SHRI JAGDISHPRASAD JHABARMAL TIBREWALA UNIVERSITY

श्री जगदीशप्रसाद झाबरमल टीबडेवाला विश्वविद्यालय

Department of Electronics and Communication Engineering

Scheme and Syllabus

(2013-2017)

B.Tech.(Electronics and Communication Engineering)

SHRI JAGDISH PRASAD JHABARMAL TIBREWALA UNIVERSITY, CHUDELA, JHUNJHUNU, RAJASTHAN

Teaching and Examination Scheme for B.Tech. (4 Year Course)
In
Electronics & Communication Engg.

Year : II **Semester : III**

Code	Subject	Hrs./week			Exam Hrs.	Minimum/Maximum Marks		
		L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
A. Theory Papers								
3EC1	Mathematics-III	3	-	-	3	30/12	70/28	100/40
3EC2	Electronic Devices & Circuits	3	1	-	3	30/12	70/28	100/40
3EC3	Circuit Analysis & Synthesis	3	1	-	3	30/12	70/28	100/40
3EC4	Electronic Measurements & Instrumentation	3	-	-	3	30/12	70/28	100/40
3EC5	Electronic Materials and processes	3	-	-	3	30/12	70/28	100/40
3EC6	Data Structures & Algorithms	3	-	-	3	30/12	70/28	100/40
B. Practicals								
3EC7	Electronics Workshop	-	-	3	3	40/16	60/24	100/40
3EC8	Computer Programming Lab-I	-	-	3	3	40/16	60/24	100/40
3EC9	Electronics Lab-I	-	-	3	3	40/16	60/24	100/40
3EC10	Electronic Measurement & Instrumentation Lab	-	-	3	3	40/16	60/24	100/40
	GRAND TOTAL	**18**	**2**	**12**	**-**	**-**	**-**	**1000/400**

Total Teaching Load=32

SHRI JAGDISH PRASAD JHABARMAL TIBREWALA UNIVERSITY, CHUDELA, JHUNJHUNU, RAJASTHAN

Teaching and Examination Scheme for B.Tech. (4 Year Course)
In
Electronics & Communication Engg.

Year : II **Semester : IV**

Code	Subject	Hrs./week			Exam Hrs.	Minimum/Maximum Marks		
		L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
A. Theory Papers								
4EC1	Mathematics-IV	3	-	-	3	30/12	70/28	100/40
4EC2	Analog Electronics	3	-	-	3	30/12	70/28	100/40
4EC3	Digital Electronics	3	1	-	3	30/12	70/28	100/40
4EC4	Electromagnetic Field Theory	3	1	-	3	30/12	70/28	100/40
4EC5	Management Process and Organization	3	-	-	3	30/12	70/28	100/40
4EC6 4EC6.1 4EC6.2 4EC6.3	Elective (any one of the following) Object Oriented Programming Data Base Management System Computer Graphics	3	-	-	3	30/12	70/28	100/40
B. Practicals								
4EC7	Computer Programming Lab-II	-	-	3	3	40/16	60/24	100/40
4EC8	Electronics Lab-II	-	-	3	3	40/16	60/24	100/40
4EC9	Digital Electronics Lab	-	-	3	3	40/16	60/24	100/40
4EC10	Humanities	-	-	3	3	40/16	60/24	100/40
	GRAND TOTAL	**18**	**2**	**12**	**-**	**-**	**-**	**1000/400**

Total Teaching Load=32

SHRI JAGDISH PRASAD JHABARMAL TIBREWALA UNIVERSITY, CHUDELA, JHUNJHUNU, RAJASTHAN

Teaching and Examination Scheme for B.Tech. (4 Year Course)
In
Electronics & Communication Engg.

Year : III **Semester : V**

Code	Subject	Hrs./week			Exam Hrs.	Minimum/Maximum Marks		
		L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
A. Theory Papers								
5EC1	Signals & Systems	3	1	-	3	30/12	70/28	100/40
5EC2	Linear Integrated Circuits	3	-	-	3	30/12	70/28	100/40
5EC3	Telecommunication Engg.	3	-	-	3	30/12	70/28	100/40
5EC4	Analog Communication	3	1	-	3	30/12	70/28	100/40
5EC5	Microwave Engg. –I	3	-	-	3	30/12	70/28	100/40
5EC6 5EC6.1 5EC6.2 5EC6.3	Elective (any one of the following) Biomedical Instrumentation ASIC and FPGA Computer Oriented Numerical & Statistical Methods	3	-	-	3	30/12	70/28	100/40
B. Practicals								
5EC7	Electronic Engineering Design Lab	-	-	3	3	40/16	60/24	100/40
5EC8	Microwave Engg. Lab	-	-	3	3	40/16	60/24	100/40
5EC9	Communication Lab-I	-	-	3	3	40/16	60/24	100/40
5EC10	Signal Processing Lab-I	-	-	3	3	40/16	60/24	100/40
	GRAND TOTAL	**18**	**2**	**12**	**-**	**-**	**-**	**1000/400**

Total Teaching Load=32

SHRI JAGDISH PRASAD JHABARMAL TIBREWALA UNIVERSITY, CHUDELA, JHUNJHUNU, RAJASTHAN

Teaching and Examination Scheme for B.Tech. (4 Year Course)
In
Electronics & Communication Engg.

Year : III **Semester : VI**

Code	Subject	Hrs./week			Exam Hrs.	Minimum/Maximum Marks		
		L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
A. Theory Papers								
6EC1	Microwave Engg.-II	3	-	-	3	30/12	70/28	100/40
6EC2	Microprocessor and Microcontroller	3	-	-	3	30/12	70/28	100/40
6EC3	Industrial Electronics	3	-	-	3	30/12	70/28	100/40
6EC4	Digital Communication	3	1	-	3	30/12	70/28	100/40
6EC5	Control Systems	3	1	-	3	30/12	70/28	100/40
6EC6 6EC6.1 6EC6.2 6EC6.3	Elective (any one of the following) Neural Networks Parallel Computation & Architecture Optimization Techniques	3	-	-	3	30/12	70/28	100/40
B. Practicals								
6EC7	Communication Lab-II	-	-	3	3	40/16	60/24	100/40
6EC8	Microprocessor Lab	-	-	3	3	40/16	60/24	100/40
6EC9	Unix Shell Programming Lab	-	-	3	3	40/16	60/24	100/40
6EC10	Industrial Electronics Lab	-	-	3	3	40/16	60/24	100/40
	GRAND TOTAL	**18**	**2**	**12**	**-**	**-**	**-**	**1000/400**

Total Teaching Load=32

SHRI JAGDISH PRASAD JHABARMAL TIBREWALA UNIVERSITY, CHUDELA, JHUNJHUNU, RAJASTHAN

Teaching and Examination Scheme for B.Tech. (4 Year Course)
In
Electronics & Communication Engg.

Year : IV **Semester: VII**

Code	Subject	Hrs./week			Exam Hrs.	Minimum/Maximum Marks		
		L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
A. Theory Papers								
7EC1	Antenna & Wave Propagation	3	-	-	3	30/12	70/28	100/40
7EC2	Digital Signal Processing	3	1	-	3	30/12	70/28	100/40
7EC3	Wireless Communication	3	-	-	3	30/12	70/28	100/40
7EC4	IC Technology	3	-	-	3	30/12	70/28	100/40
7EC5	VLSI Design	3	1	-	3	30/12	70/28	100/40
7EC6 7EC6.1 7EC6.2 7EC6.3	Elective (any one of the following) Advanced Microprocessors Artificial Intelligence and Expert Systems Operating System	3	-	-	3	30/12	70/28	100/40
B. Practicals								
7EC7	Signal Processing Lab-II	-	-	3	3	40/16	60/24	100/40
7EC8	Wireless Communication Lab	-	-	3	3	40/16	60/24	100/40
7EC9	Practical Training Seminar & Industrial	-	-	3	-	40/16	60/24	100/40
7EC10	Project (Stage I)	-	-	3	-	40/16	60/24	100/40
	GRAND TOTAL	**18**	**2**	**12**	**-**	**-**	**-**	**1000/400**

Total Teaching Load=32

SHRI JAGDISH PRASAD JHABARMAL TIBREWALA UNIVERSITY, CHUDELA, JHUNJHUNU, RAJASTHAN

Teaching and Examination Scheme for B.Tech. (4 Year Course)
In
Electronics & Communication Engg.

Year : IV **Semester: VIII**

Code	Subject	Hrs./week			Exam Hrs.	Minimum/Maximum Marks		
		L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
A. Theory Papers								
8EC1	Computer Networks	3	-	-	3	30/12	70/28	100/40
8EC2	Radar & TV Engineering	3	-	-	3	30/12	70/28	100/40
8EC3	Optical Communication	3	1	-	3	30/12	70/28	100/40
8EC4 8EC4.1 8EC4.2 8EC4.3	Elective (any one of the following) Image Processing and Pattern Recognition VHDL Microcontroller and Embedded Systems	3	1	-	3	30/12	70/28	100/40
B. Practicals								
8EC5	Computer Network Programming Lab	-	-	3	3	40/16	60/24	100/40
8EC6	Industrial Economics & Management.	-	-	3	3	40/16	60/24	100/40
8EC7	VLSI & Optical Fiber Lab	-	-	3	3	40/16	60/24	100/40
8EC8	Project(Stage-II)	-	-	3	-	80/32	120/48	200/80
8EC9	Seminar	-	-	3	-	40/16	60/24	100/40
	GRAND TOTAL	**18**	**2**	**15**	**-**	**-**	**-**	**1000/400**

Total Teaching Load=35

BEC-301 MATHEMATICS-III

UNIT 1: LAPLACE TRANSFORM - Laplace transform with its simple properties, applications to the solution of ordinary and partial differential equations having constant co-efficients with special reference to the wave and diffusion equations.

UNIT 2: FOURIER SERIES & Z TRANSFORM – Expansion of simple functions in fourier series. Half range series, Change of intervals, Harmonic analysis. Z transform **-** Introduction, Properties, Inverse Z Transform.

UNIT 3: FOURIER TRANSFORM - Complex form of Fourier Transform and its inverse, Fourier sine and cosine transform and their inversion. Applications of Fourier Transform to solution of partial differential equations having constant co-efficient with special reference to heat equation and wave equation.

UNIT 4: COMPLEX VARIABLES - Analytic functions, Cauchy-Riemann equations, Elementary conformal mapping with simple applications, Line integral in complex domain, Cauchy;s theorem. Cauchy's integral formula.

UNIT 5: COMPLEX VARIABLES -Taylor's series Laurent's series poles, Residues, Evaluation of simple definite real integrals using the theorem of residues. Simple contour integration.

BOOKS

- Engineering Mathematics, T Veerarajan, TMH
- Mathematical Techniques, Jordan, Oxford
- Advance Engineering Mathematics, Potter, Oxford
- Advanced Engineering Mathematics, Irvin Kreyszig, Wiley
- Mathematical Methods, Dutta, D., New Age
- Text BOOK Of Engineering Mathematics, Dutta, New Age

BEC-302 ELECTRONIC DEVICES & CIRCUITS

UNIT 1: SEMICONDUCTOR PHYSICS: Mobility and conductivity, charge densities in a semiconductor, Fermi Dirac distribution, carrier concentrations and fermi levels in emiconductor, Generation and recombination of charges, diffusion and continuity equation, Mass action Law, Hall effect.

UNIT 2: Junction diodes, Diode as a ckt. element, load line concept, clipping and clamping circuits, Voltage multipliers. Construction, characteristics and working principles of UJT

UNIT 3: Transistor characteristics, Current components, Current gains: alpha and beta. Operating point. Hybrid model, h-parameter equivalent circuits. CE, CB and CC configuration. DC and AC analysis of CE, CC and CB amplifiers. Ebers-Moll model. Biasing & stabilization techniques. Thermal runaway, Thermal stability.

UNIT 4: JFET, MOSFET, Equivalent circuits and biasing of JFET's & MOSFET's. Low requency CS and CD JFET amplifiers. FET as a voltage variable resistor.

UNIT 5: SMALL SIGNAL AMPLIFIERS AT LOW FREQUENCY: Analysis of BJT and FET, DC and RC coupled amplifiers. Frequency response, midband gain, gains at low and high requency. Analysis of DC and differential amplifiers, Miller's Theorem. Cascading Transistor amplifiers, Darlington pair. Emitter follower, source follower.

BOOKS

- Millman's Integrated Electronics, Millman &Parekh, TMH
- Electronic Devices And Circuits, Salivahanan, TMH
- Millnman's Electronic Devices And Circuits (Special Indian Edition), Millman & Halkias, TMH
- Electronic Devices And Circuits, Bogart, Pearson
- Electronic Devices And Circuit Theory, Boylestad, Pearson
- Electronic Devices And Circuits, Cheruku, Pearson
- Electronic Devices, Floyd, Pearson
- Basic Electronics, Ghatak, Pearson
- Electronic Devices And Circuits (For Jntu), Rao, Pearson
- Electronic Devices And Circuits, Bell, Oxford
- Semiconductor Devices: Modelling And Technology, Nandita Dasgupta, PHI
- Electronic Devices And Circuits: An Introduction, Allen Mottershead, PHI
- Electronic Devices And Circuits, I.J. Nagrath, PHI
- Electronic Devices And Applications, B. Somanathan Nair, PHI
- Electronic Devices And Circuits, Balbir Kumar, PHI
- Electron Devices And Circuits, Chattopadhayay.D, Rakshit, P.C, New Age
- A Text
- BOOK Of Electronics, Kakani, S.L.Bhandari, K.C, New Age
- Electronic Devices And Circuits, S.K.Sahdev, Na, Dhanpatrai

BEC-303 CIRCUIT ANALYSIS & SYNTHESIS

UNIT 1: NETWORK THEOREMS AND ELEMENTS: Thevenin's, Norton's, Reciprocity, Superposition, Compensation, Miller's, Tellegen's and maximum power transfer theorems. Networks with dependent sources. Inductively coupled circuits – mutual inductance, coefficient of coupling and mutual inductance between portions of same circuits and between parallel branches. Transformer equivalent, inductively and conductively coupled circuits.

UNIT 2:TRANSIENTS ANALYSIS: Impulse, step, ramp and sinusoidal response Analysis of first order and second order circuits. Time domain & transform domain (frequency, Laplace) analysis. Initial and final value theorems. Complex periodic waves and their analysis by Fourier analysis. Different kind of symmetry. Power in a circuit.

UNIT 3: NETWORK FUNCTIONS: Terminals and terminal pairs, driving point impedance transfer functions, poles and zeros. Procedure of finding network functions for general two terminal pair networks. Stability & causality. Hurwitz polynomial, positive real function.

UNIT 4: TWO PORT NETWORKS: Two port parameters and their interrelations – z-parameters, yparameters, h-parameters, ABCD parameters. Equivalence of two ports, transformer equivalent, interconnection of two port networks. Image parameters. Attenuation & phase shift in symmetrical T and π networks.

UNIT 5: NETWORK SYNTHESIS: RL & RC networks synthesis, Foster First & Second form, Cauer forms.

BOOKS

- Circuits And Networks: Analysis And Synthesis, Sudhakar, TMH
- Network Analysis And Synthesis, Ghosh & Chakrabarti, TMH
- Electrical Networks, Singh, TMH
- Schaum's Outlines Of Electric Circuits (Sie), Nahvi, TMH
- Eelectronic Circuits: Analysis And Design(Sie), Donald Neamen, TMH
- Electric Circuits & Networks, Suresh Kumar, Pearson
- Electric Circuits, Nilsson, Pearson
- Linear Circuits Analysis, Decarlo, Oxford
- Linear Circuits (Includes Cd), Ramakalyan, Oxford
- Circuits And Network: Analysis, Design, And Synthesis, Sukhija, Oxford
- Basic Engineering Circuit Analysis, Irwin, Wiley
- Network Analysis & Synthesis, Kuo, Wiley
- Network Theory: Analysis And Synthesis, Smarjit Ghosh, PHI
- Basic Circuit Theory, Lawrence P. Huelsman, PHI
- Electric Circuit Analysis, Xavier, S.P. Eugene, New Age

BEC-304 ELECTRONIC MEASUREMENTS & INSTRUMENTATION

UNIT 1: THEORY OF ERRORS: Accuracy & precision, Repeatability, Limits of errors, Systematic & random errors Modeling of errors, Probable error & standard deviation, Gaussian error analysis, Combination of errors.

UNIT 2: ELECTRONIC INSTRUMENTS FOR MEASURING BASIC PARAMETERS: Electronic Voltmeter, Electronic Multimeters, Digital Voltmeter, Component Measuring Instruments, Q meter, Vector Impedance meter, RF Power & Voltage Measurements. Measurement of frequency. Introduction to shielding & grounding.

UNIT 3: OSCILLOSCOPES: CRT Construction, Basic CRO circuits, CRO Probes, Oscilloscope Techniques of Measurement of frequency, Phase Angle and Time Delay, Multibeam, multi trace, storage & sampling Oscilloscopes. Curve tracers.

UNIT 4: SIGNAL GENERATION: - Sine wave generators, Frequency synthesized signal generators, Sweep frequency generators. Signal Analysis **-** Measurement Technique, Wave Analyzers, Frequency - selective wave analyser, Heterodyne wave analyser, Harmonic distortion analyser, Spectrum analyser.

UNIT 5: TRANSDUCERS - Classification, Selection Criteria, Characteristics, Construction, Working Principles, Application of following Transducers- RTD, Thermocouples, Thermistors, LVDT, RVDT, Strain Gauges, Bourdon Tubes, Bellows. Diaphragms, Seismic Accelerometers, Tachogenerators, Load Cell, Piezoelectric Transducers, Ultrasonic Flow Meters.

BOOKS

- Electronic Instrumentation, H S Kalsi, TMH
- Electronic Measurements & Instrumentation, Bernard Oliver, TMH
- Instrumentation Measurement & Analysis, B.C.Nakra, K.K. Chaudhry, TMH
- Electronic Measurements & Instrumentation, Bernard Oliver, John Cage, TMH
- Electronic Measurements And Instrumentation, Lal Kishore, Pearson
- Elements Of Electronic Instrumentation And Measurement, Carr, Pearson
- Electronic Instrument And Measurment, Bell, Oxford
- Electronic Measurements And Instrumentation, Dally, Wiley
- Theory And Design For Mechanical Measurements, Figliola, Wiley
- Electronic Instrumentation And Measurements, David A. Bell, PHI
- Introduction To Measurements And Instrumetation, Arun K. Ghosh, PHI
- A Course In Electrical & Electronic Measurement & Instrumentation, A.K.Sawhney, Dhanpatrai

BEC-305 ELECTRONIC MATERIALS & PROCESSES

UNIT 1: DIELECTRIC MATERIALS: Polarisation phenomenon, spontaneous polarisation, dielectric constant and loss, piezo and ferro electricity.

UNIT 2: MAGNETIC MATERIALS: Dia, para, ferro-ferrimagnetism; soft and hard magnetic materials and their applications.

UNIT 3: SEMI CONDUCTOR MATERIALS: Crystal growth, zone refining, Degenerate and nondegenerate semiconductors, Direct and indirect band gap semiconductors. Electronic properties of silicon, Germanium, Compound Semiconductor, Gallium Arsenide, gallium phosPHIde & Silicon carbide.

UNIT 4: CONDUCTIVE & SUPERCONDUCTIVE MATERIALS: Electrical properties of conductive and resistive materials. Important characteristics and electronic applications of specific conductor & resistance materials. Superconductor phenomenon, Type I and Type II superconductors and their applications.

UNIT 5: PASSIVE COMPONENETS & PCB FABRICATION: Brief study of fabrication methods of fixed and variable type of resistors; capacitors, Inductors, solenoid and toroid, air core, iron core and Ferro core conductors. Printed Circuit Boards – Types, Manufacturing of copper clad laminates, PCB Manufacturing process, Manufacturing of single and double sided PCBs. Surface mount devices – advantages & limitations.

BOOKS

- Principles Of Electronic Materials And Devices, S O Kasap, TMH
- Electronics Engineering Material And Devices, J Allison, TMH
- Electronics Material And Processes Hand
- BOOK, Charles Harpa, Ronald Sampson, TMH
- Introduction To Materials Science For Engineers, Shackelford, Pearson
- Elements Of Materials Science & Engineering, Van Vlack, Pearson
- Material Science For Electrical And Electronic Engineers, Jones, Oxford
- Introduction To Semiconductor Materials And Devices, Tyagi, Wiley
- Electronic Instrumentation And Measurements, David A. Bell, PHI
- Introduction To Measurements And Instrumetation, Arun K. Ghosh, PHI
- Electronic Components And Processes, Maheshwari, Preeti, New Age
- Rudiments Of Materials Science, Pillai, S.O., New Age

BEC-306 DATA STRUCTURES & ALGORITHMS

UNIT 1: PERFORMANCE MEASUREMENT: Space complexity and Time complexity, big oh, omega and theta notations and their significance. Linear Lists **-** Array and linked representation, Singly & Doubly linked lists. Concept of circular linked lists.

UNIT 2: ARRAY & MATRICES - Row and Column Major mapping & representation, irregular 2D array, Matrix operations, Special matrices: diagonal, tri-diagonal, triangular, symmetric. Sparse matrices representation and its transpose.

UNIT 3: STACKS - Representation in array & linked lists, basic operation, Applications of stacks in parenthesis matching, towers of Hanoi etc. Queues **-** Representation in array & linked lists, applications, circular queues.

UNIT 4: TREES - Binary Tree, representation in array & linked lists, basic operation on binary trees, binary tree traversal (preorder, post order, in order). Search Trees **-** Binary search tree, indexed-binary search tree, basic operation, AVL tree, B-tree.

UNIT 5: GRAPHS - Representation of unweighted graphs, BFS, DFS, Minimum cost spanning trees, Single source shortest path.Sorting **-** Bubble sort, insertion sort, merge sort, selection sort, quick sort, heap sort.

BOOKS

- Data Structures (Special Indian Edition) (Schaums' Outlines Series), Lipschutz & Pai, TMH
- Data Structures And Algorithms, Pai, TMH
- Data Structure Using C (Sigma Series), Mukherjee, TMH
- Introduction To Data Structures With Applications, Tremblay, TMH
- Data Structure Using C, Krishnamoorthy, TMH
- Data Structures, Keogh, Wiley

BEC-401 MATHEMATICS-IV

UNIT 1: NUMERICAL ANALYSIS - Finite differences – Forward, Backward and Central differences. Newton's forward and backward differences, interpolation formulae. Stirling's formula, Lagrange's interpolation formula.

UNIT 2: NUMERICAL ANALYSIS- Integration-Trapezoidal rule, Simpson's one third and three-eighth rules. Numerical solution of ordinary differential equations of first order - Picard's mathod, Euler's and modified Euler's methods, Miline's method and Runga-Kutta fourth order method., Differentiation

UNIT 3: SPECIAL FUNCTIONS – Bessel's functions of first and second kind, simple recurrence relations, orthogonal property of Bessel's, Transformation, Generating functions, Legendre's function of first kind. Simple recurrence relations, Orthogonal property, Generating function.

UNIT 4: STATISTICS AND PROBABILITY - Elementary theory of probability, Baye's theorem with simple applications, Expected value, theoretical probability distributions-Binomial, Poisson and Normal distributions. Lines of regression, co-relation and rank correlation.

UNIT 5: CALCULUS OF VARIATIONS - Functional, strong and weak variations simple variation problems, the Euler's equation.

BOOKS

- Advanced Engg. Mathematics-4, S.K.Dadhich, N.K.
- Advanced Engg. Mathematics, Irvin Kreyszig, Wiley
- Applied Statics & Probability, Montgomery, Wiley

BEC-402 ANALOG ELECTRONICS

UNIT 1: FEEDBACK AMPLIFIERS: Classification, Feedback concept, Transfer gain with feedback, General characteristics of negative feedback amplifiers. Analysis of voltage-series, voltage-shunt, current-series and current-shunt feedback amplifier. Stability criterion.

UNIT 2: OSCILLATORS: Classification. Criterion for oscillation. Tuned collector, Hartley, Colpitts, RC Phase shift, Wien bridge and crystal oscillators, Astable, monostable and bistable multivibrators. Schmitt trigger. Blocking oscillators.

UNIT 3: HIGH FREQUENCY AMPLIFIERS: Hybrid Pi model, conductances and capacitances of hybrid Pi model, high frequency analysis of CE amplifier, gain- bandwidth product. Emitter follower at high frequencies.

UNIT 4: TUNED AMPLIFIER - Band Pass Amplifier, Parallel resonant Circuits, Band Width of Parallel resonant circuit. Analysis of Single Tuned Amplifier, Primary & Secondary Tuned Amplifier with BJT & FET. Double Tuned Transformer Coupled Amplifier. Stagger Tuned Amplifier. Pulse Response of such Amplifier. Shunt Peaked Circuits for Increased Bandwidth.

UNIT 5: POWER AMPLIFIERS: Power amplifier circuits, Class A output stage, class B output stage and class AB output stages, class C amplifiers, pushpull amplifiers with and without transformers. Complementary symmetry & quasi complimentary symmetry amplifiers

BOOKS

- Millman's Integrated Electronics, Millman & Parekh, TMH
- Electronic Devices And Circuits, Salivahanan, TMH
- Millman’s Electronic Devices And Circuits (Special Indian Edition), Millman & Halkias, TMH
- Analysis And Design Of An Analog Integrated Ckt, Gray, Wiley
- Electronic Devices And Circuit Theory, Boylested, Pearson
- Electronic Devices, Floyd, Pearson
- Electronic Devices And Integrated Circuits, Singh, Pearson
- Electronic Devices And Circuits, 5e, Bell, Oxford
- Microelectronic Circuits, 5e (Intl. Version), Sedra, Oxford

BEC-403 DIGITAL ELECTRONICS

UNIT 1: NUMBER SYSTEMS, BASIC LOGIC GATES & BOOLEAN ALGEBRA: Binary Arithmetic & Radix representation of different numbers. Sign & magnitude representation, Fixed point representation, complement notation, various codes & arithmetic in different codes & their inter conversion. Features of logic algebra, postulates of Boolean algebra. Theorems of Boolean algebra. Boolean function. Derived logic gates: Exclusive-OR, NAND, NOR gates, their block diagrams and truth tables. Logic diagrams from Boolean expressions and vica-versa. Converting logic diagrams to universal logic. Positive, negative and mixed logic. Logic gate conversion.

UNIT 2: DIGITAL LOGIC GATE CHARACTERISTICS: TTL logic gate characteristics. Theory & operation of TTL NAND gate circuitry. Open collector TTL. Three state output logic. TTL subfamilies. MOS & CMOS logic families. Realization of logic gates in RTL, DTL, ECL, C-MOS & MOSFET. Interfacing logic families to one another.

UNIT 3: **MINIMIZATION TECHNIQUES:** Minterm, Maxterm, Karnaugh Map, K map upto 4 variables. Simplification of logic functions with K-map, conversion of truth tables in POS and SOP form. Incomplete specified functions. Variable mapping. Quinn-Mc Klusky minimization techniques.

UNIT 4: **COMBINATIONAL SYSTEMS:** Combinational logic circuit design, half and full adder, subtractor. Binary serial and parallel adders. BCD adder. Binary multiplier. Decoder: Binary to Graydecoder, BCD to decimal, BCD to 7-segment decoder. Multiplexer, demultiplexer, encoder. Octal to binary, BCD to excess-3 encoder. Diode switching matrix. Design of logic circuits by multiplexers, encoders, decoders and demultiplexers.

UNIT 5: **SEQUENTIAL SYSTEMS:** Latches, flip-flops, R-S, D, J-K, Master Slave flip flops. Conversions of flip-flops. Counters: Asynchronous (ripple), synchronous and synchronous decade counter, Modulus counter, skipping state counter, counter design. Ring counter. Counter applications. Registers: buffer register, shift register.

BOOKS

- Digital Circuit & Logic Design, Samuel C.Lee, Eee
- Modern Digital Electronics, R.P. Jain, TMH
- Digital Principles And Applications (Special Indian Edition), Leach & Malvino, TMH
- 2000 Solved Problems In Digital Electronics (Sigma Series), Bali, TMH
- Digital Fundamental, Floyd & Jain, Pearson
- Digital Logic And Computer Design, Mano, Pearson
- Digital Systems: Principles And Applications, Tocci, Pearson
- Digital Design, M.Morris Mano, Pearson
- Digital Electronics Principal & Intigrated Ckt, Maini, Wiley
- Digital Logic Design Principals, Palbanian, Wiley
- Digital Electronics, Kharate, Oxford

BEC-404 ELECTROMAGNETIC FIELD THEORY

UNIT 1: INTRODUCTION: Vector Relation in rectangular, cylindrical, spherical and general curvilinear coordinate system. Concept and physical interpretation of gradient, Divergence and curl, Green's & Stoke's theorems.

UNIT 2: ELECTROSTATICS: Electric field intensity & flux density. Electric field due to various charge configurations. The potential functions and displacement vector. Gauss's law. Poisson's and Laplace's equation and their solution. Uniqueness theorem. Continuity equation. Capacitance and electrostatics energy. Field determination by method of images. Boundary conditions. Field mapping and concept of field cells.

UNIT 3: MAGNETOSTATICS: Magnetic field intensity, flux density & magnetization, Faraday's Law, Bio-Savart's law, Ampere's law, Magnetic scalar and vector potential, self & mutual inductance, Energy stored in magnetic field, Boundary conditions, Analogy between electric and magnetic field, Field maping and concept of field cells.

UNIT 4: TIME VARYING FIELDS: Displacement currents and equation of continuity. Maxwell's equations, Uniform plane wave in free space, dielectrics and conductors, skin effect sinusoidal time variations, reflection & refraction of Uniform Plane Wave, standing wave ratio. Pointing vector and power considerations.

UNIT 5: RADIATION, EMI AND EMC: Retarded Potentials and concepts of radiation, Radiation from a small current element. Radiation resistance**:** Introduction to Electromagnetic Interference and Electromagnetic compatibility, EMI coupling modes, Methods of eliminating interference, shielding, grounding, conducted EMI, EMI testing: emission testing, susceptibility testing.

BOOKS

- Engineering Electromagnetics, (With Cd), Hayt, TMH
- Electromagnetics (Sie) (Schaum's Outlines Series), Edminister, TMH
- Electromagnetics With Applications, Jd Kraus, TMH
- Electromagnetic Field Theory And Transmission Lines, Raju, Pearson
- Field & Wave Electromagnetic, Cheng, Pearson
- Elements Of Engineering Electromagnetics, Rao, Pearson
- Electromagnetic For Engineers, Ulaby, Pearson
- Fundamentals Of Electromagnetics For Engineers, Rao, Pearson

BEC-405 MANAGEMENT PROCESS AND ORGANIZATION

UNIT 1: The Concept Management: History of Management Thought, Definition of Management, Delegation, Decentrialisation. Differences between Top management, Middle level Management, Lower level Management, PDCA Cycle.

UNIT 2: Management: Skills, Roles, Functions And Contemporary Challenges Cost, Volume, and Profit analysis, Variable cost, Fixed Cost, Break even Analysis, Competition.

UNIT 3: Communication in Organization: Formal and Informal Channels of Communication, Principles of Organization, Interpersonal Communication, Line & Staff Organization, Organizational & Academic Block Diagram & Examples.

UNIT 4: Motivation: Process of Motivation Maslow's Need Hierarchy Theory, Herzberg's Motivation Hygiene Theory, ERG Theory, Job Enrichment, Job Enlargement And Job Rotation a Motivational Tools.

UNIT 5: Organizational Structure and Design: Decisions involved in determining Organizational Structure Degree Specialization, Delegation of Authority , Chain of Command, Types of Departmentalization and Span of Control Mechanical and Organic Models of Organization

BEC-406.1 OBJECT ORIENTED PROGRAMMING

UNIT 1: OOP FUNDAMENTALS: Concept of class and object, attributes, public, private and protected members, derived classes, single & multiple inheritance,

UNIT 2: PROGRAMMING IN C++: Enhancements in C++ over C, Data types, operators and functions. Inline functions, constructors and destructors. Friend function, function and operator overloading. Working with class and derived classes. Single, multiple and multilevel inheritances and their combinations, virtual functions, pointers to objects.
Input output flags and formatting operations. Working with text files.

UNIT 3: JAVA: Variation from C++ to JAVA. Introduction to Java byte code, virtual machine, application & applets of Java, integer, floating point, characters, Boolean, literals, and array declarations.

UNIT 4: OPERATORS AND CONTROL STATEMENTS: Arithmetic operators, bit wise operators, relational operators, Boolean logic operators, the assignment operators,?: operators, operator precedence. Switch and loop statements.

UNIT 5: PACKAGE AND INTERFACES: Packages, access protection, importing & defining packages. Defining and implementing interfaces.

BOOKS

- Object Oriented Programming With C++, Sahay,
- Object Oriented Programming With C++, Josuttis, Oxford
- An Inteoduction To Programming & Oo Design Using Java, J.Nino&F.A.Hosch, Wiley
- Object Oriented Programming With C++, Shukla, Wiley
- OOP, Timothy Budd, Wiley
- Object Oriented Programming With C++, Balagurusamy, Pearson
- Programming With C++ (Sie) (Schaum's Outline Series), Hubbard, TMH
- Mastering C++, Venugopal, TMH
- Programming With C++, Ravichandran, TMH

BEC-406.2 DATA BASE MANAGEMENT SYSTEM

UNIT 1 :Introduction Need, purpose and goals of DBMS. DBMS Architecture, Concept of keys, Generalisation and specialization, Introduction to Relational data model, ER Modeling, Relational algebra.

UNIT 2: DATABASE DESIGN : Conceptual Data Base design. Theory of normalization, Primitive and composite data types, concept of physical and logical databases, data abstraction and data independence,. Relational calculus.

UNIT 3 : **SQL :** DDL and DML. Constraints assertions, views, data base security. Application Development using SQL : Host language interface, embedded SQL programming. GL's, Forms management and report writers. Stored procedures and triggers.

UNIT 4 INTERNAL OF RDBMS - Physical data organization in sequential, indexed, random and hashed files. Inverted and multilist structures.

UNIT 5 : Transaction processing, concurrency control, Transaction model properties and state serialisability. Lock base protocols, two phase locking, Log based recovery Management.

Books

- Date C J, “An Introduction To Database System”, Addision Wesley
- Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill
- Elmasri, Navathe, “Fundamentals Of Database Systems”, Addision Wesley
- Leon & Leon, “Database Management System”, Vikas Publishing House.
- Bipin C. Desai, “An introduction to Database Systems”, Galgotia Publication
- Majumdar & Bhattacharya, “Database Management System”, TMH
- Ramakrishnan, Gehrke, “Database Management System”, McGraw Hill
- Kroenke, “Database Processing: Fundamentals, Design and Implementation”, Pearson Education.
- Maheshwari Jain, “DBMS: Complete Practical Approach”, Firewall Media, New Delhi.

BEC-406.3 COMPUTER GRAPHICS

UNIT 1 : Introduction to interactive computer graphics, picture analysis, overview of programmer's model of interactive graphics. Fundamental problems in geometry, Hardware for Computer Graphics.

UNIT 2 : BASIC RASTER GRAPHICS - Scan conversion algorithms for line, Circle, Ellipse, Filling algorithms, Line Clipping and Polygon clipping

UNIT 3 : GEOMETRIC MANIPULATION : 2 D and 3 D Transformation, Composite Transformations, Concept of Homogenous Coordinates Viewpoints.

UNIT 4 : **ELEMENTRY 3 D GRAPHICS** – Types of Projections, Vanishing Points, specification of 3 D View, Matrices for Parallel and Perspective Projections. Visibility; Image and object precision, z-buffer algorithms, area based algorithms, floating horizon.

UNIT 5: RENDERING - Ray tracing, antialiasing, Gourard and Phong Shading. Curves and Surfaces : Parametric Representation, Bezier and B-Spline curves.

Books

- David F Rogers – Procedural Elements for Computer Graphics – McGraw-Hill.
- Foley, Vandam, Feiner & Huges – Computer Graphics Principles and Practice – Addison Wesley.
- Newman & Sproul – Principles of Interactive Computer Graphics.
- David F Rogers and Adams – Mathematical Elements for Computer Graphics.

BEC-501 SIGNALS AND SYSTEMS

UNIT 1: **INTRODUCTION:** Continuous time and discrete time systems, Properties of systems. Linear time invariant systems - continuous time and discrete time. Properties of LTI systems and their block diagrams. Convolution, Discrete time systems described by difference equations.

UNIT 2: FOURIER SERIES REPRESENTATION OF SIGNALS: Fourier series representation of continuous periodic signal & its properties, Fourier series representation of Discrete periodic signal & its properties, Continuous time filters & Discrete time filters described by Diff. equation.

UNIT 3: **FOURIER TRANSFORM:** The continuous time Fourier transform for periodic and aperiodic signals, Properties of CTFT. Discrete time Fourier transform for periodic and aperiodic signals. Properties of DTFT. The convolution and modulation property.

UNIT 4: **Z-TRANSFORM & LAPLACE TRANSFORM:** Introduction. The region of convergence for the Z-transform. The Inverse Z-transform. Two dimensional Z-transform. Properties of Z transform. Laplace transform, Properties of Laplace Transform, Application of Laplace transform to system analysis.

UNIT 5: **SAMPLING**: Mathematical theory of sampling. Sampling theorem. Ideal & Real sampling. Interpolation technique for the reconstruction of a signal from its samples. Aliasing. Sampling in freq. domain. Sampling of discrete time signals.

BOOKS

- Principles Of Linear Systems And Signals, 2e (Intl. Version), Lathi 2nd, Oxford
- Signal & Systems 3e, Chen 3rd, Oxford
- Fundamentals Of Signals And Systems, Wiley
- Signals And Systems, P Rao, TMH
- Signals And Systems: A Simplified Approach, Ganesh Rao, 4e, Pearson
- Signals And Systems: Continuous And Discrete, Roger E Ziemer, 4e, PHI
- Signals And Systems, Ravi Kumar, PHI

BEC-502 LINEAR INTEGRATED CIRCUITS

UNIT 1: OPERATIONAL AMPLIFIERS: Basic differential amplifier analysis, Single ended and double ended configurations, Op-amp configurations with feedback, Op-amp parameters, Inverting and Non-Inverting configuration, Comparators, Adder**.**

UNIT 2: OPERATIONAL AMPLIFIER APPLICATIONS: Integrator, Differentiator, Voltage to frequency & Frequency to voltage converters. Oscillators: Phase shift, Wien bridge, Quadrature, square wave, triangular wave, sawtooth oscillators. Voltage controlled oscillators.

UNIT 3: ACTIVE FILTERS: Low pass, high pass, band pass and band reject filters, All pass filter, Switched capacitor filter, Butterworth filter design, Chebyshev Filter design.

UNIT 4: PHASE-LOCKED LOOPS: Operating Principles of PLL, Linear Model of PLL, Lock range, Capture range, Applications of PLL as FM detector, FSK demodulator, AM detector, frequency translator, phase shifter, tracking filter, signal synchronizer and frequency synthesizer, Building blocks of PLL, LM 565 PLL.

UNIT 5: LINEAR IC's: Four quadrant multiplier & its applications, Basic blocks of linear IC voltage regulators, Three terminal voltage regulators, Positive and negative voltage regulators. The 555 timer as astable and monostable multivibrators. Zero crossing detector, Schmitt trigger.

BOOKS

- Linear Circuits (Includes Cd), Ramakalyan-, Oxford
- Linear Circuit Analysis, Decarlo, Oxford
- Linear Integrated Circuits, Nair, Wiley
- Analysis And Design Of Analog Integrated Circuits, Gray, 5e, Wiley
- Analog Mos Integrated Circuits For Signal Processing-Gregorian, Gregorian, 1e, Wiley
- Linear Integrated Circuits, S Salivahanan, TMH
- Electronic Circuits: Discrete And Integrated, Donald Schilling, TMH
- Op-Amps And Linear Integrated Circuits, Gayakwad, Ramakant A, PHI

BEC-503 TELECOMMUNICATION ENGINEERING

UNIT 1: TRANSMISSION LINE: Types of transmission lines, general transmission line equation, line constant, equivalent circuits, infinite line, and reflection on a line, SWR of line with different type of terminations. Distortion less and dissipation less lines, Coaxial cables, Transmission lines at audio and radio frequencies, Losses in transmission line,. Characteristics of quarter wave, half wave and lines of other lengths,

UNIT 2:TRANSMISSION LINE APPLICATIONS: Smith chart and its application. Transmission line applications, Impedance matching Network. Single & double Stub matching. Measurement of parameters of transmission line, measurement of attenuation, insertion loss, reflection coefficient and standing wave ratio.

UNIT 3: ATTENUATORS & FILTERS: Elements of telephone transmission networks, symmetrical and Asymmetrical two port networks. Different Attenuators, π-section & T-section attenuators, stub matching, Transmission equalizers Filters, constant K-section, Ladder type, π-section, T-section filter, m-derived filter sections, Lattics filter section.

UNIT 4: TELEPHONE TRANSMISSION: Telephone set, Touch tone dial types, two wire/ four wire transmission, Echo suppressors & cancellors, cross talk. Multi-channel systems: Frequency division & time division multiplexing.

UNIT 5: AUTOMATIC TELEPHONY & TELEGRAPHY: Trunking concepts, Grade of service, Traffic definitions, Introduction to switching networks, classification of switching systems. Principle of Electronic Exchange, EPABX and SPC Digital telephone Exchange, Numberig Plan, Fascimile services.

BOOKS

- Digital Telephony, Bellamy, Wiley
- Fields And Waves In Communication Electronics 3ed By Ramo, Wiley

BEC-504 ANALOG COMMUNICATION

UNIT 1: **NOISE EFFECTS IN COMMUNICATION SYSTEMS:** Resistor noise, Networks with reactive elements, Noise temperature, Noise bandwidth, effective input noise temperature, Noise figure. Noise figure & equivalent noise temperature in cascaded circuits.

UNIT 2: **AMPLITUDE MODULATION:** Frequency translation, Recovery of base band signal, Spectrum & power relations in AM systems. Methods of generation & demodulation of AM-DSB, AM-DSB/SC and AM-SSB signals. Modulation & detector circuits for AM systems. AM transmitters & receivers.

UNIT 3: **FREQUENCY MODULATION:** Phase & freq. modulation & their relationship, Spectrum & band width of a sinusoidally modulated FM signal, phasor diagram, Narrow band & wide band FM. Generation & demodulation of FM signals. FM transmitters & receivers.. Comparison of AM, FM & PM. Pre emphasis & deemphasis. Threshold in FM, PLL demodulator.

UNIT 4: NOISE IN AM AND FM: Calculation of signal-to-noise ratio in SSB-SC, DSB-SC, DSB with carrier, Noise calculation of square law demodulator & envelope detector. Calculation of S/N ratio in FM demodulators, Super heterodyne receivers.

UNIT 5: **PULSE ANALOG MODULATION:** Practical aspects of sampling: Natural and flat top sampling. PAM, PWM, PPM modulation and demodulation methods, PAM-TDM.

BOOKS

- Modern Digital & Analog Communication Systems, Lathi, Oxford
- Analog Communication, Chandrasekhar, Oxford
- An Introduction To Analog & Digital Communications-, Haykins, Wiley
- Digital And Analog Communication Systems-, Shanmugam, Wiley
- Communications Systems, 4ed-, Haykins, Wiley
- Principles Of Communication Systems, Herbert Taub, Donald Schilling, Goutam Saha-, TMH
- Communication Systems, R Singh, S. Sapre, TMH
- Analog Communication, K. N. Hari Bhat, Pearson
- Digital & Analog Communication Systems, Leon W. Couch, Pearson

BEC-505 MICROWAVE ENGINEERING-I

UNIT 1: WAVE GUIDES: Introduction of Microwaves and their applications. Rectangular Waveguides, Solution of Wave equation in TE and TM modes. Power transmission and Power losses. Excitation of modes in Rectangular waveguides, circular waveguides: Basic idea of TE and TM modes, field patterns, TEM mode of propagation.

UNIT 2: **WAVEGUIDE COMPONENTS:** Scattering matrix representation of networks. Rectangular cavity and circular cavity resonators. Waveguide Tees, Magic Tees. Hybrid rings. Waveguide corners, Bends and twists. Directional couplers, Circulators and isolators.

UNIT 3: **KLYSTRONS:** Limitation of conventional vacuum tubes, Construction and operation of two cavity & multicavity klystrons. Velocity modulation and electron bunching (analytical treatment), Applegate diagram and applications of two cavity klystrons. Construction, working and operation of Reflex klystron. Applications and practical considerations. Velocity modulation, power output and frequency characteristics of a Reflex klystron. Electron admittance.

UNIT 4: TRAVELLING WAVE TUBES (TWT): Construction, operation and practical consideration of helix type TWT. Introduction to CW power, pulsed dual mode TWT. Coupled cavity TWT. Applications of TWT.

UNIT 5: MAGNETRON: Types of Magnetron. Construction, operation, analysis and practical consideration of cavity or travelling wave magnetron. Introduction to coaxial, frequency angle and voltage tunable magnetrons. Backward cross field oscillator, Forward wave cross field amplifier.

BOOKS

- Foundations For Microwave Engineering – R.E. Collin, R.E. Collin, Wiley
- Microwave Engineering By, Pozar, Wiley
- Microwave Engineering, Annapurna Das, Sisir Das, TMH
- Microwave Devices And Circuits, 3, Samuel Y. Liao, Pearson
- Microwave Devices And Circuit Design, Ganesh Prasad Srivastava, Vijay Laxmi Gupta, PHI
- Microwave Semiconductor Devices, Roy Mitra, PHI

BEC-506.1 BIOMEDICAL INSTRUMENTATION

UNIT 1: HUMAN BODY SUBSYSTEMS: Brief description of neural, muscular, cardiovascular and respiratory systems; their electrical, mechanical and chemical activities.
TRANSDUCERS AND ELECTRODES: Principles and classification of transducers for Bio-medical applications, Electrode theory, different types of electrodes, Selection criteria for transducers and electrodes.

UNIT 2: BIOPOTENTIALS: Electrical activity of excitable cells, ENG, EMG, ECG, ERG, EEG. Neuron potential. CARDIOVASCULAR SYSTEM MEASUREMENTS: Measurement of blood pressure, blood flow, cardiac output, cardiac rate, heart sounds, Electrocardiograph, phonocardiograph, Plethysmograph, Echocardiograph.

UNIT 3: INSTRUMENTATION FOR CLINICAL LABORATORY: Measurement of pH valve of blood, ESR measurement, hemoglobin measurement, O_2 and CO_2 concentration in blood, GSR measurement.Instrumentation for clinical laboratory: Spectrophotometry, chromatography, Hematology, Measurement of pH value, concentration in blood. MEDICAL IMAGING: Diagnostic X-rays, CAT, MRI, thermography, Ultrasonography, medical use of isotopes, endoscopy.

UNIT 4: PATIENT CARE, MONITORING AND SAFETY MEASURES: Elements of Intensive care monitoring basic hospital systems and components, physiological effect of electric current shock hazards from electrical equipment, safety measures, Standards & practices. COMPUTER APPLICATIONS AND BIOTELEMETRY: Real time computer applications, data acquisition and processing, remote data recording and management.

UNIT 5: THERAPEUTIC AND PROSTHETIC DEVICES: Introduction to cardiac pacemakers, defibrillators, ventilators, muscle stimulators, diathermy, heart lung machine, Hemodialysis, Applications of Laser.

BOOKS

- Medical Instrumentation: Application And Design, 3ed-, Webster, Wiley
- Biomedical Signal Processing, D Reddy, TMH
- Electronics In Medicine And Biomedical Instrumentation, PHI

BEC-506.2 ASIC AND FPGA

UNIT 1: Introduction: Course outline, Logistics introduction to ASICs, FPGAs, Economics. HDL: Logic design Review, Behavior, Dataflow, Structural modeling, Control statements, FSM modeling.

UNIT 2: CMOS Review: Classical, CMOS (Deep Sub-micron), ASIC Methodologies (classical) ASIC Methodologies (aggressive). Fabrication of MOSFET: MOS Transistor, Design methodologies, Design for manufacturability and testability.

UNIT 3: Programmable Logic Devices: Types of Programmable Logic Devices, Combinational Logic Examples, PROM - Fixed AND Array and Programmable OR Array, Implementation of Functions using PROM, PLA - Programmable Logic Array (PLA) – Implementation Examples.

UNIT 4: Programmable Array Logic: PAL - Programmable Array Logic, Comparison of PROM, PLA and PAL, Implementation of a Function using PAL, Types of PAL Outputs, Device Examples. FPGA: Programmable logic FPGA, Configuration logic blocks, Function Generator, ROM implementation, RAM implementation, Time skew buffers, FPGA Design tools, Network-on-chip, Adaptive System-on-chip.

UNIT 5: System Design Examples using FPGA Board: Design Applications using FPGA Board - Traffic Light Controller and Real Time Clock, XSV FPGA Board Features, Testing of FPGA Board, Setting the XSV Board Clock Oscillator Frequency, Downloading Configuration Bit Streams. Logic synthesis: Fundamentals, Logic synthesis with synopsis, Physical design compilation, Simulation, implementation. Floor planning and placement, Commercial EDA tools for synthesis. Testing: Advanced interconnects and testing techniques.

BEC-506.3 COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS

UNIT 1 : MATRIX COMPUTATION: Algebra of matrix, Inverse of a matrix, Rank of a matrix, Matrix inversion by Gauss elimination, Computer programs for matrix inversion.

UNIT 2 : SOLUTION OF LINEAR EQUATIONS: Cramer's rule, Gauss elimination, Gauss Jordan elimination and Gauss Seidal iterative method and their implementation in C.

UNIT 3 : SOLUTION OF NON-LINEAR EQUATIONS: Interval bisection method, Secant method, Regula- Falsi method, Curve fitting, Method of least squares and their implementation in C.

UNIT 4 : SOLUTION OF DIFFERENTIAL EQUATIONS: Euler's method, Modified Euler's method, Runge Kutta method of fourth order, Solution of partial differential equation with special reference to heat equation, Laplace equation and wave equation Milne's and their implementation in C.

UNIT 5 : STATISTICAL METHODS: Curve fitting methods – method of least squares, fitting a straight line, parabola. Correlation and Linear regression.

Books

- Numerical methods for Scientific and Engineering Computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.
- Elementary Numerical Analysis by Samuel D.Conte and Cart de Boor, McGraw Hill International Edition.
- Numerical methods for Science and Engineering, PHI by R.G.Stanton
- Computer based numerical algorithms by E.V. Krishnamoorthy
- Introduction to Numerical Analysis by E. Atkinson

BEC-601 MICROWAVE ENGINEERING-II

UNIT 1: MICROWAVE MEASUREMENTS: Detection of microwaves, Microwave power measurement, Impedance measurement, Measurement of scattering parameters, Frequency measurement, VSWR measurements.

UNIT 2: Introduction to microstrip lines, Parallel striplines, Coplanar striplines, Shielded striplines, Slot lines, Integrated Fin line, Non-radiative guide, Transitions, Bends and Discontinuities.

UNIT 3: MICROWAVE NETWORK ANALYSIS: Impedance and Admittance matrices, Scattering matrix, Reciprocal networks and Loss less networks parameters, ABCD Matrix, Equivalent circuits for Two port Network, Conversions between two port network Signal flow graphs, Discontinuities in waveguides and microstrip.

UNIT 4: MICROWAVE SEMICONDUCTOR DEVICES: Construction, Operation and Practical applications of PIN diode, varactor and Tunnel diode, Gunn diode, IMPATT, TRAPTT diodes, BJT, JFET, MESFET, CCD, MASER and LASER.

UNIT 5: MONOLITHIC MICOWAVE INTEGRATED CIRCUITS: Introduction, Materials, MMIC Growth, MOSFET fabrication, Thin film formation, Hybrid integrated circuit fabrication, Advantages & Difficulties of MICs.

BOOKS

- Microwave Engineering, Annapurna Das, Sisir Das, TMH
- Foundations For Microwave Engineering, R.E. Collin, Wiley
- Microwave Devices And Circuits, Samuel Y. Liao, Pearson
- Microwave Engineering, Pozar, Wiley
- Microwave Engineering, M.L. Sisodiya, New Age

BEC-602 MICROPROCESSOR AND MICROCONTROLLER

UNIT 1: INTRODUCTION: CPU, address bus, data bus and control bus. Input/ Output devices, buffers, encoders, latches and memories.

UNIT 2: 8085 MICROPROCESSOR ARCHITECTURE: Internal data operations and registers, pins and signals, peripheral devices and memory organization, interrupts. CISC and RISC architecture overview.

UNIT 3: 8085 MICROPROCESSOR INSTRUCTIONS: Classification, format and timing. Instruction set. Programming and debugging, 8 bit and 16 bit instructions.

UNIT 4: 8085 MICROPROCESSOR INTERFACING: 8259, 8257, 8255, 8253, 8155 chips and their applications. A/D conversion, memory, keyboard and display interface (8279).

UNIT 5: INTRODUCTION TO 8051 MICROCONTROLLER: General features & architecture of 8051. Memory, timers and interrupts. Pin details. Interfacing and applications.

BOOKS

- 8051 Microcontroller: Hardware, Software And Application., V Udayashankara, M Mallikarjunaswamy, TMH
- Introduction To Microprocessors, Mathur, TMH
- Modern Microprocessors, Korneev, Wiley
- The 8085 Microprocessor: Architecture, Programming And Interfacing, K. Udaya Kumar, Pearson
- Microprocessor Interfacing And Applications, B.P.Singh, New Age
- Microprocessor: Architecture, Programming And Application For 8085, Goankar, Penram International
- Microprocessor: Architecture, Programming And System Featuring In 8085, William A.Routt, Delmur Pub
- The 8051 Microcontrollers & Embedded Systems, Mazidi, Pearson

BEC-603 INDUSTRIAL ELECTRONICS

UNIT 1: SEMICONDUCTOR POWER DEVICES - Basic characteristics & working of Power Diodes, Diac, SCR, Triac, Power Transistor, MOSFETs, IGBT, and GTO.

UNIT 2: RECTIFIERS & INVERTERS - Working principles of single and three phase bridge rectifiers, Voltage and current source inverters.

UNIT 3: POWER SUPPLIES: Principle of operation of choppers. Step up, Step down and reversible choppers. High frequency electronic ballast, Switch Mode Power Supply: Fly back converter, forward/buck converter, Boost converter and buck-boost converter. Uninterruptible Power Supply.

UNIT 4: MOTOR CONTROL: Introduction to speed control of DC motors using phase controlled converters and choppers, Basic idea of speed control of three phase induction motors using voltage and frequency control methods.

UNIT 5: Stepper Motors: Variable reluctance, Permanent magnet and hybrid stepper motors. Induction and dielectric heating control.

BOOKS

- Power Electronics Principles & Applications, Joseph Vithayathil, TMH
- Power Eletronics, Ravish Singh, TMH
- Industrial Electronics And Control, Ttti, TMH
- Power Electronics: Converters Applications., Mohan, Robbins, Wiley
- Power Electronics, Moorthi, Oxford
- Elements Of Power Electronics, Krein, Oxford
- Power Electronics, R.S.Murthy, Pearson
- Power Electronics: Circuits, Devices And Applications, Muhammad.H.Rashid, Pearson

BEC-604 DIGITAL COMMUNICATION

UNIT 1: **PCM & DELTA MODULATION SYSTEMS:** Uniform and Non-uniform quantization. PCM and delta modulation, Signal to quantization noise ratio in PCM and delta modulation. DPCM, ADM, T1 Carrier System, Matched filter detection. Error probability in PCM system.

UNIT 2: BASE BAND TRANSMISSION: Line coding(RZ, NRZ): Polar, Bipolar, Manchester, AMI. Inter symbol interference, Pulse shaping, Nyquist criterion, Raised cosine spectrum.

UNIT 2: DIGITAL MODULATION TECHNIQUES: Geometric interpretation of signals, Orthogonalization. ASK, BPSK, BFSK, QPSK, MSK modulation techniques and Coherent detection of these techniques. Calculation of error probabilities.

UNIT 4: INFORMATION THEORY: Amount of Information, Average Information, Entropy, Information rate, Increase in Average information per bit by coding, Shannon's Theorem and Shannon's bound, Capacity of a Gaussian Channel, BW-S/N trade off,

UNIT 5: CODING: Coding and decoding of Information, Hamming code, Single Parity- Bit Code, Linear Block code, cyclic code & convolutional code.

BOOKS

- Analog And Digital Communication, Hwei Hsu, Debjani Mitra, TMH
- Digital Commnunication, Amitabha Bhattacharya, TMH
- Schaums Outline And Digital Communication, Hwei Hsu, TMH
- Taub's Principles Of Communication Systems, Taub & Schilling, TMH
- Electronic Communication Systems, Kennedy, TMH
- Analog And Digital Communication, Sudakshina Kundu, Pearson
- Digital Communication, Sklar & Ray, Pearson
- Digital Communication, Ian Glover, Pearson
- Modern Digital And Analog Communication Systems, Lathi, Oxford
- Digital Communications, Simon Haykin, Wiley
- Digital And Analog Communication Systems, K.Sam Shanmugam, Wiley
- An Introduction To Analog And Digital Communication System, Simon Haykin, Wiley
- Information Theory And Network Coding, Raymond W, Springer
- Principle Of Digital Communication, J.Das, New Age
- Digital Commnunication, Barry John, Le, Edward, David.G, Springer

BEC-605 CONTROL SYSTEMS

UNIT 1: CONTROL SYSTEMS ANALYSIS AND COMPONENTS: Examples and application of open loop and close loop systems. Brief idea of multivariable control system, Brief idea of Z-transform and digital control systems. Differential equations. Determination of transfer function by block diagram reduction technique & signal flow graph method.

UNIT 2: TIME RESPONSE ANALYSIS OF FIRST ORDER & SECOND ORDER SYSTEMS: Transient response analysis. Steady state error & error constants. Dynamic error and dynamic error coefficient, Performance Indices.

UNIT 3: FREQUENCY DOMAIN METHODS: Bode plot, Design specification in frequency domain and their co-relation with time domain.

UNIT 4: STABILITY OF THE SYSTEM: Absolute stability and relative stability. Routh's stability criterion, Hurwitz criterion. Root locus method of analysis. Polar plots, Nyquist stability criterion. M and N loci, Nicholas charts.

UNIT 5: STATE VARIABLE ANALYSIS: Concepts of state, state variable and state model. State models for linear continuous time systems. Brief idea of state variable analysis in discrete time domain. Transfer functions, Solution of state equation. Concepts of controllability & observability.

BOOKS

- Control System Engineering, S Palani, TMH
- Control Systems, Manjita Srivastava, Mahesh Srivastava, Smriti Bhatnagar, TMH
- Schaum's Outline Of Feedback And Control Systems, Allen Stubberud, Ivan Williams, Joseph Distefano, TMH
- Control Systems: Principles & Design, M. Gopal, TMH
- Control Systems Engineering, S. K. Bhattacharya, Pearson
- Design Feedback Controk System, Stefani, Oxford
- Systems And Control, Zak, Oxford
- Automatic Control Systems, B. C. Kuo, Wiley
- Control Systems Engg., Norman S. Nise, Wiley
- Control System, N.K.Sinha, New Age
- Control System Engineering, J.Nagrath, New Age
- Control System, Ghosh, Pearson

BEC-606.1 NEURAL NETWORKS

UNIT 1: INTRODUCTION: Introduction to Neural Networks, Biological basis for NN, Human brain, Models of a Neuron, Directed Graphs, Feedback, Network architectures, Knowledge representation, Artificial intelligence & Neural Networks.

UNIT 2: LEARNING PROCESSES: Introduction, Error –Correction learning, Memory – based learning, Hebbian learning, Competitive learning, Boltzmann learning, Learning with a Teacher & without a teacher, learning tasks, Memory, Adaptation.

UNIT 3: SINGLE LAYER PERCEPTRONS: Introduction, Least-mean-square algorithm, Learning Curves, Learning rate Annealing Techniques, Perceptron, Perceptron Convergence Theorem.

UNIT 4: MULTI LAYER PERCEPTRONS: Introduction, Back-Propagation Algorithm, XOR Problem, Output representation and Decision rule, Feature Detection, Back-Propagation and Differentiation, Hessian Matrix, Generalization.

UNIT 5: RADIAL-BASIS FUNCTION NETWORKS & SELF-ORGANISING MAPS: Introduction to Radial basis function networks, Cover's Theorem on the Separability of Patterns, Interpolation Problem, Generalized Radial-Basis function networks, XOR Problem. Self-Organizing map, Summary of SOM Algorithm, Properties of the feature map.

BOOKS

- Artificial Neural Networks, Jacek M Zurada, Pws Pub Co
- Neural Networks: A Classroom Approach, Satish Kumar, TMH
- Artificial Neural Networks, Christina Ray, TMH
- Neural Networks For Pattern Reconization, Bishop, Oxford
- Neural Network In Soft Computing Framework, Swamy, Springer
- Fundamentals Of Neural Networks: Architectures, Algorithms And Applications., Fausett, Pearson
- Learning And Soft Computing: Support Vector Machines, Neural Networks, And Fuzzy Logic Models, Vojislav Kacman, Pearson
- Fuzzy Logic And Neural Networks:, Chennakesava R, New Age

BEC-606.2 PARALLEL COMPUTATION & ARCHITECTURE

UNIT 1 : INTRODUCTION - Synchronous and asynchronous paradigms of parallel computing.

UNIT 2 : HARDWARE TAXONOMY – Flynn's classification, Handler's classification, Software taxonomy, Kung's taxonomy, SPMD.

UNIT 3 : ABSTRACT PARALLEL COMPUTATIONAL MODELS – Combinational circuits, Sorting networks, PRAM models, interconnection RAMs.

UNIT 4 : **PARALLEL PROGRAMMING LANGUAGES:** Performances Matrices – Laws governing performance measurements, metrics-speed up, efficiency utilization, communication, overheads, single/multiple programme performances, benchmarks.

UNIT 5 : **PROCESSOR ARRAYS:** Basic Algorithms – Fast Fourier Transform, Linear System Solution, Sorting etc.

BOOKS

- Kai Hwang, "Advanced Computer Architecture", Mc Graw Hill
- Hwang and Briggs, "Advanced Computer Architecture", Mc Graw Hill

BEC-606.3 OPTIMIZATION TECHNIQUES

UNIT 1: INTRODUCTION -Historical development, engineering application of optimization, Formulation of design problems as a mathematical programming problem, Classification of optimization problems.

UNIT 2: LINEAR PROGRAMMING - Simplex methods, Revised simplex method, Duality in linear programming, post optimality analysis.

UNIT 3: Applications of Linear programming, Transportation and assignment problems.
UNIT 4: NON-LINEAR PROGRAMMING - Unconstrained optimization techniques, Direct search methods, Descent methods, Constrained optimization, Direct and Indirect methods.

UNIT 5: Dynamic Programming: Introduction, multi-decision processes, computational procedure

BOOKS

- Hiller and Lieberman, Introduction to Operation Research (Seventh Edition) Tata McGrawHill Publishing Company Ltd

- Ravindren Philips and Solberg, Operation Research Principles and Practice (Second Edition) John Wiley & Sons.

BEC-701 ANTENNA & WAVE PROPAGATION

UNIT 1: ANTENNA FUNDAMENTALS - Antenna parameters, Radiation from a current element in free space. Quarter & half wave antenna. Reciprocity theorem. Resonant and non-resonant antenna. Effective length and aperature, gain, beamwidth, directivity, radiation resistance, efficiency, polarization, impedance and directional characteristics of antenna, antenna temperature.

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UNIT 3: ANTENNAS - V and Rhombic antennas, Folded dipole, Yagi-Uda antenna, Frequency independent antennas, Log-periodic antennas, UHF and Microwave antennas- Antenna with parabolic reflectors, Horn and Lens antennas, Helical antennas, Square and Circular loop antennas, Fundamentals of Slot and Microstrip antennas.

UNIT 2: ANTENNA ARRAYS - Two element array, N-element linear arrays, Broadside, End fire, collinear and combination arrays, Multiplication of patterns, Binomial arrays. Effect of ground on antennas, Antenna loading Antenna Measurements - Antenna impedance, radiation pattern, gain, directivity, polarization and phase measurements

UNIT 4: RADIO WAVE PROPAGATION - Mechanism of radio wave propagation, Reflection, Refraction interference and diffraction of radio waves. Theory of ground wave, space wave and sky wave propagation. Plane earth reflection, Reflection factors for horizontal and vertical polarizations. Duct propagation and tropospheric scattering.

UNIT 5: Various Ionospheric layers. Characteristics of ionosphere and its effects on wave propagation. Critical frequency, Virtual height, skipzone & maximum usable frequency. Multiple hop transmission. Oblique & vertical incidence transmission. Effect of earth's magnetic field, solar activity and meteorological conditions on wave propagation.

BOOKS

- Antennas, John Kraus, Ronald Marhefka, TMH
- Electromagnetic Waves And Radiating Systems, E.C. Jordan And K.G. Balmain, PHI
- Antenna Theory: Analysis And Design, Constantine A. Balanis , John Wiley & Sons
- Antenna Theory & Design, Robert S. Elliott, John Wiley & Sons
- Antennas And Wave Propagation, G. S. N. Raju , Pearson
- Antennas And Wave Propagation, A.R. Harish, M. Sachidananda, Oxford
- Antenna Hand
- BOOK: Antenna Theory, Y. T. Lo, S. W. Lee, Springer
- Antenna Theory And Practice, Chatterjee, R., New Age International

BEC-702 DIGITAL SIGNAL PROCESSING

UNIT 1: SAMPLING - Discrete time processing of Continuous-time signals, continuous-time processing of discrete-time signals, changing the sampling rate using discrete-time processing.

UNIT 2: TRANSFORM ANALYSIS OF LTI SYSTEMS - Introduction, The frequency response of LTI systems, System functions for systems characterized by LCCD (Linear Constant Coefficient Difference) equations, All-pass system, Minimum-Phase systems, Linear systems with linear phase.

UNIT 3: STRUCTURES FOR DISCRETE-TIME SYSTEMS- Block diagram and signal flow graph representation of LCCD (LCCD – Linear Constant Coefficient Difference) equations, Basic structures for IIR and FIR systems, Transposed forms.

UNIT 4: FILTER DESIGN TECHNIQUES - Introduction, Analog filter Design: Butterworth & Chebyshev.IIR filter design by impulse invariance & Bilinear transformation. Design of FIR filters by Windowing: Rectangular, Hanning, Hamming & Kaiser.

UNIT 5: The Discrete Fourier transform (DFT), Properties of the DFT, Linear Convolution using DFT. Efficient computation of the DFT: Decimation–in-Time and Decimation-in frequency FFT Algorithms. Processing of speech signals: Vocoders, linear predictive coders.

BOOKS

- Digital Signal Processing, Sanjit K Mitra, TMH
- Digital Signal Processing, S.Salivahanan A Vallavaraj, C.Gnanapriya, TMH
- Digital Signal Processing: Principals, Algorithms And Applications, John G.Proakis, Dimitris G Manolakis, PHI
- Digital Signal Processing, A.V. Oppenheim And R.W. Schaffer, PHI
- Digital Signal Processing, Thomas J. Cavicchi, John Wiley & Sons
- Digital Signal Processing, Emmanuel Ifeachor, Barry Jervis, Pearson
- Digital Signal Processing, Chi-Tsong Chen, Oxford
- Digital Signal Processing, Engelberg, Shlomo, Springer
- Digital Signal Processing For Measurement , D Antona, Gabriele, New Age International

BEC-703 WIRELESS COMMUNICATION

UNIT 1: PROPAGATION PHENOMENA - Fundamentals of fading, Multipath channels, Spread Spectrum signals: Direct-sequence spread spectrum signals, p-n sequences, Frequency-hopped spread spectrum signals, Code-division multiplexing.

UNIT 2: LINE OF SIGHT MICOWAVE COMMUNICATION- Link Engineering, Frequency planning, Free space loss, Fresnel zone clearance bending of radio beam, Effective earth radius, Building blocks of Transmitter & Receiver.

UNIT 3: MULTIPLE ACCESS TECHNIQUES - FDMA, TDMA and CDMA with reference to mobile radio and satellite systems. TDMA based networks. CDMA based networks,

UNIT 4: CELLULAR WIRELESS NETWORKS-, GSM: Introduction, overview of theGSM systems, GSM codec, channel coding and interleaving, radio like control. Cordless systems and WLL, Mobile IP, Wireless access protocol. Wireless LAN's: Technology, IEEE 802.11 standards and Blue tooth. Broadband Wireless 802.16

UNIT 5: SATELLITE COMMUNICATION - Elements of satellite communication: Frequency bands, Transmission and multiplexing. Modulation, Multiple access. Satellite orbit and description- orbital period and velocity, effects of orbital inclination, Azimuth and elevation, Coverage angle and slant range, Geostationary orbit, Satellite description. Earth Station antenna, high-power amplifier, low-noise amplifier, up converter, down converter, monitoring and control, reliability. Satellite Link: basic link analysis,

BOOKS

- Mobile Cellular Telecommunications, W.C.Y. Lee, TMH
- Wireless Communication And Networking, Misra, TMH
- Fundamentals Of Satellite Communications, K.N. Raja Rao, PHI
- Wireless Broadband Networks, David T. Wong, Peng-Yong Kong, John Wiley & Sons
- Satellite Communications, Timothy Pratt, Charles Bostian And, John Wiley & Sons
- Wireless Communications, Theodore S. Rappaport, Pearson
- Wireless Communication And Networking, William Stallings, Pearson
- Wireless Communication, Upena Dalal, Oxford
- Broadband Wireless Communications, Jiangzhou Wang, Springer
- Wireless And Mobile Communication, Kumar, Sanjeev, New Age International

BEC-704 IC TECHNOLOGY

UNIT 1: INTRODUCTION TO TECHNOLOGIES- Semiconductor Substrate-Crystal defects, Electronic Grade Silicon, Czochralski Growth, Float Zone Growth, Characterization & evaluation of Crystals; Wafer Preparation- Silicon Shaping, Etching and Polishing, Chemical cleaning.

UNIT 2: DIFFUSION & ION IMPLANTATION- Ficks diffusion Equation in One Dimension, Atomic model, Analytic Solution of Ficks Law, correction to simple theory, Diffusion in SiO_2. Ion Implantation and Ion Implantation Systems Oxidation. Growth mechanism and Deal-Grove Model of oxidation, Linear and Parabolic Rate co-efficient, Structure of SiO_2, Oxidation techniques and system, Oxide properties.

UNIT 3: CHEMICAL VAPOUR DEPOSITION AND LAYER GROWTH- CVD for deposition of dielectric and polysilicon – a simple CVD system, Chemical equilibrium and the law of mass action, Introduction to atmospheric CVD of dielectric, low pressure CVD of dielectric and semiconductor. Epitaxy-Vapour Phase Expitaxy, Defects in Epitaxial growth, Metal Organic Chemical Vapor Deposition, Molecular beam epitaxy.

UNIT 4: PATTERN TRANSFER- Introduction to photo/optical lithography, Contact/ proximity printers, Projection printers, Mask generation, photoresists. Wet etching, Plasma etching, Reaction ion etching.

UNIT 5: VLSI PROCESS INTEGRATION- Junction and Oxide Isolation, LOCOS methods, Trench Isolation, SOI; Metallization, Planarization. Fundamental consideration for IC Processing, NMOS IC Technology, CMOS IC Technology, Bipolar IC Technology.

BOOKS

- Vlsi Technology, Sze, TMH
- Semiconductor Devices: Modelling And Technology, Nandita Dasgupta, Amitava Dasgupta, PHI
- Fundamentals Of Semiconductor Fabrication, Gary S. May, S.M.Sze, John Wiley & Sons
- Semiconductor Devices: Physics And Technology, Simon M. Sze, John Wiley & Sons
- Introduction To System Design Using Integrated Circuits, Sonde, B.S., New Age International
- Micro-Nanofabricationtechnologies And Applications, Cui, Zheng, Springer

BEC-705 VLSI DESIGN

UNIT 1: INTRODUCTION TO MOS TECHNOLOGY- Basic MOS transistors, Enhancement Mode transistor action, Depletion Mode transistor action, NMOS and CMOS fabrication.

UNIT 2: BASIC ELECTRICAL PROPERTIES OF MOS CIRCUITS- I_{ds} versus V_{ds} relationship, Aspects of threshold voltage, Transistor Transconductance g_m. The nMOS inverter, Pull up to Pull-down ratio for a NMOS Inverter and CMOS Inverter (B_n/B_p), MOS transistor circuit Model, Noise Margin.

UNIT 3: CMOS LOGIC CIRCUITS- The inverter, Combinational Logic, NAND Gate NOR gate, Compound Gates, 2 input CMOS Multiplexer, Memory latches and registers, Transmission Gate, Gate delays, CMOS-Gate Transistor sizing, Power dissipation.

UNIT 4: Basic physical design of simple Gates and Layout issues. Layout issues for inverter, Layout for NAND and NOR Gates, Complex Logic gates Layout, Layout optimization for performance.

UNIT 5: Introduction to VHDL, Prolog & other design tools. VHDL Code for simple Logic gates, flip-flops, shift registers.

BOOKS

- CMOS Digital Integrated Circuits Analysis , Sung-Mo (Steve) Kang, TMH
- Essentials Of Vlsi Circuits And Systems, Kamran Eshraghian, Eshraghian, PHI
- Introduction To Vlsi Circuits And Systems, John P. Uyemura, John Wiley & Sons
- Modern Vlsi Design, Wayne Wolf, Pearson
- Principles Of Cmos Vlsi Design, Neil H.E.Weste, Pearson
- Cmos Logic Circuit Design, Uyemura, John P., Springer
- Vlsi Design, Shanthi, A. Kavitha, A., New Age International
- Vlsi Design And Technology, Bose, D.N., New Age International

BEC-706.1 ADVANCED MICROPROCESSORS

UNIT 1 : 8086 ARCHITECTURE- Hardware specifications, Pins and signals, Internal data operations and Registers, Minimum and maximum mode, System Bus Timing, Linking and execution of Programs, Assembler Directives and operators.

UNIT 2: SOFTWARE & INSTRUCTION SET- Assembly language programming: addressing mode and instructions of 8086, MACRO programming, 8086 interrupts.

UNIT 3: ANALOG INTERFACING: A/D and D/A converter interfacing, keyboard and display interfacing, RS 232 & IEEE 488 communication standards**.**

UNIT 4 : DIGITAL INTERFACING: Programmable parallel ports**,** Interfacing microprocessor to keyboard and alphanumeric displays, Memory interfacing and Decoding , DMA controller.

UNIT 5 : MULTIPROCESSOR CONFIGURATIONS - Multiuser / Multitasking operating system concepts, 8086 based Multiprocessor systems. Introduction and basic features of 286, 386, 486 & Pentium processors.

BOOKS

- The 8088 AND 8086 microprocessors By Walter A. Trebel & Avtar Singh (PHI)
- 8086 Microprocessor By Uffenbeck (PHI)
- The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium And Pentium Pro Processor Architecture, programming and interfacing. By Barry B. Brey (PHI)

BEC-706.2 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

UNIT 1 : INTRODUCTION TO AI KNOWLEDGE- Importance of AI, Knowledge Base System Knowledge organization & manipulation, Conceptual Introduction to LISP and other AI programming Languages.

UNIT 2 : KNOWLEDGE REPRESENTATION- Syntax Semantics, Inference Rules, Non-deductive Inference methods, and representations using rules, forward chaining and backward chaining. Fuzzy Logic & Natural languages computations. Probabilistic Reasoning. Object Oriented Representations.

UNIT 3 : KNOWLEDGE ORGANIZATION & MANIPULATION- Search & control strategies, matching techniques, knowledge organization & management, Genetic Algorithms based search techniques.

UNIT 4 : KNOWLEDGE SYSTEMS ARCHITECTURE- Rule based, non-production, uncertainty knowledge system building tools.

UNIT 5 : KNOWLEDGE ACQUISITION- General concepts, learning by induction.

BOOKS

- Char nick “Introduction to Artificial Intelligence”, Addision Wesley.
- Rich & Knight, “Artificial Intelligence”.
- Winston, “LISP”, Addison Wesley.
- Marcellous, “Expert Systems Programming”, PHI.
- Elamie, “Artificial Intelligence”, Academic Press.

BEC-706.3 OPERATING SYSTEMS

UNIT 1: INTRODUCTION – History, Operating system services, types, responsibilities, generations, LINUX, WINDOWS.

UNIT 2: PROCESS MANAGEMENT- Operations on process, Process state, Scheduling, Criteria, scheduling algorithms, Evaluation, Synchronization, Semaphores, Monitors.

UNIT 3: MEMORY MANAGEMENT- Swapping, Continuous memory allocation, Paging, Pure paging, Demand paging, Page-replacement algorithms, thrashing, Example-Pentium, Disk Scheduling.

UNIT 4: INFORMATION MANAGEMENT- File and directory concept, Access methods, Protection, Free space management, Efficiency and performance, Access matrix, Capability-based systems, Program-threats, User authentication, Firewall.

UNIT 5: DEAD LOCKS- System model, Dead lock characterization, Deadlock prevention, Avoidance, Detection, Recovery, Classic problems of synchronization.

BOOKS

- Operating Systems, Dhamdhere, TMH
- Operating System:, Crowley, TMH
- Modern Operating Systems, Andrew S Tanenbaum, PHI
- Operating Systems:, Pal Chaudhury, PHI
- Operating System Principles, Peter B. Galvin, Greg Gagne, John Wiley & Sons
- Operating Systems, Gary Nutt, Pearson
- Operating Systems: Internals And Design Principles, William Stallings, Pearson

BEC-801 COMPUTER NETWORKS

UNIT 1: QUEUING THEORY- Pure birth, Pure death & Birth-death processes, Mathematical models for M/M/1, M/M/∞, M/M/m, M/M/1/K and M/M/m/m queues. Little's formula. M/G/1 Queuing model basics.

UNIT 2: DATA LINK LAYER - Packet & Circuit switching, OSI & TCP/IP Reference Models, Framing, Simplex protocol, Simplex stop & wait protocol, Sliding window protocol, Go back N protocol, selective repeat, HDLC, Data link layer in internet.

UNIT 3: MEDIUM LAYER- Static & dynamic channel allocation, Multiple Access Protocols: ALOHA, slotted ALOHA, CSMA, Token Bus, Token Ring, FDDI, IEEE standards 802.2, 802.3 Hubs, Bridges, Routers & Gateways.

UNIT 4: NETWORK LAYER- Network layer Design issues.
Adaptive & Non-adaptive routing algorithms, Congestion control algorithms for TCP/IP networks, Internetworking, Network layer in the Internet: IPv4 & IPv6 Protocols, OSPF and BGP. TCP Protocol architecture.

UNIT 5: ATM NETWORKS- Connection Oriented Networks: X.25, Frame Relay & ATM. ISDN system architecture. Broadband ISDN. ATM Protocol architecture, Recognition Algorithm in ATM Networks, Congestion control Algorithms.

BOOKS

- Computer Network, Leon And Garcia, TMH
- Data Communication And Networking(Sie), Forouzan, TMH
- Computer Network, Tanenbaum, Pearson
- Computer Networking, Kurose, Pearson
- Computer Networking And Inernet, Halsell, Pearson
- Digital Telephony, 3rd Ed, James Irvine & David Harle, Wiley
- Line Communication System: Telecommunication Switching Approach, Das, Apurba, New Age
- Telecommunication Switching And Networks, Gnanasivam, New Age

BEC-802 RADAR & TV ENGINEERING

UNIT 1: RADAR - Radar Block diagram, frequencies and applications. Radar range equation. Continuous wave (CW) & FM radar; Moving target indicator (MTI): Delay line cancellers, blind velocity Pulse Doppler Radar. Tracking radar sequential lobbing, Conical scan and monopulse radar, Types of display, Radar receivers, Noise figure.

UNIT 2: NAVIGATIONAL AIDS - Principle of operation of Radar direction finder & range system. LORAN system, DME, TACAN, Aircraft landing systems.

UNIT 3: TV ENGINEERING- Theory of scanning standards, Principles of Monochrome and colour T.V. system (PAL, SECAM, NTSC). Composite video signal analysis. T.V Cameras: Image orthicon, plumbicon, vidicon. CCD camera tubes. Types of Monochrome and colour picture tubes, set-up adjustments. LCD and Plasma displays

UNIT 4: Picture, colour and sound carriers. Vestigial side band transmission. Encoding picture information. Chrominance modulation. Compatibility of colour and monochrome T.V. systems. Block diagram of T.V. transmitters. TV transmission & reception antennas.

UNIT 5:TV RECEIVER: Functional block diagram of T.V. receiver, R.F. Tuner, I.F. amplifier, Video detector, video amplifier, AGC, Synch. Separation, Sync. Processing and AFC. Deflection oscillators, vertical & horizontal deflection and sound system circuits. EHT generation. Common faults and their diagnosis. Basic idea of HDTV, DBS-TV and 3D-TV.

BOOKS

- Radar Principles, By Peyton Z. Peebles, Oxford
- Radar Hand
- BOOK, By Merrill I. Skolnik, Oxford
- Television Engineering And Video System, By Rg Gupta, TMH
- Television & Video Engineering, By Dhake, TMH
- Modern Television Practice – Principle, R.R. Gulati, New Age
- Monochrome And Colour Tv, By R.R. Gulati, New Age
- Components, And Circuits Hand
- BOOK (Hardcover), By Ferril Losee, New Age

BEC-803 OPTICAL COMMUNICATION

UNIT 1: OPTICAL FIBERS - Basic optical laws and definitions, Principles of light propagation in fibers, Ray theory, Optical fiber modes and configurations, Step index and graded index fibers, Monomode and multimode fibers, Fiber materials, fiber fabrication, Fiber optic cables. Attenuation, signal distortion in optical fibers, Dispersion- intra modal & inter modal, Dispersion shifted and flattened fiber.

UNIT 2: OPTICAL SOURCES - LED's- Structure, Materials, Characteristics, Modulation, Power & efficiency, Laser Diodes - Basic concept, Hetro Structure, properties and modulation.

UNIT 3: OPTICAL DETECTORS - PIN and Avalanche photo diodes, photo detector noise, detector response time, Avalanche multiplication noise. Photo diode materials. Fundamental of Optical Receiver Operation.

UNIT 4: OPTICAL FIBER COMMUNICATION SYSTEMS- Source to fiber coupling, fiber to fiber joints, fiber splicing, fiber connectors. Principal components. Link design calculation, Applications, Wavelength division multiplexing.

UNIT 5: OPTICAL FIBER MEASUREMENTS: Measurements of Fiber attenuation, Dispersion, refractive index profile, Numerical aperture & diameter.

BOOKS

- Optical Fibre And Laser: Principles And Applications, De, Anuradha, New Age
- Opto Electronics And Fibre Optics Communication, Sarkar, D.C,
- Optical Fiber Communications: Principles And Practice, G P Agrawal, Govind P Agrawal, Wiley
- Optical Fiber Communications: Principles And Practice, John Senior, PHI
- Fiber Optics Communications, Joseph C Palais, PHI
- Fiber- Optic Communications Technology, Lowell L Scheiner, PHI
- Fiber Optics Communications, Harold Kolimbiris, PHI
- Understanding Fiber Optics, Jeff Hecht, PHI
- Optical Communication System, Johan Gowar, PHI
- Fiber Optics And Optoelectronics, Khare, Oxford
- Introduction To Optical Fiber Communications Systems, William B. Jones, Oxford
- Optical Wdm Networks - Principles And Practice, Biswanath Mukherjee, Oxford
- Optical Fiber Communication: Principles And Practice,: John M Senior, Pearson
- Fiber Optics Communication(With Cd), Kolimbiris, Pearson
- Fiber Optics Communication Technology, Mybaev, Pearson
- Optical Communication, Palais, Pearson
- Optical Fiber Communications, Keiser, Gerd, TMH
- Fiber Optics Communications, Gerard Lachs, Bepdf, TMH
- Optical Fiber Communication: Principles And Systems, Selvarajan, A, TMH

BEC-804. 1 IMAGE PROCESSING AND PATTERN RECOGNITION

UNIT 1: INTRODUCTION: Imaging in ultraviolet and visible band. Fundamental steps in image processing. Components in image processing. Image perception in eye, light and electromagnetic spectrum, Image sensing and acquisition using sensor array.

UNIT 2: DIGITAL IMAGE FUNDAMENTALS: Image sampling and quantization, Representing digital images, Spatial and gray-level resolution, Aliasing and Moiré patterns, Zooming and Shrinking digital images.

UNIT 3: IMAGE RESTORATION: Image restoration model, Noise Models, Spatial and frequency properties of noise, noise probability density functions, Noise - only spatial filter, Mean filter Statistic filter and adaptive filter, Frequency domain filters - Band reject filter, Band pass filter and Notch filter.

UNIT 4: IMAGE COMPRESSION: Compression Fundamentals - Coding Redundancy, Interpixel redundancy, Psycho visual redundancy and Fidelity criteria. Image Compression models, Source encoder and decoder, Channel encoder and decoder, Lossy compression and compression standards. Color space formats, scaling methodologies (like horizontal, vertical up/down scaling). Display format (VGA, NTSC, PAL).

UNIT 5: EXPERT SYSTEM AND PATTERN RECOGNITION: Use of computers in problem solving, information representation, searching, theorem proving, and pattern matching with substitution. Methods for knowledge representation, searching, spatial, temporal and common sense reasoning, and logic and probabilistic inferencing. Applications in expert systems and robotics

BOOKS

- Digital Image Processing Using MATLAB, Gonzalez, Woods and Eddins, Gatesmark Publishing
- Applications of Pattern Recognition, Fu, K.S., CRC Press
- Digital Image Restoration, Andrews, H.C. Hunt, B.R., Prentice Hall, Englewood Cliffs.
- Applications of Digital Signal Processing, Oppenheim, A.V.,Prentice Hall Englewood Cliffs.
- Digital Image Processing, Gonzalez, R.C. & Wintz, P.A., Reading, Addison-Wesley.
- Digital Image Processing, Pratt, W.K., New York: Wiley
- Digital Image Processing of Remotely Sensed Data, Hord, R.M., Academic Press.
- Pattern Recognition: Human and Mechanical, Watanabe, S., Wiley
- Fundamentals of Digital Image Processing, Jain, A.K., Prentice Hall
- Algorithms for Graphics and Image Processing, Pavlidis, T., Computer Sc.Press
- Selected Papers on Digital Image Processing, Trivedi, M.M., Optical Engg Press.
- The Image Processing Handbook, Ross, J.C., CRC Press, Boca Raton

BEC-804.2 VHDL

UNIT 1: INTRODUCTION – Fundamental & history of various hardware description language, Design flow of ASICs and and standard logic circuits using software.

UNIT 2: COMBINATIONAL CIRCUIT BUILDING BLOCKS- Multiplexer, Decoders, encoders, Code Converters, VHDL Code for Combinational Circuits.

UNIT 3: SEQUENCIAL CIRCUITS: VHDL code for Flip-Flops, shift registers, Counters.

UNIT 4: SYNCHRONOUS/ ASYNCHRONOUS SEQUENCIAL CIRCUITS: Mealy & Moore type FSMs, VHDL Code for Mealy & Moore Machines, VHDL Codes for Serial Adder, Vending Machine.

UNIT 5: DIGITAL SYSTEM DESIGN- Building Block circuits, Memory organization, SRAM, Design examples of divider, Multiplier, Shifting & Sorting Operations, Clock Synchronization, CPU organization and design concepts.

BOOKS

- VHDL: Programming By Example, Douglas Perry, Oxford
- The Designer's Guide To Vhdl, Peter J. Ashenden, Oxford
- VHDL (Text BOOK Binding), Douglas L. Perry, Thh
- VHDL For Programmable Logic, Skahill, Pearson
- Introductory VHDL : From Simulation To Synthesis, Yalamanchili, Pearson
- Circuit Design With VHDL , By Volnei A Pedroni, PHI

BEC-804.3 MICROCONTROLLER AND EMBEDED SYSTEMS

UNIT 1 : THE 8051 MICROCONTROLLER: Introduction, The 8051 microcontroller hardware, I/O pins, Port, External memory, Counters and Timers, Serial data. Interrupts.

UNIT 2 : 8051 ASSEMBLY LANGUAGE PROGRAMMING: Addressing modes, External data moves, push and pop opcodes, Logical operations, Byte level and bit level logical operations. Arithmetic operations, Jump and call instructions, Interrupts & returns.

UNIT 3: REAL TIME CONTROL: Interrupts, Multiple sources of interrupts, Non maskable sources of interrupts, Interrupt structure in 8051,Timers,Free running counter & Real Time control .

UNIT 4: SYSTEM DESIGN: Serial I/O interface, Parallel I/O ports interface, Digital and Analog interfacing methods, LED array, keyboard, Printer, Flash memory interfacing.

UNIT 5: INTRODUCTION TO EMBEDED SYSTEM: Application of Microcontrollers in interfacing, Robotics, MCU based measuring instruments. Real Time Operating System for System Design, Multitasking System, Task Definition in a Multitasking System, Round Robin Scheduling, Full Pre-emptive Scheduling, Basic study and Features of Commercial RTOS : WINCE and Embedded Linux.

BOOKS:

- B. B. Brey: The Intel Microprocessors, Architecture, Programming and Interfacing, Pearson Education.
- Liu Gibson: Microcomputer Systems: The 8086/8088 Family- Architecture, Programming And Design , PHI
- D. V. Hall: Microprocessors and Interfacing, TMH
- Mazidi and Mazidi: The 8051 Microcontroller and Embedded Systems, Pearson Education.
- Ayala Kenneth:- The 8051 microcontroller, Third Edition, Cengage Learning
- A. V. Deshmukh: Microcontroller (Theory and Application), TMH.
- Raj Kamal: Embedded Systems- Architecture, Programming and Design, TMH,
- V. Udayashankara and M. S. Mallikarjunaswamy: 8051 Microcontroller, TMH,