Oliver and Cage, “Electronic Measurements and Instrumentation ", McGraw Hill, 1975.
4. Deobelin, “Measurements Systems ", McGraw Hill, 1990.
5. DVS.Moorthy,“Transducer&Measurements”

SEMESTER IV

DIGITAL ELECTRONICS

(Common for ECE, ETCE, EEE, EIE, MECHAT, CSE, IT, CSSW)

1. BASIC CONCEPTS AND BOOLEAN ALGEBRA 9

Number systems - Binary, Octal, Decimal, Hexadecimal, conversion from one to another, complement arithmetic, Boolean theorems of Boolean algebra, Sum of products and product of sums, Minters and Maxterms, Karnaugh map, Tabulation and computer aided minimization procedures.

2. LOGIC GATES 9

RTL, DTL, TTL, ECL, ICL, HTL, NMOS & CMOS logic gates, Circuit diagram and analysis characteristics and specifications, tri-state gates.

3. COMBINATIONAL CIRCUITS 9

Problem formulation and design of combinational circuits, Adder / Subtractor, Encoder / decoder, Mux / Demux, Code-converters, Comparators, Implementation of combinational logic using standard ICs, ROM, EPROM, EEPROM, Basics of PLD, PAL, PLA and their use in combinational circuit design.

4. SEQUENTIAL CIRCUITS 9

Flip flops - SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis of clocked sequential circuits - their design, State minimization, state assignment, Circuit implementation, Registers-Shift registers, Ripple counters, Synchronous counters, Timing signal, RAM, Memory decoding, Semiconductor memories.

5. FUNDAMENTAL MODE SEQUENTIAL CIRCUITS 9

Stable, Unstable states, Output specifications, Cycles and Races, Race free Assignments, Hazards, Essential hazards, Pulse mode sequential circuits.

TOTAL HOURS: 45

TEXT BOOKS:

1. Morris Mano, “Digital logic and Computer Design ", Prentice-Hall of India, 1998.
2.William I. Fletcher, “An Engineering Approach to Digital Design ", Prentice-Hall of India, 1980.
3.Floyd T.L., “Digital Fundamentals ", Charles E. Merrill publishing Company, 1982.
4.Tokheim R.L., “Digital Electronics - Principles and Applications ", Tata McGraw Hill, 1999.
5.Jain R.P., “Modern Digital Electronics ", Tata McGraw Hill, 1999.

SEMESTER IV

ELECTRONIC CIRCUITS- I

(Common for ECE and ETCE)

1. BASIC STABILITY AND DEVICE STABILIZATION 9

Biasing circuits for BJT, DC and AC Load lines, Stability factor analysis, Temperature compensation methods, biasing circuits for FET's and MOSFET's.

2. SMALL SIGNAL LOW FREQUENCY ANALYSIS AND DESIGN 9

Transistor, FET and MOSFET Amplifiers, Equivalent circuit, input and output characteristics, calculation of midband gain, input and output impedance of various amplifiers, cascode amplifier, Darlington Bootstrapping, Differential amplifier, CMRR measurement, Use of current source in Emitter.

3. LARGE SIGNAL AMPLIFIERS 9

Class A, B, AB and C type of operation, efficiency of Class A amplifier with resistive and transformer coupled load, efficiency of Class B, Complementary Symmetry amplifiers, Thermal stability of Power amplifiers, heat sink design.

4. FREQUENCY RESPONSE OF AMPLIFIERS 9

High frequency equivalent circuits for BJT and FET amplifiers, Calculation of Lower and Higher cutoff frequencies, Bode plot of frequency response, relation bandwidth and rise time, HF amplifiers, Video amplifiers, Optocouplers, BJT modeling.

5. RECTIFIERS AND POWER SUPPLIES 9

Half and Full wave rectifiers, Ripple factor calculation for C, L, L-C and π section filters, Switch mode power supplies, Linear electronic voltage regulators, Power control using SCR.

TOTAL HOURS: 45

TEXT BOOKS:

1.Millman J. and Halkias C.C., “Integrated Electronics ", McGraw Hill.
2.Robert Boylestead and Louis Nashelsky, “Electronic Devices and Circuit Theory”, Pearson Education, Ninth Edition

REFERENCES:

1. David A. Bell, “Electronic Devices and Circuits ", Prentice Hall of India, 1998.
2. Donald L. Schilling Charles Beloue, “Electronic Circuits ", Third Edition, 1989.

SEMESTER IV

DIGITAL SIGNAL PROCESSING
(Common for ECE and ETCE)

1. DISCRETE FOURIER TRANSFORMS & FAST FOURIER TRANSFORMS: 9

Introduction to DFT-Efficient computation of DFT properties of DFT -FFT algorithms-Radix-2 and Radix-4 FFT algorithms-Decimation in Time- Decimation in Frequency algorithms-Use of FFT algorithms in Linear Filtering and correlation.

2. IIR FILTER DESIGN: 9

Structure of IIR-System Design time IIR filter from continuous time filter-IIR filter design by Impulse Invarience.Bilinear transformation-Approximation derivatives-Design of IIR filter in the frequency domain.

3**. FIR FILTER DESIGN: 9**

Symmetric and Antisymmetric FIR filters – Linear phase FIR filters – Windowing technique-Rectangular, Kaiser windows-Frequency sampling techniques-Structure for FIR systems.

4. FINITE WORD LENGTH EFFECTS: 9

Quantization noise – derivation for quantization noise power – Fixed point and binary floating point number representations – Comparison – Overflow error – truncation error – coefficient quantization error – limit cycle oscillations- signal scaling – analytical model of sample and hold operations-Application of DSP-Model of speech Wave form-Vocoder.

5. DIGITAL SIGNAL PROCESSORS: 9

Introduction to DSP architecture-Harvard architecture-Dedicated MAC unit-Multiple ALUs Advanced addressing modes, Pipelining, Overview of instruction set of TMS320C5X and C54X.

TOTAL HOURS: 45

TEXT BOOK:

1. John G. Proakis and Dimitris G.Manolakis, 'Digital Signal Processing Principles, Algorithms and Applications ', PHI of India Ltd., New Delhi 3rd Edition 2000.
2. B.Venkataramani&M.Bhasker, Digital Signal processor, Architecture, Programming and Application, TMH 2002.

REFERENCES:

1. Alan V Oppenheim, Ronald W Schafer and John R Buck."Discrete time signal processing", PHI/Pearson Education, 2000, second Edition.
2. Jhony R.Johnson, "Introduction to Digital Signal Processing", Prentice Hall of India/Pearson Education, 2002.
3. Sanjit K.Mitra 'Digital Signal Processing', A Computer Based Approach, Tata McGraw-Hill, New Delhi, 1998, Second Edition.

SEMESTER IV

COMMUNICATION ENGINEERING

(Common for ECE, ETCE & EIE)

1. AMPLITUDE(LINEAR) MODULATION 9

Model of a communication systems-Need for modulation in communication systems-Virtues, Limitations & modifications of amplitude modulation- AM , DSB –SC AM ,SSB SC AM , VSB AM –mathematical representation - Frequency spectrum-bandwidth , power relations - Modulators- Square law , product , switching and balanced modulators- Transistor linear modulators – AM transmitter –Master oscillator, privacy equipment , aerial coupling circuits - Comparison of linear modulation systems

2. EXPONENTIAL (NON LINEAR) MODULATION 9

Introduction –angle modulation-FM & PM-Frequency spectrum of FM-Bandwidth of FM-Bessel function-NBFM & WBFM-Comparisons of FM & PM-Generation of FM-Direct method-varactor diode modulator-FET FM modulator-FM transmitters-direct & indirect transmitters, comparison of AM & FM.

3. DETECTORS & RECEIVERS 9

Principle of AM Detectors –Square law detector -Envelope detectors- Synchronous Detectors – Coastas PLL scheme – Demodulation of FM signals - Balanced Slope detector , Foster seely discriminator , Ratio detector - Pre emphasis & De emphasis – Receivers – Classification of receivers - TRF receiver , Superhetrodyne receiver - Choice of IF , tracking , AGC , AFC- High frequency Communication Receivers – Characteristics of receivers

4. PULSE MODULATION 9

Introduction - Pulse modulation – sampling theorem – types of pulse modulation - PAM , PDM , PPM – Modulation & Demodulation circuits - Synchronization & cross talk - multiplexing – TDM , FDM & Quadrature multiplexing – Comparison of multiplexing .

5. NOISE IN COMMUNICATION SYSTEMS 9

Introduction –Internal & External noise –Noise figure , Noise temperature , Noise in cascaded system , Noise in Amplifiers – Narrow band noise - Noise in AM system with carrier , DSB SC AM , SSB SC AM , VSB AM system - Envelop detection & Synchronous detection – Noise in FM system , threshold effect - FMFB technique – Noise in PM system - Noise in pulse modulation systems.

TOTAL HOURS: 45

TEXT BOOK:

1. Digital Communications- Fundamentals and Applications - Bernard Sklar- Pearson Education - 2nd Edition

REFERENCE BOOKS:

1) Principles of Communication Engineering by Anokh Singh S.Chand &Company, 1994 edition

2) Kennedy, Davis Electronic Communication Systems, TMH

3) Simon Haykin, Communication Systems, Wiley eastern Ltd

4). R.P Singh, S.D.Spade, Communication Systems Analog &Digital, TMH

SEMESTER IV

ELECTRONIC CIRCUIT DESIGN LAB – 1

(Common for ECE and ETCE)

List of Experiments:

Designing, Simulation using PSPICE, Assembling and Testing

1. Power supplies
2. Frequency response of CE Amplifier with self bias
3. Frequency response of CB Amplifier with self bias
4. Frequency response of CC Amplifier with self bias
5. Class A Power amplifier
6. Class B Power amplifier
7. Differential amplifiers, CMRR Measurements

SEMESTER IV

DIGITAL ELECTRONICS LAB

(COMMON FOR ECE, ETCE, CSE, CSSE, IT, EIE and MECHAT)

List of Experiments:

1. Design and implementation of Adders and Subtractors using logic gates

2. Design and implementation of code converters using logic gates

    1) BCD to excess -3 codes 2) Binary to gray

3. Design and implementation of 4 bit BCD adder using IC 7483

4. Design and implementation of 2 Bit Magnitude comparator using logic gates 8 bit magnitude comparator using IC 7485

5. Design and implementation of Multiplexer and De-Multiplexer using logic gates and study of IC74150 and IC74154

6. Design and implementation of encoder and decoder using logic gates and study of IC7445 and IC74147

7. Design and implementation of 3 bit synchronous up/down counter

8. Implementation of SISO, SIPO, and PISO shift registers using flip flops

SEMESTER V

INFORMATION THEORY & CODING

(COMMON FOR ECE, ETCE & IT)

UNIT-I: SOURCE CODING **9**

Mathematical model for information source: - Mutual Information - Discrete Entropy- Definition and properties - Joint and conditional entropies - Entropy in the continuous case - Unique decipherability and instantaneous codes - Kraft inequality.

UNIT-II: NOISY CODING **9**

Discrete memory less channel - Classification of channels & channel capacity - Calculation of channel capacity - Decoding schemes - Fano"s inequality - Shannon's fundamental theorem - Capacity of a band limited Gaussian channel.

UNIT-III: **CHANNEL CODING** **9**

Channel models: Binary Symmetric channels - Information capacity theorem - Implication of the information capacity theorem - Information capacity of coloured noise channel - Rate distortion theory - Data compression.

UNIT-IV: **ERROR CONTROL CODING** **9**

Linear block codes: - Cyclic codes, BCH Codes, RS codes, Golay codes, Burst error correcting codes, Interleaved codes, Convolutional codes : Convolutional encoder, code tree, state diagram, trellis diagram - Turbo codes.

UNIT-V: **DECODING OF CODES** **9**

Maximum likelihood decoding of convolutional codes - Sequential decoding of convolutional codes- Applications of Viterbi decoding.

TOTAL HOURS: 45

TEXT BOOKS:

1.S.P.Eugene Xavier, "Statistical Theory of Communication", New Age International, Reprint 2001

2,Richard B.Wells, "Applied Coding & Information Theory for Engineers",LPE,Pearson Education,1999

REFERENCE BOOKS:

1.Simon Haykin, "Communication Systems", John Wiley & Sons, Inc, Newyork, 3rd Edition.

2.John G.Proakias, "Digital Communication", McGraw Hill, Singapore, 4th Edition,2001.

3.Hwei P Hsu, "Theory of Analog and Digital Communication", Pearson / Prentice Hall

4.Shu Lin& Daniel J. Costello, "Error control coding Fundamentals and applications", Pearson Education 2nd edition

SEMESTER V

DIGITAL COMMUNICATION
(COMMON FOR ECE & ETCE)

1. BASEBAND TRANSMISSION & DETECTION 9

Formatting analog information – Sampling theorem, aliasing. Uniform and non – uniform Quantization. Base band modulation – waveform representation of binary digits. Signals and noise – error performance degradation in communication systems – demodulation/detection. Detection of binary signals in Gaussian noise. Matched filter, maximum likelihood receiver, Inter Symbol Interference.Equalisation - channel characterization and eye pattern.

2. BANDPASS TRANSMISSION & DETECTION 9

Digital band pass modulation techniques – ASK, FSK, PSK, and QPSK. Detection of signals in Gaussian noise. Correlation receiver – coherent and non-coherent detection of PSK and FSK. Error performance for binary systems. Comparison of bit error performance of binary systems. M – ary signaling – Symbol error performance of M – ary systems – probability of symbol error for MPSK, MFSK. Effects of Inter Symbol Interference

3. SYNCHRONISATION 9

Approach and assumptions, Cost aspects, Receiver Synchronization – Frequency and phase synchronization, Symbol Synchronization – Discrete Symbol modulations, Synchronization with continuous phase modulation. Frame Synchronization, Network Synchronization - Open loop transmitter Synchronization, Closed loop transmitter Synchronization

4. SPREAD SPECTRUM TECHNIQUES 9

Attributes of spread spectrum systems, Pseudo noise sequences – randomness properties, shift register sequences, Direct sequence spread spectrum systems, Frequency hopping systems, Synchronization, Jamming considerations – broad band noise jamming, partial band noise jamming, multiple tone jamming, pulse jamming, repeat back jamming.

5. ENCRYPTION & DECRYPTION: 9

Models, goals and early cipher systems – model encryption and decryption, system goals. Secrecy of cipher systems – perfect secrecy, entropy and equivocation, ideal secrecy. Practical security – confusion and diffusion, substitution, permutation. Data encryption standard, Stream Encryption – Public key Encryption system.

TOTAL HOURS: 45

TEXT BOOKS:

1.Digital Communication- Bernard Sklar, Pearson Education Ltd, 2 / e 2001.

REFERENCE BOOKS:

1. Simon Haykin, “Digital Communication”, John Wiley and Sons, 1988.
2. John Proakis, “Digital Communication”, TMH, 4th edition
3. Taub and Schilling, “Principles of Communication Systems”, TMH Ltd,
4. R.F.Z Ziemer and W.H. Tramter, “Principles of Communication”, Jaico Publishing

SEMESTER V

CONTROL SYSTEMS

(COMMON FOR ECE, ETCE, EEE, EIE & MECHAT)

1. BASIC CONCEPTS AND SYSTEM REPRESENTATION 12

Terminology and basic structure feedback control theory- multivariable systems – dynamic models – state variable models – impulse response models and transfer function models – application to the mechanical, thermal, hydraulic, pneumatic and electromechanically systems. Block diagram representation and signal flow graphs – control systems components**.**

2. TIME RESPONSE ANALYSIS AND DESIGN 9

I and II order systems – performance specifications – feedback analysis- P, PI, PID controllers design – effect of pole, zero addition – desired closed loop pole location – root locus plot and applications – steady state and dynamic error coefficient – robust control**.**

3. FREQUENCY RESPONSE ANALYSIS AND DESIGN 9

Performance specification – correlation to time domain specifications – Bode plots and polar plots – gain and phase margin – constant M and N circles and Nichols chart – all pass and non – minimum phase systems.

4. STABILITY 9

BIBO stability – Routh – Hurwitz criterion – stability ranges for a parameters – Nyquist stability criterion – relative stability assessment using Routh and Nyquist criterion and Bode plots.

5. COMPENSATION DESIGN 6

Compensation techniques – Lag, Lead, Controllers design in frequency Domain, Concept.

TUTORIAL: 15 TOTAL HOURS: 60

TEXT BOOK

1. M.Gopal, 'Control System Principles and Design', Tata McGraw-Hill, 1998.

REFERENCE BOOKS

1. Ogatta, 'Modern Control Engineering', Tata McGraw-Hill 1997.
2. C.J.Chesmond, 'Basic Control System Technology', viva low priced student edition, 1998.
3. I.J.Nagrath and M.Gopal, 'Control System Engineering', Wiley Eastern Ltd., Reprint 1995.
4. K.Datton, W. Banaclough and S.Thompson, 'The Art of Control Engineering', Addison Wesley.
5. R.C.Dorf and R.H.Bishop, 'Modern Control Systems,' Addison Wesley, 1995.

N.E.Leonard and William Levine, 'Using MATLAB to Analyse and Design Control Systems', Addison Wesley 1995.

SEMESTER V

ELECTRONIC CIRCUITS- II

(COMMON FOR ECE & ETCE)

1. FEEDBACK AMPLIFIERS **9**

Types of feedback, Effect of feedback on noise, distortion, gain, input and output impedance of the amplifiers, Analysis of Voltage and Current feedback amplifiers.

2. OSCILLATORS **9**

Negative Resistance Oscillator, Barhausen Criterion for oscillation in feedback oscillator, Mechanism for start of oscillation and stabilization of amplitude, Analysis of RC Oscillators using Cascade connection of Low pass and High pass filters, Wein Phase shift and twin-T network, Analysis of LC Oscillators, Colpitts, Hartley, Clapp, Franklin, Armstrong and Miller Oscillator, Frequency range of RC and LC Oscillator, Frequency range of RC and LC Oscillator, Quartz Crystal Construction Electrical equivalent circuit of Crystal, Crystal Oscillator circuits, use of Logic Gates as linear amplifiers, oscillator and clock generator circuits using logic gate amplifiers.

3. TUNED AMPLIFIERS **9**

Coil losses, unloaded and loaded Q of tank circuits, Analysis of single tuned amplifier, Double tuned, stagger- tuned amplifiers, instability of tuned amplifiers, stabilization techniques, Narrow band neutralization using coil, Broad banding using Hazeltine neutralization, Class C tuned amplifiers and their applications. Efficiency of Class C tuned Amplifier.

4. MULTIVIBRATOR CIRCUITS **9**

Collector coupled and Complementary collector coupled astable multivibrators, Emitter coupled astable multivibrator, monostable and bistable multivibrator using similar and complementary transistors, triggering methods, storage delay and calculation of switching times, speed up capacitors, Schmitt trigger circuits.

5. BLOCK OSCILLATORS AND TIME BASE GENERATORS **9**

Monostable and Astable Blocking Oscillators using Emitter based timing, frequency control using core saturation, push pull operation of astable blocking oscillator i.e., inverters, pulse transformers, RC and RL wave shaping circuits, UJT sawtooth generators, Linearization using constant current circuit, Bootstrap and Miller saw tooth generators, current time base generators.

TOTAL HOURS: 45

TEXT BOOKS:

1. David A. Bell, "Solid State Pulse Circuits ", Prentice Hall of India, 1992.
2. John D. Ryder, "Electronic Fundamental and Applications - Integrated and Discrete system ", Prentice Hall of India, 1999.

REFERENCE BOOKS

1. Millman J. and Taub H., “Pulse Digital and Switching waveform ", McGraw Hill International 1992.

SEMESTER V

TRANSMISSION LINES AND WAVEGUIDES

(COMMON FOR ECE & ETCE)

UNIT – 1 FILTERS **9**

The neper - the decibel - Characteristic impedance of Symmetrical Networks – Current and voltage ratios - Propagation constant, - Properties of Symmetrical Networks – Filter fundamentals – Pass and Stop bands. Behavior of the Characteristic impedance. Constant K Filters - Low pass, High pass band, pass band elimination filters - m - derived sections – Filter circuit design – Filter performance – Crystal Filters

UNIT - 2 TRANSMISSION LINE PARAMETERS **9**

A line of cascaded T sections - Transmission lines - General Solution, Physical Significance of the equations, the infinite line, wavelength, velocity, propagation, Distortion line, the telephone cable, Reflection on a line not terminated in Zo, Reflection Coefficient, Open and short circuited lines, Insertion loss.

UNIT – 3 THE LINE AT RADIO FREQUENCY **9**

Parameters of open wire line and Coaxial cable at RF – Line constants for dissipation - voltages and currents on the dissipation less line - standing waves – nodes – standing wave ratio - input impedance of open and short circuited lines - power and impedance measurement on lines – ***f*Ü** / 4 line, Impedance matching – single and double-stub matching circle diagram, smith chart and its applications – Problem solving using Smith chart.

UNIT – 4 GUIDED WAVES BETWEEN PARALLEL PLANES **9**

Application of the restrictions to Maxwell’s equations – transmission of TM waves between Parallel plans – Transmission of TE waves between Parallel planes. Transmission of TEM waves between Parallel planes – Manner of wave travel. Velocities of the waves – characteristic impedance - Attenuators

UNIT – 5 WAVE GUIDES **9**

Application of Maxwell’s equations to the rectangular waveguide. TM waves in Rectangular guide. TE waves in Rectangular waveguide – Cylindrical waveguides. The TEM wave in coaxial lines. Excitation of wave guides. Guide termination and resonant cavities.

TUTORIAL-15 HOURS **TOTAL= 60 HOURS**

TEXT BOOKS

1.John D.Ryder, "Networks, lines and fields", Prentice Hall of India, 2nd Edition, 2006.

REFERENCE BOOKS

1. E.C.Jordan, K.G. Balmain: “E.M.Waves & Radiating Systems”, Pearson Education, 2006.
2. Joseph Edminister, Schaum’s Series,“Electromagnetics, TMH, 2007.

3. G S N Raju, Electromagnetic Field Theory and Transmission Lines, Pearson Education, 2006.
4. Ramo, Whineery and Van Duzer: “Fields and Waves in Communication Electronics”, John Wiley, 2003.

SEMESTER V

LIC & ITS APPLICATIONS
(COMMON FOR ECE, ETCE & MECHAT)

1. CIRCUIT CONFIGURATION FOR LINEAR ICS 9

Current sources, Analysis of difference amplifiers with active loads, supply and temperature independent biasing, Band gap references, Monolithic IC operational amplifiers, specifications, frequency compensation, Slew rate and methods of improving slew rate.

2. APPLICATIONS OF OPERATIONAL AMPLIFIERS 9

Linear and Nonlinear Circuits using operational amplifiers and their analysis, Inverting and Non inverting Amplifiers, Differentiator, Integrator Voltage to Current converter, Instrumentation amplifier, Sine wave Oscillators, Low pass and band pass filters, comparator, Multivibrator and Schmitt trigger, Triangle wave generator, Precision rectifier, Log and Antilog amplifiers, Non-linear function generator.

3. ANALOG MULTIPLIER AND PLL 9

Analysis of four quadrant and variable transconductance multipliers, Voltage controlled Oscillator, Closed loop analysis of PLL, AM, PM and FSK modulators and demodulators. Frequency synthesizers, Compander ICs.

4. ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTORS 9

Analog switches, High speed sample and hold circuits and sample and hold IC's, Types of D/A converter Current driven DAC, Switches for DAC, A/D converter, Flash, Single slope, Dual slope, Successive approximation, DM and ADM, Voltage to Time and Voltage to frequency converters.

5. SPECIAL FUNCTION ICS 9

Timers, Voltage regulators - linear and switched mode types, Switched capacitor filter, Frequency to Voltage converters, Tuned amplifiers, Power amplifiers and Isolation Amplifiers, Video amplifiers, Fiber optics ICs and opto couplers, Sources of Noises, Op Amp noise analysis and Low noise OP-Amps.

TOTAL HOURS : 45

TEXT BOOKS:

1. Sergio Franco, “Design with operational amplifiers and analog integrated circuits ", McGraw Hill, 1997.
2. D Roy Choudhry, Shail Jain, “Linear Integrated Circuits”, New Age International Pvt Ltd., 2000

REFERENCE BOOKS

1. Gray and Meyer, “Analysis and Design of Analog Integrated Circuits ", Wiley International, 1995.
2. Michael Jacob J., “Applications and Design with Analog Integrated Circuits ", Prentice Hall of Inida, 1996.
3. Ramakant A. Gayakwad, “OP - AMP and Linear IC's ", Prentice Hall, 1994.

4. Botkar K.R., “Integrated Circuits ", Khanna Publishers, 1996.
5. Taub and Schilling, “Digital Integrated Electronics ", McGraw Hill, 1977.
6. Caughlier and Driscoll, " Operational amplifiers and Linear Integrated circuits ", Prentice Hall, 1989.
7. Millman J. and Halkias C.C., “Integrated Electronics ", McGraw Hill, 1972.

SEMESTER V

ELECTRONIC CIRCUIT DESIGN LAB – II & INTEGRATED CIRCUITS LAB

(COMMON FOR ECE & ETCE)

LIST OF EXPERIMENTS:

(A) ELECTRONIC CIRCUIT DESIGN LAB – II

1. Feedback amplifier Using Transistor

2. Transistor Phase shift oscillator Using Transistor

3. Class A single tuned amplifier Using Transistor

4. LC Oscillators (Hartley and Colpitts Oscillators)

5. Wein bridge oscillator Using Transistors

6. Class C tuned amplifier Using Transistor

7. Schmitt Trigger Using Transistors

(B)INTEGRATED CIRCUITS LAB

Design and testing of:

1. Inverting, Non-inverting and differential Amplifiers.
2. Integrator and Differentiator
3. Instrumentation Amplifier
4. Active Low pass and Band pass filter
5. Comparators
6. Waveform Generators-Square, Saw-tooth and Triangular.
7. Multivibrators using IC555 Timer.
8. ADC/DAC using OPAMP.

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SEMESTER V

COMMUNICATION ENGINEERING LAB

(COMMON FOR ECE & ETCE)

LIST OF EXPERIMENTS:

1. Amplitude Modulation and Demodulation
2. Frequency Modulation and Demodulation
3. Pulse modulation
4. Sampling and time division multiplexing
5. Pulse code modulation
6. Line coding and Decoding- Manchester, AMI
7. Digital modulation – PSK, QPSK and FSK

SEMESTER VI

SATELLITE COMMUNICATION

(COMMON FOR ECE & ETCE)

UNIT I SATELLITE ORBITS 9

Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility –eclipse-Sub satellite point –Sun transit outage-Launching Procedures -launch vehicles and propulsion.

UNIT II SPACE SEGMENT AND SATELLITE LINK DESIGN 11

Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

UNIT III SATELLITE ACCESS 10

Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Broadcast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption

UNIT IV EARTH SEGMENT 8

Earth Station Technology-- Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.

UNIT V SATELLITE APPLICATIONS 10

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to Home Broadcast (DTH), Digital audio broadcast (DAB) - World space services, Business TV (BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet

TOTAL= 45 PERIODS

TEXT BOOKS:

1. Dennis Roddy, 'Satellite Communication', McGraw Hill International, 4th Edition, 2006.

2. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, 'Satellite Communication Systems Engineering', Prentice Hall/Pearson, 2007.

REFERENCE BOOKS

1. N.Agarwal, 'Design of Geosynchronous Space Craft, Prentice Hall, 1986.
2. Bruce R. Elbert, 'The Satellite Communication Applications' Hand Book, Artech House Bostan London, 1997.
3. Tri T. Ha, 'Digital Satellite Communication', II edition, 1990.
4. Emanuel Fthenakis, 'Manual of Satellite Communications', McGraw Hill Book Co., 1984.
5. Robert G. Winch, 'Telecommunication Transmission Systems', McGraw-Hill Book Co., 1983.
6. Brian Ackroyd, 'World Satellite Communication and earth station Design', BSP professional Books, 1990.
7. G.B.Bleazard, 'Introducing Satellite communications', NCC Publication, 1985.
8. M.Richharia, 'Satellite Communication Systems-Design Principles', Macmillan 2003

SEMESTER VI

ANTENNA AND WAVE PROPOGATION
(COMMON FOR ECE & ETCE)

UNIT I ELECTROMAGNETIC RADIATION AND ANTENNA FUNDAMENTALS 9

Review of electromagnetic theory: Vector potential, Solution of wave equation, retarded case, Hertizian dipole. Antenna characteristics: Radiation pattern, Beam solid angle, Directivity, Gain, Input impedance, Polarization, Bandwidth, Reciprocity, Equivalence of Radiation patterns, Equivalence of Impedances, Effective aperture, Vector effective length, Antenna temperature.

UNIT II WIRE ANTENNAS AND ANTENNA ARRAYS 9

Wire antennas: Short dipole, Radiation resistance and Directivity, Half wave Dipole, Monopole, Small loop antennas. Antenna Arrays: Linear Array and Pattern Multiplication, Two-element Array, Uniform Array, Polynomial representation, Array with non-uniform Excitation-Binomial Array.

UNIT III APERTURE ANTENNAS 9

Aperture Antennas: Magnetic Current and its fields, Uniqueness theorem, Field equivalence principle, Duality principle, Method of Images, Pattern properties, Slot antenna, Horn Antenna, Pyramidal Horn Antenna, Reflector Antenna-Flat reflector, Corner Reflector, Common curved reflector shapes, Lens Antenna.

UNIT IV SPECIAL ANTENNAS AND ANTENNA MEASUREMENTS 9

Special Antennas: Long wire, V and Rhombic Antenna, Yagi-Uda Antenna, Turnstile Antenna, Helical Antenna- Axial mode helix, Normal mode helix, Biconical Antenna, Log periodic Dipole Array, Spiral Antenna, Microstrip Patch Antennas. Antenna Measurements: Radiation Pattern measurement, Gain and Directivity Measurements, Anechoic Chamber measurement.

UNIT V RADIO WAVE PROPAGATION 9

Calculation of Great Circle Distance between any two points on earth, Ground Wave Propagation, Free-space Propagation, Ground Reflection, Surface waves, Diffraction, Wave propagation in complex Environments, Tropospheric Propagation, Tropospheric Scatter. Ionospheric propagation: Structure of ionosphere, Sky waves, skip distance, Virtual height, Critical frequency, MUF, Electrical properties of ionosphere, Effects of earth's magnetic fields, Faraday rotation, Whistlers.

TUTORIAL: 15 HOURS **TOTAL HOURS: 60 HOURS**

TEXTBOOKS

1. E.C.Jordan and Balmain, “Electromagnetic waves and Radiating Systems”, Pearson Education / PHI, 2006
2. A.R.Harish, M.Sachidanada, “Antennas and Wave propagation”, Oxford University Press, 2007.

REFERENCE BOOKS

1. John D.Kraus, Ronald J Marhefka and Ahmad S Khan, “Antennas for all Applications”, Tata McGraw-Hill Book Company, 3 ed, 2007.
2. G.S.N.Raju, Antenna Wave Propagation, Pearson Education, 2004.
3. Constantine A. Balanis, Antenna Theory Analysis and Design, John Wiley, 2nd Edition, 2007.
4. R.E.Collins, “Antenna and Radio wave propagation”, McGraw-Hill
5. W.L Stutzman and G.A. Thiele, “Antenna analysis and design”, John Wiley, 2000.

SEMESTER VI
MICROPROCESSORS AND MICROCONTROLLERS

(COMMON FOR ECE, ETCE, BME, EEE, EIE, CSE, CSSE, IT & MECHAT)

1. THE 8085 MICROPROCESSOR **9**

Introduction to 8085 – Microprocessor architecture – Instruction set – Programming the 8085

2.8086 SOFTWARE ASPECTS **9**

Intel 8086 microprocessor – Architecture – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines.

3.8086 SYSTEM DESIGN **9**

8086 signals and timing – MIN/MAX mode of operation – Addressing memory and I/O – Multiprocessor configurations – System design using 8086

4. I/O INTERFACING **9**

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications

5. MICROCONTROLLERS **9**

Architecture of 8051 – Signals – Operational features – Memory and I/O addressing – Interrupts – Instruction set – Applications.

TOTAL HOURS: 45

TEXT BOOKS

1. Ramesh S.Gaonkar, "Microprocessor - Architecture, Programming and Applications with the 8085", Penram International publishing private limited, fifth edition.
(UNIT-1: – Chapters 3, 5, 6 and programming examples from chapters 7-10)
2. A.K.Ray & K.M.Bhurchandi, "Advanced Microprocessors and peripherals-Architectures, Programming and Interfacing", TMH, 2002 reprint. (UNITS 2 to 5: – Chapters 1-6, 7.1-7.3, 8, 16)

REFERENCE BOOKS

1. Douglas V.Hall, "Microprocessors and Interfacing: Programming and Hardware", TMH, Third edition
2. Yu-cheng Liu, Glenn A. Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", PHI 2003
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, "The 8051 microcontroller and embedded systems", Pearson education, 2004.

SEMESTER VI
INTRODUCTION TO VLSI DESIGN

(COMMON FOR ECE, ETCE, BME,EEE, EIE & MECHAT)

1. MOS TECHNOLOGY AND CIRCUITS **9**

MOS Technology and VLSI, Process parameters and considerations for BJT, MOS and CMOS, Electrical properties of MOS circuits and Device modeling.

2. MOS CIRCUIT DESIGN PROCESS **9**

MOS Layers, Stick diagram, Layout diagram, Propagation delays, Examples of combinational logic design, Scaling of MOS circuits.

3. DIGITAL CIRCUITS AND SYSTEMS **9**

Programmable Logic Array (PLA) and Finite State Machines, Design of ALUs, Memories and Registers.

4. ANALOG VLSI AND HIGH SPEED VLSI **9**

Introduction to Analog VLSI, Clocking Strategies and types, Sub-micron technology and GaAs VLSI technology.

5. HARDWARE DESCRIPTION LANGUAGES **9**

VHDL background and basic concepts, Structural specifications of hardware design organisation and parametrisation.

TOTAL HOURS: 45

REFERENCE BOOKS

1. Douglas A. Pucknell and Kamran Eshraghian, Basic VLSI Design Systems and Circuits, Prentice Hall of India Pvt Ltd., 1993.
2. Wayne Wolf, Modern VLSI Design, 2nd Edition, Prentice Hall, 1998.
3. Randall .L.Geiger and P.E. Allen, VLSI Design Techniques for Analog and Digital Circuits, McGraw Hill International Company, 1990.
4. Navabi .Z., VHDL Analysis and Modeling of Digital Systems, McGraw Hill, 1993.
5. Mohmmed Ismail and Terri Fiez, Analog VLSI Signal and Information Processing, McGraw Hill, 1994.
6. Weste & Eshraghian, “Principles of CMOS VLSI Design”, Second Edition, Addison Wesley, 1993

SEMESTER VI

DIGITAL IMAGE PROCESSING

(COMMON FOR ECE, ETCE, BME, MECHAT, EIE, CSE, CSSE and IT)

UNIT I INTRODUCTION TO IMAGE PROCESSING SYSTEMS & IMAGE TRANSFORMS 9

Introduction, Image sampling, Quantization, Resolution, Image file formats, Elements of image processing system, Applications of Digital image processing

Introduction, Need for transform, image transforms, Fourier transform, 2 D Discrete Fourier transform, Walsh transform, Hadamard transform, Haar transform, Slant transform, Discrete cosine transform, KL transform, Singular value decomposition, Radon transform, Comparison of different image transforms

UNIT II IMAGE ENHANCEMENT 9

Introduction to image enhancement, Enhancement in spatial domain, Enhancement through point operation, Types of point operation, Histogram manipulation, Linear Gray level transformation, Nonlinear Gray level transformation, Local or neighborhood operation, Median filter, Image sharpening, Bit plane slicing, Image enhancement in the frequency domain.

UNIT III IMAGE RESTORATION 9

Introduction to Image restoration, Image degradation, Types of image blur, Classification of image restoration techniques, Image restoration model, Linear and Nonlinear image restoration techniques, Blind deconvolution

UNIT IV IMAGE SEGMENTATION 9

Introduction to image segmentation, Classification of segmentation techniques, Region approach to image segmentation, clustering techniques, Image segmentation based on thresholding, Edge based segmentation, Edge detection and linking, Hough transform, Active contour

UNIT V IMAGE COMPRESSION AND COLOUR IMAGE PROCESSING 9

Introduction, Need for image compression, Redundancy in images, Classification of redundancy in images, image compression scheme, Classification of image compression schemes, Run length coding, Shannon – Fano coding, Huffman coding, Arithmetic coding, Predictive coding, Transformed based compression, Image compression standard, Wavelet-based image compression

Introduction to Colour Image processing, Light and colour, colour formation, Human perception of colour, colour model. The chromaticity diagram, colour image

quantization, Histogram of colour image, colour image filtering, Gamma correction of a colour image, colour image segmentation

TOTAL HOURS: 45

TEXTBOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing', Pearson Education, India, 2009
2. Anil K. Jain, 'Fundamentals of Digital Image Processing', Pearson 2002.
3. S.Jayaraman, S.Esakkirajan and T.VeeraKumar, "Digital Image processing", Tata Mc Graw Hill publishers, 2009

REFERENCE BOOKS:

1. Kenneth R. Castleman, 'Digital Image Processing', Pearson, 2006.

2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, 'Digital Image Processing using MATLAB', Pearson Education, Inc., 2004.

3. D.E.Dudgeon and RM. Mersereau, 'Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.

4. William K. Pratt, 'Digital Image Processing', John Wiley, New York, 2002

5. Milan Sonka et aI, 'Image Processing, Analysis and Machine Vision', Brookes/Cole, Vikas Publishing House, 2nd edition, 1999,

6. John W.Woods, "Multidimensional Signal, Image and Video Processing and Coding", Elsevier Academic Press Publications2006, ISBN-13: 978-0-12– 088516-9

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SEMESTER VI

SIGNAL PROCESSING LAB

(COMMON FOR ECE and ETCE)

LIST OF EXPERIMENTS:

I.USING MATLAB

1. Representation of time-series; computation of convolution
2. Response of a difference equation to initial conditions; stability
3. DFT computation
4. Computational experiments with digital filtering

II.DSP PROCESSOR IMPLEMENTATION

1. Sampling & Waveform generation
2. FIR & IIR Filters Implementation
3. Fast Fourier transforms

SEMESTER VI

MICROPROCESSOR & MICROCONTROLLER LAB

(COMMON FOR ECE, ETCE, BME,MECHAT, EIE & CSE)

LIST OF EXPERIMENTS:

A. 8085 Programming

1. Study of 8085 Microprocessor.
2. 16 bit Addition, Subtraction, Multiplication and Division.
3. BCD to Hex and Hex to BCD code conversion.
4. Largest and smallest of a given set of numbers.
5. Square Root of 8-bit number.

B. 8086 Programming

1. Study of 8086 Microprocessor.
2. 32 bit Addition and Addition of 3x3 Matrices.
3. Ascending Order and Descending Order.
4. Reversal of a String.

C. 8051 Programming

1. Study of 8051.
2. 8 Bit Arithmetic Operations - Addition ,subtraction ,multiplication and division
3. Transferring a Block of data
4. 8-bit Conversion
   (i) ASCII to it's equivalent Hexa decimal and
   (ii) Hexa decimal to it's equivalent ASCII

D. Interfacing Experiments

1. Keyboard and Display Interface
2. ADC Interface
3. DAC Interface
4. Stepper Motor Interface
5. Traffic Signal Modeling

SEMESTER VII

ENVIRONMENTAL SCIENCE AND ENGINEERING

(COMMON TO ECE, ETCE, BME, EEE, EIE, CSE, CSSE, IT, MECH, MECT, AUTO, AERO, BIF & CIVIL)

UNIT – I - ENVIRONMENT AND NATURAL RESOURCES 9

Environment – Definition , scope & importance – Public awareness – Forest resources , mineral resources , water resources, food resources , energy resources (uses, over -exploitation & adverse effects in each case) – Scope & role of environmental engineers in conservation of natural resources – Sustainability development.

UNIT – II - ECOSYSTEMS AND BIO – DIVERSITY 9

Ecosystem – Definition, structure and function – Energy flow – Ecological succession – food chain, food web, ecological pyramids – Introduction, types, characteristics, structure and function of forest, grassland, desert and Aquatic ecosystems - Bio – Diversity : values and uses, hotspots, threats and conservation.

UNIT – III - ENVIRONMENTAL POLLUTION 9

Pollution – Definition , man made impacts and control measures of air, water and land pollution – Water quality standards & characterization – Importance of sanitation -Nuclear hazards – Hazardous waste management : Solid waste, waste water and biomedical waste – Prevention of pollution and role of individual – Disasters management : Floods, earthquake, cyclone and land slides – Clean technology options.

UNIT – IV - SOCIAL ISSUES AND ENVIRONMENT 9

Urban problems related to energy – Water conservation – Resettlement and rehabilitation of people – Environmental ethics – Climate change – Global warming – Acid rain – Ozone depletion- Waste land reclamation , Environment Protection Act for air, water , wild life and forests - Pollution Control Board.

UNIT – V - HUMAN POPULATION AND ENVIRONMENT 9

Population growth – Population explosion – Family welfare programme – Environment & human health – Human rights – Value education – Women and child welfare, Role of information technology in environment and human health.

Total: 45 hours

TEXT BOOK:

1. Environmental Science and Engineering by Dr. J. Meenambal, MJP Publication, Chennai

2. Gilbert M. Masters: Introduction to Environmental Engineering and Science, Pearson Education Pvt Ltd., II Edition, ISBN 81-297-0277-0, 2004

3. Miller T.G. Jr Environmental Science Wadsworth Publishing Co.

4.Townsend C. Harper J. and Michael Begon, Essentials of Ecology, Blackwell Science.

REFERENCE BOOKS

1.Wager K.D. “Environmental Management”, W.B. Saunders Co. Philadelphia, USA, 1998.

2.Bharucha Erach “The Biodiversity of India” Mapin Publishing Pvt Ltd, Ahmedabad, India

3.Trivedi R.K. “ Handbook of Environmental Laws”, Rules, Guidelines, Compliances and Standards Vol I & II, Enviro media.

SEMESTER VII

OPTICAL COMMUNICATION

(Common for ECE and ETCE)

1. INTRODUCTION TO OPTICAL FIBERS **9**

Evolution of fiber Optic system – Element of an Optical Fiber Transmission link – Ray Optics – Optical Fiber Modes and Configurations – Mode theory of Circular Wave guides – Overview of Modes – Key Modal concepts – Linearly Polarized Modes – Single Mode Fibers – Graded Index fiber structure.

2. SIGNAL DEGRADATION IN OPTICAL FIBERS **9**

Attenuation – Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides – Information Capacity determination – Group Delay – Material Dispersion, Wave guide Dispersion, Signal distortion in SM fibers – Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers – Mode Coupling – Design Optimization of SM fibers – RI profile and cut-off wavelength.

3. FIBER OPTICAL SOURCES **9**

Direct and indirect Band gap materials – LED structures – Light source materials – Quantum efficiency and LED power, Modulation of a LED, Laser Diodes – Modes and Threshold condition – Rate equations – External Quantum efficiency – Resonant frequencies – Laser Diodes structures and radiation patterns – Single Mode lasers – Modulation of Laser Diodes, Temperature effects, Introduction to Quantum laser, Fiber amplifiers.

4. **FIBER OPTICAL RECEIVERS** **9**

PIN and APD diodes – Photo detector noise, SNR, Detector Response time, Avalanche Multiplication Noise – Comparison of Photo detectors – Fundamental Receiver Operation – pre-amplifiers - Error Sources – Receiver Configuration – Probability of Error – The Quantum Limit.

5. **DIGITAL TRANMISSION SYSTEM** **9**

Point-to-Point links – System considerations – Fiber Splicing and connectors – Link Power budget – Rise-time budget – Noise Effects on System Performance – Operational Principals of WDM, Solutions.

TOTAL HOURS: 45

TEXT BOOK:

1. Gerd Keiser, “Optical Fiber Communication” McGraw-Hill International, Singapore, 3rd ed., 2000

REFERENCE BOOKS

1. J.Senior, “Optical Communication, Principles and Practice”, Prentice Hall of India, 1994.
2. J.Gower, “Optical Communication System”, Prentice Hall of India, 2001.

SEMESTER VII

MICROWAVE ENGINEERING AND WIRELESS MOBILE COMMUNICATION

(COMMON FOR ECE & ETCE)

1. MICROWAVE NETWORK THEORY 9

Introduction, Symmetrical Z and Y matrices for reciprocal network, Scattering matrix representation of multi port network properties of S-parameters, S matrix of a two port network with mismatched load, comparison between [S], [Z] and [Y] matrices. Relationship between Y, Z and ABCD parameters with S parameters, Numerical Problems.

2. MICROWAVE PASSIVE DEVICES: 6

Coaxial Connectors and Adapters, Wave guide Choke Flanges, Matched Terminations, Short Circuit Plunger, Rectangular to circular wave guide transition, Tuning screws, Wave guide Corners, Bends and Twists, Windows, Coaxial line to Wave guide Adapters, Coupling Loops and Coupling Aperture, Attenuators, Phase shifters, Wave guide Tees - E plane Tee, H plane Tee, Magic Tee and their applications, Isolators, Circulators, Directional couplers. Scattering matrix derivation for all components, Numerical Problems.

3. MICROWAVE VACCUM TUBE DEVICES & SOLID STATE DEVICES AND CIRCUITS: 12

Introduction, Two cavity Klystron Amplifier – Mechanism and mode of Operation, Power output and Efficiency, Mode Curve, Equivalent circuit and Voltage gain, Beam loading; applications, Reflex Klystron Oscillator – Mechanism and mode of Operation Power output, efficiency, mode curve, equivalent circuit, Electronic Admittance, Modulation of Reflex Klystron; Applications, TWT amplifier, Principle of Operation gain and applications; Magnetron Oscillator – Hull cut-off voltage, Mechanism of Operation, Mode separation, Phase focusing, Power output and Efficiency, Applications, Numerical Problems.

Microwave diodes – Crystal diode, Schottky diode, Harmonic Mixer; PIN diode – Operation switches, Phase switches & Attenuators – Gun diode – Mode of operation, Oscillator Circuit, IMPATT diodes – Mechanism of Operation, Application as Oscillator and Amplifiers, Tunnel diodes Oscillator amplifiers, Varactor diode – VCO, parametric amplifier, Microwave transistors – Unipolar and Bipolar, Applications, Numerical Problems.

4. MICROWAVE MEASUREMENTS: 9

Introduction, Tunable detector, Slotted line Carriage, VSWR meter, Spectrum analyzer, Network Analyzer, Power measurements – Schottky Barrier diode sensor, Bolometer sensor, power sensor, High power measurement, Insertion loss and Attenuation measurement, VSWR measurement – Low and High VSWR, Impedance measurement. Frequency measurement, Measurement of cavity Q, Dielectric measurement of a solid by Wave-guides method, Antenna Measurement – radiation pattern, Phase and gain.

5. WIRELESS MOBILE COMMUNICATION **9**

Introduction to Wireless Standards, Cellular concepts, AMPS, GSM, CDMA, Modulation techniques, Multiple Access Technologies – TDM, FDMA, 2G Concepts, Changeover to 3G, OFDM, IEEE Wireless Standards 802.11, 802.15 & 802.16, MAC, LLC, WiFi & Bluetooth.

TOTAL HOURS: 45

TEXT BOOK:

1.Annapurna Das, Sisir. K.Das, "Microwave Engineering", Tata McGraw-Hill Co., Ltd., 1999. Reprint 2001.
2.T.S. Rappaport, Wireless Communication; Principles and Practice, Prentice Hall, NJ, 1996.
3.William Stallings, "Data and Computer Communication", Fifth Edition, Prentice Hall of India, 1997.

REFERENCE BOOKS

1. Collin. R.E, "Foundation of Microwave Engineering", McGraw-Hill, II Edition, 1992.
2. Samuel.Y.Liao, "Microwave devices and Circuits", Prentice Hall of India Pvt Ltd., 1995.
3. Reich J.H.et al, "Microwave' East West Press, 1978.
4. K.C.Gupta, "Microwaves" Wiley Eastern Ltd, 1995.

SEMESTER VII

COMPUTER NETWORKS

(COMMON FOR ECE, ETCE, CSE, CSSE, IT, BME, EEE & EIE)

UNIT I PHYSICAL LAYER **9**

Data Communications – Networks - Networks models – OSI model – Layers in OSI model – TCP / IP protocol suite – Addressing – Guided and Unguided Transmission media. Switching: Circuit switched networks – Data gram Networks – Virtual circuit networks. Cable networks for Data transmission: Dialup modems – DSL – Cable TV – Cable TV for Data transfer.

UNIT II DATA LINK LAYER **10**

Data link control: Framing – Flow and error control –Protocols for Noiseless and Noisy Channels – HDLC.Multiple access: Random access – Controlled access. Wired LANS: Ethernet – IEEE standards – standard Ethernet – changes in the standard– Fast Ethernet – Gigabit Ethernet. Wireless LANS: IEEE 802.11–Bluetooth. Connecting LANS: Connecting devices - Backbone networks - Virtual LANS.Virtual circuit networks: Architecture and Layers of Frame Relay and ATM.

UNIT III NETWORK LAYER **9**

Logical addressing: IPv4, IPv6 addresses. Internet Protocol: Internetworking – IPv4, IPv6 - Address mapping – ARP, RARP,BOOTP, DHCP, ICMP, IGMP, Delivery - Forwarding - Routing – Unicast, Multicast routing protocols.

UNIT IV TRANSPORT LAYER **8**

Process-to-Process delivery - User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QoS) – Techniques to improve QoS.

UNIT V APPLICATION LAYER **9**

Domain Name System (DNS) – E-mail – FTP – WWW – HTTP – Multimedia Network Security: Cryptography – Symmetric key and Public Key algorithms - Digital signature – Management of Public keys – Communication Security – Authentication Protocols.

TOTAL 45 PERIODS

TEXT BOOKS

1. Behrouz A. Foruzan, “Data communication and Networking”, Tata McGraw-Hill, 2006: Unit I-IV
2. Andrew S. Tannenbaum, “Computer Networks”, Pearson Education, Fourth Edition, 2003: Unit V

REFERENCE BOOKS

1. Wayne Tomasi, “Introduction to Data Communication and Networking”, 1/e, Pearson Education.
2. James .F. Kurouse & W. Rouse, “Computer Networking: A Top down Approach Featuring”, 3/e, Pearson Education.
3. C.Sivaram Murthy, B.S.Manoj, “Ad hoc Wireless Networks – Architecture and Protocols”, Second Edition, Pearson Education.
4. B.Muthukumaran,’High Performance Networks”, Vijay Nicolle, First Edition, 2005
5. Greg Tomshon, Ed Tittel, David Johnson. “Guide to Networking Essentials”, fifth Edition, Thomson India Learning, 2007.
6. William Stallings, “Data and Computer Communication”, Eighth Edition, Pearson Education, 2000.

SEMESTER VII

ADVANCED COMMUNICATION ENGINEERING LAB

(COMMON FOR ECE & ETCE)

LIST OF EXPERIMENTS:

A. Experiments on Antenna:

To plot and analyse the radiation patterns of the following antennas.

1. Dipole
2. Half Wave Dipole
3. Monopole
4. Yagi Antenna

B. Design and Testing of RF Circuits:

1. RF Tuned Amplifier
2. RF Oscillator
3. IF Amplifier
5. RF Filters (LP, HP, BP, Notch Filter)

C.Microwave Experiments

1. Characteristics of Reflex Klystron Oscillator
2. Characteristics of Gunn Diode Oscillator
3. Study of Power Distribution in directional coupler, E / H Plane Tee, Magic Tee.
4. Radiation pattern of Horn Antenna.

D.Optical Communication Experiments

1. D.C. Characteristics of LED and PIN Photo Diode
2. Optical transmission using Analog Modulation
3. Time Division Multiplexing
4. PI Characteristics of LASER diode.

SEMESTER VII

NETWORKS LAB

(Common to ECE and ETCE)

List of Experiments:

1. PC to PC/peripherals communication

a. Establish RS232 communication

b. Establish Parallel port communication

2. MAC Layer LAN Protocols

Observe the behaviour & measure the throughput, compare the performance with other MAC Layer protocols.

a. CSMA/CD at MAC Layer b. Token Bus at MAC Layer

c. Token Ring at MAC Layer d. CSMA/CA at MAC Layer

3. LLC (Logical Link Control) Layer LAN Protocols

observe the behaviour & measure the throughput of reliable data transfer protocols. Compare the performance with other LLC Layer protocols.

a. Stop & Wait at LLC Layer

b. Sliding Window – Go-Back-N at LLC Layer

c. Sliding Window – Selective Repeat at LLC Layer

4. Routing Algorithm

Performance Study of Routing Algorithms through simulation

a. Distance Vector Routing b. Link State Routing

5. Introduction to Socket Communication in Linux & Windows

a. Socket programming concept in Windows & Linux platforms

b. File Transfer between PC's through sockets

6. Study of Data Encryption & Decryption techniques by using them in a File Transfer

SEMESTER VIII

ENGINEERING MANAGEMENT AND ETHICS

(COMMON FOR ECE, ETCE, BME, CSE, CSSE, IT, EEE, EIE, MECH, MECT, AUTO, AERO & CIVIL)

UNIT I PLANNING **9**

Nature and purpose of planning - Planning process - Types of plans – Objectives Managing by objective (MBO) Strategies - Types of strategies - Policies – Decision Making - Types of decision - Decision Making Process - Rational Decision Making Process - Decision Making under different conditions.

UNIT II ORGANIZING **9**

Nature and purpose of organizing - Organization structure - Formal and informal groups *I*
Organization - Line and Staff authority - Departmentation - Span of control - Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - Performance Appraisal.

UNIT III DIRECTING **9**

Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective Communication - Organization Culture - Elements and types of culture – Managing cultural diversity.

UNIT IV INTRODUCTION TO ETHICS **9**

Moral dilemmas -Uses of Ethical Theories- Engineering As Social Experimentation-Engineer's Responsibility For Safety-Codes of Ethics-Challenger Case Study

UNIT V ETHICS IN ENGINEERING **9**

Employed Engineers Rights and Duties- Collective Bargaining-Occupational Crime-Global Issues- Multinational Corporation- Technology transfer-Engineers as managers-Consulting Engineers-Expert Witness-Moral Leadership

TOTAL HOURS: 45

TEXT BOOKS:

1. Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India, 8th edition.
2. Charles W L Hill, Steven L McShane, 'Principles of Management', Mcgraw Hill Education, Special Indian Edition, 2007.
3. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York (2005).

REFERENCE BOOKS

1. Charles D Fleddermann, “Engineering Ethics”, Prentice Hall, New Mexico, (1999).
2. Harold Koontz, Heinz Weihrich and Mark V Cannice, 'Management - A global & Entrepreneurial Perspective', Tata Mcgraw Hill, 12th edition, 2007.
3. Andrew J. Dubrin, 'Essentials of Management', Thomson Southwestern, 7th edition, 2007.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, “Business Ethics – An Indian Perspective”, Biztantra, New Delhi, (2004)
5. David Ermann and Michele S Shauf, “Computers, Ethics and Society”, Oxford University Press, (2003)

SEMESTER VIII

PROJECT WORK

The objective of project work is to enable the students to work in convenient groups of not more than four members in a group, on a project involving some design and fabrication work or the oretical and experiments studies related to be respective engineering discipline.

Every project work shall have a guide who is a member of the Faculty of the University, twelve periods per week shall be allotted in the Time table for this important activity and this time shall be utilized by the student to resume directions from the Guide, on library reading, laboratory work, computer analysis, or field work as designed by the guide and also to present in periodical seminars or viva to review the progress made in the project.

Each student hall finally produce a comprehensive report covering background information, literature survey, problem statement, project work details, estimation of cost and conclusions. This final report shall be typewritten form as specified in the guidelines.

The continuous assessment and semester evaluation any be carried out as specified in the guidelines to be issued from time to time.

ELECTIVE

1. ADVANCED DIGITAL SIGNAL PROCESSING

(COMMON FOE ECE & ETCE)

UNIT I DISCRETE RANDOM PROCESS **9**

Discrete random process – Ensemble averages, Stationary and Ergodic processes, Autocorrelation and Auto covariance properties and matrices, White noise, Power Spectral Density, Spectral Factorization, Innovations Representation and Process, Filtering random processes, ARMA, AR and MA processes.

UNIT II SPECTRAL ESTIMATION **9**

Bias and Consistency, Periodogram, Modified periodogram, Blackman-Turkey method, Welch method, Parametric methods of spectral estimation, Levinson-Durbin recursion.

UNIT III LINEAR ESTIMATION AND PREDICTION **9**

Forward and Backward linear prediction, Filtering - FIR Wiener filter- Filtering and linear prediction, non-causal and causal IIR Wiener filters, Discrete Kalman filter.

UNIT IV ADAPTIVE FILTERS **9**

Principles of adaptive filter – FIR adaptive filter – Newton's Steepest descent algorithm – Derivation of first order adaptive filter – LMS adaptation algorithms – Adaptive noise cancellation, Adaptive equalizer, Adaptive echo cancellors.

UNIT V ADVANCED TRANSFORM TECHNIQUES **9**

2-D Discrete Fourier transform and properties– Applications to image smoothing and sharpening – Continuous and Discrete wavelet transforms – Multiresolution Analysis – Application to signal compression.

TOTAL= 45 PERIODS

TEXT BOOKS:

1. Monson H Hayes," Statistical Digital Signal processing and Modeling", Wiley Student Edition, John Wiley and Sons, 2004.

2. R.C. Gonzalez and R.E. Woods, "Digital Image Processing", Pearson, Second Edition, 2004.

REFERENCE BOOKS

1. John G Proakis and Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", Pearson, Fourth Edition, 2007.

2. Sophocles J. Orfanidis, Optimum Signal Processing, An Introduction, McGraw Hill, 1990.

ELECTIVE

2- ADVANCED MICROPROCESSORS
(COMMON FOE ECE, ETCE & CSE)

UNIT I 80186, 80286, 80386 AND 80486 MICROPROCESSORS 9

80186 Architecture, Enhancements of 80186 – 80286 Architecture – Real and Virtual Addressing Modes – 80386 Architecture – Special Registers – Memory Management – Memory Paging Mechanism – 80486 Architecture – Enhancements – Cache Memory Techniques – Exception Handling – Comparison of Microprocessors (8086 – 80186 – 80286 – 80386 – 80486).

UNIT II PENTIUM MICROPROCESSORS 9

Pentium Microprocessor Architecture – Special Pentium Registers – Pentium Memory Management – New Pentium Instructions – Pentium Pro Microprocessor Architecture – Special features – Pentium II Microprocessor Architecture – Pentium III Microprocessor Architecture – Pentium III Architecture – Pentium IV Architecture – Comparison of Pentium Processors.

UNIT III RISC PROCESSORS I 9

PowerPC620 – Instruction fetching – Branch Prediction – Fetching – Speculation, Instruction dispatching – dispatch stalls – Instruction Execution – Issue stalls- Execution Parallelism – Instruction completion – Basics of P6 micro architecture – Pipelining – our of- order core pipeline – Memory subsystem.

UNIT IV RISC PROCESSORS II(Superscalar Processors) 9

Intel i960 – Intel IA32- MIPS R8000 – MIPS R10000 – Motorola 88110 – Ultra SPARC processor- SPARC version 8 – SPARC version 9.

UNIT V PC HARDWARE OVERVIEW 9

Functional Units & Interconnection, New Generation Mother Boards 286 to Pentium 4 Bus Interface- ISA- EISA- VESA- PCI- PCIX. Peripheral Interfaces and Controller, Memory and I/O Port Addresses.

TOTAL HOURS: 45

TEXTBOOKS:

1. B.B.Brey The Intel Microprocessor 8086/8088 /80186/80188, 80286, 80386, 80486 PENTIUM, PENTIUM Pro, PII, PIII & IV Architectures, Programming & Interfacing, Pearson Education , 2004.

1. John Paul Shen, Mikko H.Lipasti, “Modern Processor Design”, Tata McGraw Hill, 2006.

REFERENCE BOOKS

1. Douglas V.Hall, “Microprocessors and Interfacing”, Tata McGraw Hill, II Edition 2006

2. Mohamed Rafiquzzaman, “Microprocessors and Microcomputer Based System Design”, II Edition, CRC Press, 2007.

ELECTIVE

3. EMBEDDED SYSTEMS

(COMMON FOR ECE, ETCE, CSE, IT & MECT)

1. INTRODUCTION REVIEW OF EMBEDDED HARDWARE 9

Terminology Gates - Timing Diagram - Memory - microprocessors Buses-Direct Memory Access-interrupts -Built-ins on the Microprocessor-Conventions Used on Schematic-schematic. Interrupts Microprocessor Architecture-Interrupt Basics-Shared Data Problem-Interrupt latency.

2. PIC MICROCONTROLLER AND INTERFACING 9

Introduction, CPU architecture, registers, instruction sets addressing modes Loop timing, timers, Interrupts, Interrupt timing, I/o Expansion, I 2C Bus Operation Serial EEPROM, Analog to digital converter, UART-Baud Rate-Data Handling-Initialization, Special Features - serial Programming-Parallel Slave Port.

3. EMBEDDED MICROCOMPUTER SYSTEMS 9

Motorola MC68H11 Family Architecture Registers, Addressing modes Programs. Interfacing methods parallel I/O interface, Parallel Port interfaces, Memory Interfacing, High Speed I/O Interfacing, Interrupts-interrupt service routine-features of interrupts-Interrupt vector and Priority, timing generation and measurements, Input capture, Output compare, Frequency Measurement, Serial I/o devices Rs.232, Rs.485. Analog Interfacing, and Applications.

4. SOFTWARE DEVELOPMENT AND TOOLS 9

Embedded system evolution trends. Round - Robin, robin with Interrupts, function-One-Scheduling Architecture, Algorithms. Introduction to-assembler-compiler-cross compilers and Integrated Development Environment (IDE). Object Oriented Interfacing, Recursion, Debugging strategies, Simulators.

5. REAL TIME OPERATING SYSTEMS **9**

Task and Task States, tasks and data, semaphores and shared Data Operating system Services-Message queues-Timer Function-Events-Memory Management, Interrupt Routines in an RTOS environment, basic design Using RTOS.

TOTAL HOURS: 45

TEXT BOOKS:

1. David E Simon, “An embedded software primer ", Pearson education Asia, 2001.

2. John B Peat man “Design with Microcontroller ", Pearson education Asia, 1998.

3. Jonartthan W. Valvano Brooks/cole “Embedded Micro computer Systems. Real time Interfacing ", Thomson learning 2001.

REFERENCE BOOKS:

1. Burns, Alan and Wellings, Andy, “Real-Time Systems and Programming Languages ", Second Edition. Harlow: Addison-Wesley-Longman, 1997.

2. Raymond J.A. Bhur and Donald L.Bialey, " An Introduction to real time systems: Design to networking with C/C++ ", Prentice Hall Inc. New Jersey, 1999.

3. Grehan Moore, and Cyliax, " Real time Programming: A guide to 32 Bit Embedded Development. Reading “Addison-Wesley-Longman, 1998.

4. Heath, Steve, “Embedded Systems Design ", Newnes 1997.

ELECTIVE

4- REAL TIME OPERATING SYSTEMS

(COMMON FOE ECE, ETCE & MECT)

1. REVIEW OF OPERATING SYSTEMS 9

Basic principles – system calls - files – processes – design and implementation of processes - communication between processes – operating system structures

2. DISTRIBUTED OPERATING SYSTEMS 9

Topology – network types – communication – RPC – Client server model – distributed file systems - design strategies

3. REAL TIME MODELS AND LANGUAGES 9

Event based – process based and graph based models – petrinet models – real time languages – RTOS tasks – RT scheduling – interrupt processing – synchronization control blocks – memory requirements

4. REAL TIME KERNEL 9

Principles – design issues – Polled loop systems - RTOS porting to a target – comparison and study of various RTOS like QNX – VX Works – PSOS – C Executive - case studies.

5. RTOS APPLICATION DOMAINS 9

RTOS for Image processing – Embedded RTOS for voice over IP – RTOS for fault tolerant applications – RTOS for control systems

TOTAL HOURS: 45

REFERENCE BOOKS:

1. Herma K., “Real Time systems – Design for distributed Embedded Applications”, Kluwer Academic, 1997.

2. Charles Crowley, “Operating System – A design oriented approach” McGraw-Hill, 1997.

3. R.J.A. Buhr, D.L.Bailey, “An Introduction to Real-Time Systems”, PHI, 1999.

4. C.M.Krishna, Kang G. Shin, Real Time Systems, McGraw Hill, 1997

5. Raymond J.A.Buhr, Donald L. Bailey; “An Introduction to Real Time Systems”, PHI 1999.

ELECTIVE

5- ELECTROMAGNETIC INTEREFERENCE AND COMPATIBILITY

(COMMON FOE ECE & ETCE)

UNIT I BASIC CONCEPTS **9**

Definition of EMI and EMC with examples, Classification of EMI/EMC - CE, RE, CS, RS, Units of Parameters, Sources of EMI, EMI coupling modes - CM and DM, ESD Phenomena and effects, Transient phenomena and suppression.

UNIT II EMI MEASUREMENTS **9**

Basic principles of RE, CE, RS and CS measurements, EMI measuring instruments- Antennas, LISN, Feed through capacitor, current probe, EMC analyzer and detection t6echnique open area site, shielded anechoic chamber, TEM cell.

UNIT III EMC STANDARD AND REGULATIONS **8**

National and Intentional standardizing organizations- FCC, CISPR, ANSI, DOD, IEC, CENEEC, FCC CE and RE standards, CISPR, CE and RE Standards, IEC/EN, CS standards, Frequency assignment - spectrum conversation.

UNIT IV EMI CONTROL METHODS AND FIXES **10**

Shielding, Grounding, Bonding, Filtering, EMI gasket, Isolation transformer, optosolator.

UNIT V EMC DESIGN AND INTERCONNECTION TECHNIQUES **9**

Cable routing and connection, Component selection and mounting, PCB design- Trace routing, Impedance control, decoupling, Zoning and grounding

TOTAL= 45 PERIODS

TEXT BOOKS

1. Prasad Kodali.V – Engineering Electromagnetic Compatibility – S.Chand&Co – New Delhi – 2000

2. Clayton R.Paul – Introduction to Electromagnetic compatibility – John Wiley & Sons – 1992

REFERENCE BOOKS:

1. Keiser – Principles of Electromagnetic Compatibility – Artech House – 3rd Edition – 1994

2. Don white Consultant Incorporate – Handbook of EMI / EMC – Vol I – 1985

ELECTIVE

6. MEDICAL ELECTRONICS

(COMMON FOE ECE & ETCE)

1. ELECTRO-PHYSIOLOGY AND BIOPOTENTIAL RECORDING 9

The origin of Biopotentials; biopotential electrodes; biological amplifiers; ECG, EEG, EMG, PCG, EOG, lead systems and recording methods, typical waveforms and signal characteristics.

2. BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENTS 9

pH, PO2, PCO2, PHCO3, Electrophoresis, colorimeter, photometer, Auto analyzer,

Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood cell counters.

3. ASSIST DEVICES 9

Cardiac pacemakers, DC Debrillators, Dialyser, Heart-Lung machine, Hearing aids.

4. PHYSICAL MEDICINE AND BIO-TELEMETRY 9

Diathermies – Short-wave, ultrasonic and microwave type and their applications, Medical stimulator, Telemetry principles, frequency selection, Bio-telemetry, radio-pill and tele-stimulation.

5. RECENT TRENDS IN MEDICAL INSTRUMENTATION 9

Thermograph, endoscopy unit, Laser in medicine, surgical diathermy, cryogenic application, Electrical safety.

TOTAL HOURS: 45

TEXT BOOKS:

1. John G.Webster, “Medical Instrumentation Application and Design”, John Wiley and Sons, New York, 1998.
2. Leslie Cromwell, “Biomedical instrumentation and measurement”, Prentice Hall of India New Delhi, 1997.

REFERENCEBOOKS:

1. Khandpur, R.S, “Handbook of Biomedical Instrumentation”, Tata McGraw-Hill, New Delhi, 1997.
2. Joseph J.Carr and John M.Brown, “Introduction to Biomedical equipment technology”, John Wiley and Sons, New York, 1997.

ELECTIVE

7. BIOMEDICAL SIGNAL PROCESSING

(COMMON FOE ECE & ETCE)

1. SIGNAL SYSTEM AND SPECTRUM 9

Characteristics of bio medical, bio electrical signals, impedance, acoustic signals, mechanical signals, bio magnetic signals, bio chemical signals, signal conversion, simple signal conversion systems, Conversion requirements for bio medical signals, basics of digital filtering, FIR and IIR filters.

2. TIME SERIES ANALYSIS AND SPECTRAL ESTIMATION 9

Time series analysis, linear prediction models, process order estimation, lattice representation, non-stationary process, adaptive segmentation, model based ECG simulator, Spectral estimation, Blackman tukey method, periodogram, model based estimation

UNIT III ADAPTIVE FILTERING AND WAVELET DETECTION 9

Filtering, LMS adaptive filter, adaptive noise canceling in ECG, Improved adaptive filtering in FECG, Wavelet detection in ECG, structural features, matched filtering, adaptive wavelet detection.

UNIT IV BIO SIGNAL CLASSIFICATION AND RECOGNITION 9

Signal classification and recognition, statistical signal classification, linear discriminant function, direct feature selection and ordering, Back propagation neural network based classification.

UNIT V SELECTED TOPIC IN BIO SIGNAL PROCESSING 9

Application of wavelet transform on bio signal –TFR representation, ECG data compression, ECG characterization, Application of chaos theory on Bio medical signals, software implementation of signal processing algorithms on bio medical signals

TOTAL HOURS: 45

TEXT BOOKS:

1. Willis J Tompkins, Biomedical Digital Signal Processing Prentice Hall, New Jersey, 1993.

2. Khandpur R.S, “Handbook of Biomedical Instrumentation”, Tata McGraw-Hill, New Delhi,

3. Joseph J.Carr and John M. Brown, “introduction to Biomedical equipment technology”, John Wiley and sons, New York, 1997.

REFERENCE BOOKS:

1. Samuel D.Steams Ruth A. David, Signal Processing algorithms using FORTRAN and C,Prentice Hall, New Jersey, 1994.

2. Vallaru Rao and Hayagriva Rao, C++ Neural Networks and fuzzy logic, BPS

Publica tion, New Delhi, 1996.

3. Special topics on the applications of chaos theory on Bio signal, Journal of IEEE

Engineering in Medicine and Biology Magazine, October, 1996.

4. Arnon Cohen, Bio - Medical Signal Processing Volume I and II, CRC Press Inc.,

Boca Aton, Florida.

ELECTIVE

8- VLSI SIGNAL PROCESSING

(COMMON FOE ECE & ETCE)

UNIT-I **9**

Introduction to DSP systems - Iteration Bound - Pipelined and parallel processing.

UNIT-2 **9**

Retiming - Unfolding - Algorithmic strength reduction in filters and transforms.

UNIT-3 **9**

Systolic architecture design - fast convolution - Pipelined and parallel recursive and adaptive filters.

UNIT-4 **9**

Scaling and round off noise - Digital lattice filter structures - Bit level arithmetic architecture - Redundant arithmetic.

UNIT-5 **9**

Numerical strength reduction - Synchronous, wave and asynchronous pipe lines - low power design - programmable digital signal processors.

TOTAL HOURS: 45

Text Books:

1. Keshab K.Parthi, "VLSI Digital Signal Processing systems", Design and implementation, Wiley, Inter Science, 1999.

References:

1. Mohammed Isamail and Terri Fiez, “Analog VLSI Signal and Information Processing ", Mc Graw Hill, 1994.

2. S.Y. Kung, H.J. White House, T. Kailath, "VLSI and Modern Signal Processing ", Prentice Hall, 1985.

3. Jose E. France, Yannis Tsividis, " Design of Analog - Digital VLSI Circuits for Telecommunication and Signal Processing", Prentice Hall, 1994.

9- SPEECH PROCESSING

(COMMON FOE ECE & ETCE)

UNIT I MECHANICS OF SPEECH 9

Speech production: Mechanism of speech production, Acoustic phonetics – Digital models for speech signals - Representations of speech waveform: Sampling speech signals, basics of quantization, delta modulation, and Differential PCM – Auditory perception: psycho acoustics.

UNIT II TIME DOMAIN METHODS FOR SPEECH PROCESSING 9

Time domain parameters of Speech signal – Methods for extracting the parameters Energy, Average Magnitude, Zero crossing Rate – Silence Discrimination using ZCR and energy – Short Time Auto Correlation Function – Pitch period estimation using Auto Correlation Function.

UNIT III FREQUENCY DOMAIN METHOD FOR SPEECH PROCESSING 9

Short Time Fourier analysis: Fourier transform and linear filtering interpretations, Sampling rates - Spectrographic displays - Pitch and formant extraction - Analysis by Synthesis - Analysis synthesis systems: Phase vocoder, Channel Vocoder - Homomorphic speech analysis: Cepstral analysis of Speech, Formant and Pitch Estimation, Homomorphic Vocoders.

UNIT IV LINEAR PREDICTIVE ANALYSIS OF SPEECH 9

Basic Principles of linear predictive analysis – Auto correlation method – Covariance method – Solution of LPC equations – Cholesky method – Durbin's Recursive algorithm, – Application of LPC parameters – Pitch detection using LPC parameters – Formant analysis – VELP – CELP.

UNIT V APPLICATION OF SPEECH & AUDIO SIGNAL PROCESSING 9

Algorithms: Dynamic time warping, K-means clusering and Vector quantization, Gaussian mixture modeling, hidden Markov modeling - Automatic Speech Recognition: Feature Extraction for ASR, Deterministic sequence recognition, Statistical Sequence recognition, Language models - Speaker identification and verification – Voice response system – Speech synthesis: basics of articulatory, source-filter, and concatenative synthesis – VOIP

TOTAL= 45 PERIODS

TEXT BOOK:

1. Thomas F, Quatieri, Discrete-Time Speech Signal Processing, Prentice Hall / Pearson Education, 2004.

REFERENCE BOOKS:

1. Ben Gold and Nelson Morgan, Speech and Audio Signal Processing, John Wiley and Sons Inc., Singapore, 2004
2. L.R.Rabiner and R.W.Schaffer – Digital Processing of Speech signals – Prentice Hall -1979
3. L.R. Rabiner and B. H. Juang, Fundamentals of Speech Recognition, Prentice Hall, 1993.
4. J.R. Deller, J.H.L. Hansen and J.G. Proakis, Discrete Time Processing of Speech Signals, John Wiley, IEEE Press, 1999.

ELECTIVE

10. MULTIMEDIA COMPRESSION AND COMMUNICATION

(COMMON FOE ECE & ETCE)

UNIT I MULTIMEDIA COMPONENTS **9**

Introduction - Multimedia skills - Multimedia components and their characteristics - Text, sound, images, graphics, animation, video, hardware.

UNIT II AUDIO AND VIDEO COMPRESSION **9**

Audio compression–DPCM-Adaptive PCM –adaptive predictive coding-linear Predictive coding-code excited LPC-perpetual coding Video compression –principles-H.261-H.263-MPEG 1, 2, 4.

UNIT III TEXT AND IMAGE COMPRESSION **9**

Compression principles-source encoders and destination encoders-Lossless and Lossy compression-entropy encoding –source encoding -text compression –static Huffman coding dynamic coding –arithmetic coding –Lempel Ziv-welsh Compression-image compression

UNIT IV VoIP TECHNOLOGY **9**

Basics of IP transport, VoIP challenges, H.323/ SIP –Network Architecture, Protocols, Call establishment and release, VoIP and SS7, Quality of Service- CODEC Methods-VOIP applicability

UNIT V MULTIMEDIA NETWORKING **9**

Multimedia networking -Applications-streamed stored and audio-making the best Effort service-protocols for real time interactive Applications-distributing multimedia-beyond best effort service-secluding and policing Mechanisms-integrated services-differentiated Services-RSVP.

TOTAL= 45 PERIODS

TEXT BOOKS:

1. Fred Halsall “Multimedia communication - applications, networks, protocols and standards”, Pearson education, 2007.
2. Tay Vaughan, “Multimedia: making it work”, 7/e, TMH 2007
3. Kurose and W.Ross” Computer Networking “a Top down approach, Pearson education

REFERENCE BOOKS:

1. Marcus gonzalves “Voice over IP Networks”, McGraw Hill
2. KR. Rao,Z S Bojkovic, D A Milovanovic, “Multimedia Communication Systems: Techniques, Standards, and Networks”, Pearson Education 2007
3. R. Steimnetz, K. Nahrstedt, “Multimedia Computing, Communications and Applications”, Pearson Education
4. Ranjan Parekh, “Principles of Multimedia”, TMH 2006.

ELECTIVE

11. HIGH SPEED NETWORKS

(COMMON FOE ECE, ETCE, CSE & CSSE)

UNIT I HIGH SPEED NETWORKS **9**

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL, High Speed LANs: Fast Ethernet, Gigabit Ethernet, Fiber Channel – Wireless LANs: applications, requirements – Architecture of 802.11

UNIT II CONGESTION AND TRAFFIC MANAGEMENT **8**

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III TCP AND ATM CONGESTION CONTROL **11**

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO back off – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES **8**

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services

UNIT V PROTOCOLS FOR QOS SUPPORT **9**

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

TOTAL= 45 PERIODS

TEXT BOOK:

1. William Stallings, "High Speed Networks and Interne", Pearson Education, Second Edition, 2002.

REFERENCE BOOKS:

1. Warland, Pravin Varaiya, "High performance communication networks", Second Edition, Jean Harcourt Asia Pvt. Ltd., 2001.

2. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.

3. Abhijit S. Pandya, Ercan Sea, "ATM Technology for Broad Band Telecommunication Networks", CRC Press, New York, 2004.

12- MOBILE COMMUNICATIONS

(COMMON FOR ECE, ETCE & IT)

1. INTRODUCTION TO WIRELESS MOBILE COMMUNICATIONS 9

History and evolution of mobile radio systems, Types of mobile wireless services/systems – Cellular, WLL, Paging, Satellite systems, Standard, Future trends in personal wireless systems.

2. CELLULAR CONCEPT AND SYSTEM DESIGN FUNDAMENTALS 9

Cellular concept and frequency reuse, Multiple Access Schemes, Channel assignment and handoff, Interface and system capacity, Trunking and Erlang capacity calculations.

3. MOBILE RADIO PROPAGATION 9

Radio wave propagation issues in personal wireless systems, Propagation models, Multipath fading and based and impulse models, Parameters of mobile multipath channels, Antenna systems in mobile radio.

4. MODULATION AND SIGNAL PROCESSING 9

Analog and digital modulation techniques, Performance of various modulation techniques – Spectral efficiency, Error rate, Power Amplification, Equalization/Rake receiver concepts, Diversity and Space-time processing, Speech coding and channel coding.

5. SYSTEM EXAMPLES AND DESIGN ISSUES 9

Multiple Access Techniques – FDMA, TDMA and CDMA systems, Operational systems, Wireless networking, design issues in personal wireless systems.

TOTAL HOURS: 45

TEXT BOOK:

1.K. Feher, Wireless Digital Communication, Prentice Hall of India, New Delhi, 1995.

REFERENCE BOOKS:

1. T.S. Rappaport, Wireless Communication; Principles and Practice, Prentice Hall, NJ, 1996.
2. W.C.Y. Lee, Mobile Communication Engineering; Theory and Application, Second Edition, McGraw-Hill International, 1998.

ELECTIVE

13. RADAR AND NAVIGATIONAL AIDS

(COMMON FOE ECE & ETCE)

UNIT I Introduction to Radar 9

Basic Radar –The simple form of the Radar Equation- Radar Block Diagram- Radar Frequencies –Applications of Radar – The Origins of Radar

The Radar Equation

Introduction- Detection of Signals in Noise- Receiver Noise and the Signal-to-Noise Ratio-Probability Density Functions- Probabilities of Detection and False Alarm- Integration of Radar Pulses- Radar Cross Section of Targets- Radar cross Section Fluctuations- Transmitter Power-Pulse Repetition Frequency- Antenna Parameters- System losses – Other Radar Equation Considerations

UNIT II MTI and Pulse Doppler Radar 9

Introduction to Doppler and MTI Radar- Delay –Line Cancellers- Staggered Pulse Repetition Frequencies –Doppler Filter Banks - Digital MTI Processing - Moving Target Detector - Limitations to MTI Performance - MTI from a Moving Platform (AMIT)- Pulse Doppler Radar – Other Doppler Radar Topics- Tracking with Radar –Monopulse Tracking –Conical Scan and Sequential Lobing - Limitations to Tracking Accuracy - Low-Angle Tracking - Tracking in Range - Other Tracking Radar Topics -Comparison of Trackers - Automatic Tracking with Surveillance Radars (ADT).

UNIT III Detection of Signals in Noise 9

Introduction – Matched –Filter Receiver –Detection Criteria – Detectors –-Automatic Detector - Integrators - Constant-False-Alarm Rate Receivers - The Radar operator- Signal Management - Propagation Radar Waves - Atmospheric Refraction -Standard propagation - Nonstandard Propagation - The Radar Antenna - Reflector Antennas - Electronically Steered Phased Array Antennas – Phase Shifters - Frequency-Scan Arrays

Radar Transmitters- Introduction –Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers - Other RF Power Sources – Other aspects of Radar Transmitter.

Radar Receivers - The Radar Receiver - Receiver noise Figure – Superheterodyne Receiver - Duplexers and Receiver Protectors- Radar Displays.

UNIT IV 9

Introduction - Introduction - Four methods of Navigation.

Radio Direction Finding - The Loop Antenna - Loop Input Circuits - An Aural Null Direction Finder - The Goniometer - Errors in Direction Finding - Adcock Direction Finders - Direction Finding at Very High Frequencies - Automatic Direction Finders – The Commutated Aerial Direction Finder - Range and Accuracy of Direction Finders

Radio Ranges - The LF/MF Four course Radio Range - VHF Omni Directional Range (VOR) - VOR Receiving Equipment - Range and Accuracy of VOR – Recent Developments.

Hyperbolic Systems of Navigation (Loran and Decca) - Loran-A - Loran-A Equipment - Range and precision of Standard Loran - Loran-C - The Decca Navigation System - Decca Receivers - Range and Accuracy of Decca - The Omega System

UNIT V **9**

DME and TACAN - Distance Measuring Equipment - Operation of DME - TACAN - TACAN Equipment

Aids to Approach and Landing - Instrument Landing System - Ground Controlled Approach System - Microwave Landing System (MLS)

Doppler Navigation - The Doppler Effect - Beam Configurations -Doppler Frequency Equations - Track Stabilization - Doppler Spectrum - Components of the Doppler Navigation System - Doppler range Equation - Accuracy of Doppler Navigation Systems.

Inertial Navigation - Principles of Operation - Navigation over the Earth - Components of an Inertial Navigation System - Earth Coordinate Mechanization - Strapped-Down Systems - Accuracy of Inertial Navigation Systems.

Satellite Navigation System - The Transit System - Navstar Global Positioning System (GPS)

TOTAL= 45 PERIODS

TEXTBOOKS:

1. Merrill I. Skolnik ," Introduction to Radar Systems", Tata McGraw-Hill (3rd Edition) 2003.
2. N.S.Nagaraja, Elements of Electronic Navigation Systems, 2nd Edition, TMH, 2000.

REFERENCE BOOKS:

1. Peyton Z. Peebles:, "Radar Principles", John Wiley, 2004
2. J.C Toomay, “Principles of Radar", 2nd Edition –PHI, 2004

ELECTIVE

14- INTEGRATED SERVICES DIGITAL NETWORK

(COMMON FOE ECE & ETCE)

1. ISDN – STANDARDS AND SERVICES: 9

Review of switching technologies and OSI protocol architecture, ISDN channels, access interfaces, functional devices and standards, ISDN bearer services and teleservice attribute, Broadband services.

2. ISDN PROTOCOL ARCHITECTURE AND SIGNALING: 9

Physical layer protocol, D-channel data link layer and layer 3 protocols, Network signaling systems, SS7 protocol overview and services, ISDN products, Switches, Multiplexers, Terminal adapters, ISDN chip sets.

3. BROAD BAND ISDN: 9

Frame Relay – concepts, protocols, applications and products, asynchronous transfer mode – concepts, protocols, application and products, switched multi megabit data service, Internet protocol over ISDN frame relay and ATM.

4. NETWORK TRAFFIC MANAGEMENT: 9

ATM traffic and congestion control, Traffic management framework, control mechanism and attributes, ABR traffic management

5. NETWORK PERFORMANCE MODELING AND ESTIMATION: 9

Queuing analysis, single server and multi server queues, Networks of Queues, Estimating model parameters, Self-similar traffic – performance implication, modeling and estimation

TOTAL = 45

TEXT BOOKS:

1. Gary C. Kesslar and Peter Southwick, "ISDN – concepts, facilities and services", McGraw Hill, 3rd Edition, 1997.
2. William Stallings, "High Speed Networks-TCP/IP and ATM Design Principles", Prentice Hall Inc., 1998.

REFERENCE BOOKS:

1. Balaji Kumar, "Broad Band Communications" McGraw-Hill, 1995.

ELECTIVE

15- OPTICAL NETWORKS

(COMMON FOE ECE & ETCE)

UNIT I OPTICAL SYSTEM COMPONENTS 9

Light propagation in optical fibers – Loss & bandwidth, System limitations, Non-Linear effects; Solitons; Optical Network Components – Couplers, Isolators & Circulators, Multiplexers & Filters, Optical Amplifiers, Switches, Wavelength Converters.

UNIT II OPTICAL NETWORK ARCHITECTURES 9

Introduction to Optical Networks; SONET / SDH, Metropoliton-Area Networks, Layered Architecture ; Broadcast and Select Networks – Topologies for Broadcast Networks, Media-Access Control Protocols, Test beds for Broadcast & Select WDM; Wavelength Routing Architecture.

UNIT III WAVELENGTH ROUTING NETWORKS 9

The optical layer, Node Designs, Optical layer cost tradeoff, Routing and wavelength assignment, Virtual topology design, Wavelength Routing Test beds, Architectural variations.

UNIT IV PACKET SWITCHING AND ACCESS NETWORKS 9

Photonic Packet Switching – OTDM, Multiplexing and Demultiplexing, Synchronisation, Broadcast OTDM networks, Switch-based networks; Access Networks – Network Architecture overview, Future Access Networks, Optical Access Network Architectures; and OTDM networks.

UNIT V NETWORK DESIGN AND MANAGEMENT 9

Transmission System Engineering – System model, Power penalty - transmitter, receiver, Optical amplifiers, crosstalk, dispersion; Wavelength stabilization ; Overall design considerations; Control and Management – Network management functions, Configuration management, Performance management, Fault management, Optical safety, Service interface.

TOTAL HOURS: 45

TEXT BOOK:

1. Rajiv Ramaswami and Kumar N. Sivarajan, “Optical Networks: A Practical Perspective”, Harcourt Asia Pvt. Ltd., Second Edition 2004.

REFERENCE BOOKS:

1. C. Siva Ram Moorthy and Mohan Gurusamy, “WDM Optical Networks: Concept, Design and Algorithms”, Prentice Hall of India, First Edition, 2002.
2. P.E. Green, Jr., “Fiber Optic Networks”, Prentice Hall, NJ, 1993.
3. D.W.Smith, Ed., “Optical Network Technology”, Chapman and Hall, London, 1995.

ELECTIVE

16- CRYPTOGRAPHY & NETWORK SECURITY

(COMMON FOE ECE, ETCE, CSE & IT)

UNIT I **9**

Security trends – Attacks and services – Classical crypto systems – Different types of ciphers – LFSR sequences – Basic Number theory – Congruences – Chinese Remainder theorem – Modular exponentiation – Fermat and Euler's theorem – Legendre and Jacobi symbols – Finite fields – continued fractions

UNIT II **9**

Simple DES – Differential cryptanalysis – DES – Modes of operation – Triple DES – AES – RC4 – RSA – Attacks – Primality test – factoring.

UNIT III **9**

Discrete Logarithms – Computing discrete logs – Diffie-Hellman key exchange – ElGamal Public key cryptosystems – Hash functions – Secure Hash – Birthday attacks -MD5 – Digital signatures – RSA – ElGamal – DSA.

UNIT IV **9**

Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP,S/MIME – IP security – Web Security – SSL, TLS, SET.

UNIT V **9**

System security – Intruders – Malicious software – viruses – Firewalls – Security Standards.

TOTAL HOURS: 45

TEXT BOOKS:

1. Wade Trappe, Lawrence C Washington, “Introduction to Cryptography with coding theory”, 2nd ed, Pearson, 2007.
2. William Stallings, “Cryptography and Network security Principles and Practices”, Pearson/PHI, 4th ed, 2006.

REFERENCE BOOKS:

1. W. Mao, “Modern Cryptography – Theory and Practice”, Pearson Education, Second Edition, 2007.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing Third Edition – Prentice Hall of India, 2006

ELECTIVE

17- VIRTUAL INSTRUMENTATION

(COMMON FOR ECE, ETCE, EIE & MECHAT)

UNIT I - REVIEW OF DIGITAL INSTRUMENTATION 6

Representation of analog signals in the digital domain – Review of quantization in amplitude and time axes, sample and hold, sampling theorem, ADC and DAC.

UNIT II FUNDAMENTALS OF VIRTUAL INSTRUMENTATION 10

Concept of virtual instrumentation – PC based data acquisition – Typical on board DAQ card – Resolution and sampling frequency - Multiplexing of analog inputs – Single-ended and differential inputs – Different strategies for sampling of multi-channel analog inputs. Concept of universal DAQ card - Use of timer-counter and analog outputs on the universal DAQ card.

UNIT III CLUSTER OF INSTRUMENTS IN VI SYSTEM 10

Interfacing of external instruments to a PC – RS232, RS 422, RS 485 and USB standards - IEEE 488 standard – ISO-OSI model for serial bus – Introduction to bus protocols of MOD bus and CAN bus.

UNIT IV APHICAL PROGRAMMING ENVIRONMENT IN VI 10

Concepts of graphical programming – Lab-view software – Concept of VIs and sub VI - Display types – Digital – Analog – Chart – Oscilloscopic types – Loops – Case and sequence structures - Types of data – Arrays – Formulae nodes –Local and global variables – String and file I/O.

UNIT V ANALYSIS TOOLS AND SIMPLE APPLICATIONS IN VI 9

Fourier transform - Power spectrum - Correlation – Windowing and filtering tools – Simple temperature indicator – ON/OFF controller – P-I-D controller - CRO emulation - Simulation of a simple second order system – Generation of HTML page.

TOTAL HOURS: 45

TEXT BOOKS:

1. S. Gupta and J.P Gupta, 'PC Interfacing for Data Acquisition and Process Control', Instrument society of America, 1994.
2. Peter W. Gofton, 'Understanding Serial Communications', Sybex International.
3. Robert H. Bishop, 'Learning with Lab-view', Prentice Hall, 2003.

REFERENCE BOOKS:

1. Kevin James, 'PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control', Newness, 2000.
2. Gary W. Johnson, Richard Jennings, 'Lab-view Graphical Programming', McGraw Hill Professional Publishing, 2001.

ELECTIVE

18 - COMPUTER ARCHITECTURE

(COMMON FOE ECE, ETCE, CSE, CSSE, IT, EEE & EIE)

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.

UNIT II ARITHMETIC UNIT 9

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

UNIT III BASIC PROCESSING UNIT 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

UNIT IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.

UNIT V I/O ORGANIZATION 9

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

TOTAL HOURS : 45

TEXT BOOKS:

1.Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition "Computer Organization", McGraw-Hill, 2002.

REFERENCE BOOKS:

1.William Stallings, "Computer Organization and Architecture – Designing for Performance", 6th Edition, Pearson Education, 2003.
2.David A.Patterson and John L.Hennessy, "Computer Organization and Design: The hardware / software interface", 2nd Edition, Morgan Kaufmann, 2002.
3.John P.Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw-Hill, 1998.

ELECTIVE

19- ROBOTICS

(COMMON FOR ECE, ETCE, CSE & BME)

1. ROBOT ORGANIZATION **9**

Coordinate transformation, kinematics and inverse kinematics. Trajectory planning and remote manipulation.

2. ROBOT HARDWARE **9**

Robot sensors. Proximity sensors. Range sensors. Visual sensors. Auditory sensors. Robot manipulators. Manipulator dynamics. Manipulator control. Wrists. End efforts. Robot grippers.

3. ROBOT AND ARTIFICIAL INTELLIGENCE **9**

Principles of AI. Basics of learning. Planning movement. Basics of knowledge representations, Robot programming languages.

4. ROBOTIC VISION SYSTEMS **9**

Principles of edge detection. Determining optical flow and shape. Image segmentation. Pattern recognition. Model directed scene analysis.

5. ROBOT CONTROL AND APPLICATION **9**

Robot control using voice and infrared. Overview of robot applications. Prosthetic devices. Robots in material handling, processing assembly and storage.

TOTAL HOURS: 45

REFERENCE BOOKS:

1. Koren,: "Robotics for Engineers", McGraw Hill International Company, Tokyo, 1995.
2. Vokopravotic, "Introduction to Robotics", Springer, 1988.
3. Rathmill K., "Robot Technology and Application", Springer, 1985.
4. Charniak and McDarmott, "Introduction to Artificial Intelligence", McGraw Hill, 1986.
5. K.S. Fu, R.C. Gonzally, C.S.G. Lee, "Robotics Control, Sensing, Vision and Intelligence", McGraw Hill Book Company, 1997.
6. Barry Leatham, Jones, "Elements of Industrial Robotics", Pittman Publishing, 1987.
7. Mikell P. Groover, Mitchell Weiss, Roger. N, Nagel, Nicholas G. Odrey, "Industrial Robotic Technology Programming and Applications", McGraw Hill Book Company, 1986
8. Bernard Hodges and Paul Hallam, “Industrial Robotics ", British Library Cataloguing Publication, 1990.

ELECTIVE

20- GRID COMPUTING

(COMMON FOR ECE, ETCE, CSE, CSSE & IT)

UNIT I CONCEPTS AND ARCHITECTURE 9

Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing- Anatomy and Physiology of Grid-Review of Web Services-OGSA-WSRF.

UNIT II GRID MONITORING 9

Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems-GridI CE - JAMM -MDS-Network Weather Service-R-GMA-Other Monitoring Systems- Ganglia and GridMon

UNIT III GRID SECURITY AND RESOURCE MANAGEMENT 9

Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

UNIT IV DATA MANAGEMENT AND GRID PORTALS 9

Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals.

UNIT V GRID MIDDLEWARE 9

List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and GLite - Architecture, Components and Features.

TOTAL HOURS: 45

TEXT BOOK

1. Maozhen Li, Mark Baker, 'The Grid Core Technologies', John Wiley & Sons, 2005.

REFERENCE BOOKS:

1. Ian Foster & Carl Kesselman, "The Grid 2 - Blueprint for a New Computing Infrascture", Morgan Kaufman - 2004.
2. Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson Education 2004.
3. Fran Berman, Geoffrey Fox, Anthony J.G.Hey, "Grid Computing: Making the Global Infrastructure a reality", John Wiley and sons, 2003.

ELECTIVE

21- TELEVISION & VIDEO ENGINEERING

(COMMON FOR ECE & ETCE)

UNIT I FUNDAMENTALS OF TELEVISION 9

Aspect ratio-Image continuity-Number of scanning lines-Interlaced scanning-Picture resolution-Camera tubes-Image Orthicon-Vidicon- Plumbicon- Silicon Diode Array Vidicon- Solid-state Image scanners- Monochrome picture tubes- Composite video signal- video signal dimension-horizontal sync. Composition-vertical sync. Details-functions of vertical pulse train- Scanning sequence details. Picture signal transmission-positive and negative modulation- VSB transmission- Sound signal transmission-Standard channel bandwidth.

UNIT II MONOCHROME TELEVISION TRANSMITTER AND RECEIVER 9

TV transmitter-TV signal Propagation- Interference- TV Transmission Antennas-Monochrome TV receiver- RF tuner- UHF, VHF tuner-Digital tuning techniques-AFT-IF subsystems-AGC Noise cancellation-Video and Sound inter-carrier detection-Vision IF subsystem- DC re-insertion-Video amplifier circuits-Sync operation- typical sync processing circuits-Deflection current waveforms, Deflection oscillators- Frame deflection circuits- requirements- Line deflection circuits-EHT generation-Receiver antennas.

UNIT III ESSENTIALS OF COLOUR TELEVISION 9

Compatibility- Colour perception-Three colour theory- Luminance, Hue and saturation-Colour television cameras-Values of luminance and colour difference signals-Colour television display tubes-Delta-gun Precision-in-line and Trinitron colour picture tubes-Purity and convergence- Purity and static and Dynamic convergence adjustments-Pincushion-correction techniques-Automatic degaussing circuit- Gray scale racking colour signal transmission- Bandwidth-Modulation of colour difference signals-Weighting factors-Formation of chrominance signal.

UNIT IV COLOUR TELEVISION SYSTEMS 9

NTSC colour TV systems-SECAM system- PAL colour TV systems- Cancellation of phase errors-PAL-D Colour system-PAL coder-PAL-Decoder receiver-Chromo signal amplifier-separation of U and V signals-colour burst separation-Burst phase Discriminator-ACC amplifier-Reference Oscillator-Ident and colour killer circuits-U and V demodulators- Colour signal matrixing. Sound in TV

UNIT V ADVANCED TELEVISION SYSTEMS 9

Satellite TV technology-Geo Stationary Satellites-Satellite Electronics-Domestic Broadcast System-Cable TV-Cable Signal Sources-Cable Signal Processing, Distribution & Scrambling- Video Recording-VCR Electronics-Video Home Formats- Video Disc recording and playback-DVD Players-Tele Text Signal coding and broadcast receiver-Digital television-Transmission and reception –Projection television-Flat panel display TV receivers-LCD and Plasma screen receivers-3DTV-EDTV.

TOTAL HOURS: 45

TEXTBOOKS

1. R.R.Gulati, “Monochrome Television Practice, Principles, Technology and servicing.” Third Edition 2006, New Age International (P) Publishers.
2. R.R.Gulati, Monochrome & Color Television, New Age International Publisher, 2003.

REFERENCE BOOKS

1. A.M Dhake, “Television and Video Engineering”, 2nd ed., TMH, 2003.
2. R.P.Bali, Color Television, Theory and Practice, Tata McGraw-Hill, 1994

ELECTIVE

22- WIRELESS SENSOR NETWORKS

(COMMON FOR ECE & ETCE)

UNIT I OVERVIEW OF WIRELESS SENSOR NETWORKS 8

Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks.

UNIT II ARCHITECTURES 9

Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

UNIT III NETWORKING SENSORS 10

Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.

UNIT IV INFRASTRUCTURE ESTABLISHMENT 9

Topology Control , Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT V SENSOR NETWORK PLATFORMS AND TOOLS 9

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.

TOTAL HOURS: 45

TEXT BOOKS:

1. Holger Karl & Andreas Willig, “Protocols and Architectures for Wireless Sensor Networks" , John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

REFERENCE BOOKS:

1. Kazem Sohraby, Daniel Minol & Taieb Znati, “Wireless Sensor Networks- Technology, Protocols and Applications”, John Wiley, 2007.
2. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.

ELECTIVE

23-REMOTE SENSING

(COMMON FOR ECE & ETCE)

UNIT I REMOTE SENSING 9

Definition – Components of Remote Sensing – Energy, Sensor, Interacting Body - Active and Passive Remote Sensing – Platforms – Aerial and Space Platforms – Balloons, Helicopters, Aircraft and Satellites – Synoptivity and Repetivity – Electro Magnetic Radiation (EMR) – EMR spectrum – Visible, Infra Red (IR), Near IR, Middle IR, Thermal IR and Microwave – Black Body Radiation - Planck's law – Stefan-Boltzman law.

UNIT II EMR INTERACTION WITH ATMOSPHERE AND EARTH MATERIALS 9

Atmospheric characteristics – Scattering of EMR – Raleigh, Mie, Non-selective and Raman Scattering – EMR Interaction with Water vapour and ozone – Atmospheric Windows – Significance of Atmospheric windows – EMR interaction with Earth Surface Materials – Radiance, Irradiance, Incident, Reflected, Absorbed and Transmitted Energy – Reflectance – Specular and Diffuse Reflection Surfaces- Spectral Signature – Spectral Signature curves – EMR interaction with water, soil and Earth Surface: Imaging spectrometry and spectral characteristics.

UNIT III OPTICAL AND MICROWAVE REMOTE SENSING 9

Satellites - Classification – Based on Orbits and Purpose – Satellite Sensors – Resolution –Description of Multi Spectral Scanning – Along and Across Track Scanners– Description of Sensors in Landsat, SPOT, IRS series – Current Satellites - Radar– Speckle - Back Scattering – Side Looking Airborne Radar – Synthetic Aperture Radar – Radiometer – Geometrical characteristics; Sonar remote sensing systems.

UNIT IV GEOGRAPHIC INFORMATION SYSTEM 9

GIS – Components of GIS – Hardware, Software and Organisational Context – Data – Spatial and Non-Spatial – Maps – Types of Maps – Projection – Types of Projection - Data Input – Digitizer, Scanner – Editing – Raster and Vector data structures – Comparison of Raster and Vector data structure – Analysis using Raster and Vector data – Retrieval, Reclassification, Overlaying, Buffering – Data Output – Printers and Plotters

UNIT V MISCELLANEOUS TOPICS 9

Visual Interpretation of Satellite Images – Elements of Interpretation – Interpretation Keys Characteristics of Digital Satellite Image – Image enhancement – Filtering – Classification - Integration of GIS and Remote Sensing – Application of Remote Sensing

and GIS – Urban Applications- Integration of GIS and Remote Sensing – Application of Remote Sensing and GIS – Water resources – Urban Analysis – Watershed Management – Resources Information Systems. Global positioning system – an introduction.

TOTAL HOURS: 45

TEXT BOOKS

1. M.G. Srinivas (Edited by), Remote Sensing Applications, Narosa Publishing House, 2001. (Units 1 & 2).
2. Anji Reddy, Remote Sensing and Geographical Information Systems, BS Publications 2001 (Units 3, 4 & 5).

REFERENCE BOOKS

1. Jensen, J.R., Remote sensing of the environment, Prentice Hall, 2000.
2. Kang-Tsung Chang,"Introduction to Geographic Information Systems", TMH, 2002
3. Lillesand T.M. and Kiefer R.W., "Remote Sensing and Image Interpretation", John Wiley and Sons, Inc, New York, 1987.
4. Burrough P A, "Principle of GIS for land resource assessment", Oxford
5. Mischael Hord, "Remote Sensing Methods and Applications", John Wiley & Sons, New York, 1986.
6. Singal, "Remote Sensing", Tata McGraw-Hill, New Delhi, 1990.
7. Floyd F. Sabins, Remote sensing, "Principles and interpretation", W H Freeman and Company 1996.

ELECTIVE

24-NANO ELECTRONICS

(COMMON FOR ECE, ETCE & BME)

UNIT I INTRODUCTION TO NANOTECHNOLOGY 9

Background to nanotechnology: Types of nanotechnology and nanomachines – periodic table – atomic structure – molecules and phases – energy – molecular and atomic size – surface and dimensional space – top down and bottom up; Molecular Nanotechnology:

Electron microscope – scanning electron microscope – atomic force microscope – scanning tunnelling microscope – nanomanipulator – nanotweezers – atom manipulation – nanodots – self assembly – dip pen nanolithography. Nanomaterials: preparation– plasma arcing – chemical vapor deposition – sol-gels – electrodeposition – ball milling – applications of nanomaterials;

UNIT II FUNDAMENTALS OF NANOELECTRONICS 9

Fundamentals of logic devices:- Requirements – dynamic properties – threshold gates; physical limits to computations; concepts of logic devices:- classifications – two terminal devices – field effect devices – coulomb blockade devices – spintronics – quantum cellular automata – quantum computing – DNA computer; performance of information processing systems;- basic binary operations, measure of performance processing capability of biological neurons – performance estimation for the human brain. Ultimate computation:- power dissipation limit – dissipation in reversible computation – the ultimate computer.

UNIT III SILICON MOSFETs & QUANTUM TRANSPORT DEVICES 9

Silicon MOSFETS - Novel materials and alternate concepts:- fundamentals of MOSFET Devices- scaling rules – silicon-dioxide based gate dielectrics – metal gates – junctions & contacts – advanced MOSFET concepts. Quantum transport devices based on resonant tunneling:- Electron tunneling – resonant tunneling diodes – resonant tunneling devices; Single electron devices for logic applications:- Single electron devices – applications of single electron devices to logic circuits.

UNIT IV CARBON NANOTUBES 9

Carbon Nanotube: Fullerenes - types of nanotubes – formation of nanotubes – assemblies – purification of carbon nanotubes – electronic propertics – synthesis of carbon nanotubes – carbon nanotube interconnects – carbon nanotube FETs – Nanotube for memory applications – prospects of all carbon nanotube nanoelectronics.

UNIT V MOLECULAR ELECTRONICS 9

Electrodes & contacts – functions – molecular electronic devices – first test systems – simulation and circuit design – fabrication; Future applications: MEMS – robots – random access memory – mass storage devices.

TOTAL HOURS: 45

TEXTBOOKS

1. Michael Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons and Burkhard Raguse, Nanotechnology: Basic Science and Emerging Technologies, Chapman & Hall / CRC, 2002

2. T.Pradeep, NANO:“The Essentials–Understanding Nanoscience and Nanotechnology”, TMH, 2007

3. Rainer Waser (Ed.), Nanoelectronics and Information Technology: Advanced Electronic Materials and Novel Devices, Wiley-VCH, 2003

ELECTIVE

25-AVIONICS

(COMMON FOR ECE & ETCE)

UNIT I INTRODUCTION 9

Introduction to aircraft – Axes system – Parts, importance and role of Avionics – systems which interface directly with pilot – Aircraft state sensor systems – Navigation systems –

External world sensor systems – task automation systems. Avionics architecture evolution. Avionics Data buses - MIL STD 1553, ARINC 429, ARINC 629.

UNIT II RADIO NAVIGATION 9

Types of Radio Navigation – ADF, DME, VOR, LORAN, DECCA, OMEGA. ILS, MLS

UNIT III INERTIAL AND SATELLITE NAVIGATION SYSTEMS 9

Inertial sensors – Gyroscopes, Accelerometers, Inertial navigation systems – Block diagram, Platform and strap down INS. Satellite Navigation – GPS

UNIT IV AIR DATA SYSTEMS AND AUTOPILOT 9

Air data quantities – Altitude, Airspeed, Mach no., Vertical speed, Total Air temperature, Stall warning, Altitude warning. Autopilot – basic principles – longitudinal and lateral autopilot.

UNIT V AIRCRAFT DISPLAYS 9

Display technologies – LED, LCD, CRT, Flat Panel Display. Primary Flight parameter displays - Head Up Display, Helmet Mounted Display, Night vision goggles, Head Down Display, MFD, MFK, Virtual cockpit.

TOTAL HOURS: 45

TEXTBOOKS:

1. Albert Helfrick. D, 'Principles of Avionics', Avionics communications Inc., 2004
2. Collinson, R.P.G, 'Introduction to Avionics', Chapman and Hall, 1996.

REFERENCE BOOKS:

1. Middleton, D.H, 'Avionics Systems', Longman Scientific and Technical, Longman Group UK Ltd, England, 1989.
2. Spitzer, C.R. 'Digital Avionics Systems', Prentice Hall, Englewood Cliffs, N.J., USA 1993.
3. Spitzer, C.R, 'The Avionics Handbook', CRC Press, 2000.
4. Pallet, E.H.J, 'Aircraft Instruments and Integrated Systems', Longman Scientific

ELECTIVE

26-NEURAL NETWORKS & ITS APPLICATIONS

(COMMON FOR ECE, ETCE & BME)

1. INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS 9

Neuro-physiology - General Processing Element - ADALINE - LMS learning rule - MADALINE - MR2 training algorithm.

2. BPN AND BAM **9**

Back Propagation Network - updating of output and hidden layer weights -application of BPN - associative memory - Bi-directional Associative Memory - Hopfield memory - traveling sales man problem.

3. SIMULATED ANNEALING AND CPN **9**

Annealing, Boltzman machine - learning - application - Counter Propagation network - architecture - training - Applications.

4. SOM AND ART **9**

Self organizing map - learning algorithm - feature map classifier - applications - architecture of Adaptive Resonance Theory - pattern matching in ART network.

5. NEOCOGNITRON **9**

Architecture of Neocognitron - Data processing and performance of architecture of spacio - temporal networks for speech recognition.

TOTAL HOURS: 45

REFERENCE BOOKS:

1. J.A. Freeman and B.M.Skapura , "Neural Networks, Algorithms Applications and Programming Techniques", Addison-Wesely, 1990.
2. Laurene Fausett, "Fundamentals of Neural Networks: Architecture, Algorithms and Applications", Prentice Hall, 1994

ELECTIVE

27-INTELLECTUAL PROPERTY RIGHTS

(COMMON FOR ECE, ETCE, BME, CIVIL, AERO, MECT, CSE & IT)

UNIT I **9**

Introduction - Invention and Creativity - Intellectual Property (IP) - Importance - Protection of IPR - Basic types of property (i). Movable Property - Immovable Property

and - Intellectual Property.

UNIT II **9**

IP - Patents - Copyrights and related rights - Trade Marks and rights arising from Trademark registration - Definitions - Industrial Designs and Integrated circuits - Protection of Geographical Indications at national and International levels - Application Procedures..

UNIT III **9**

International convention relating to Intellectual Property - Establishment of WIPO - Mission and Activities - History - General Agreement on Trade and Tariff (GATT) - TRIPS Agreement.

UNIT IV **9**

Indian Position Vs WTO and Strategies - Indian IPR legislations - commitments to WTO-Patent Ordinance and the Bill - Draft of a national Intellectual Property Policy - Present against unfair competition.

UNIT V **9**

Case Studies on - Patents (Basumati rice, turmeric, Neem, etc.) - Copyright and related rights - Trade Marks - Industrial design and Integrated circuits - Geographic indications Protection against unfair competition.

TOTAL HOURS: 45

TEXT BOOK

1. Subbaram N.R. "Handbook of Indian Patent Law and Practice ", S. Viswanathan Printers and Publishers Pvt. Ltd., 1998.

REFERENCE BOOKS

1. Eli Whitney, United States Patent Number: 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today: Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. www.ipmatters.net/features/000707_gibbs.html.