Annexure-1

Vision & Mission

The University will impart World Class Technical, Scientific and Professional Education, uphold and maintain high standard of Academic Excellence. It will nurture young and talented human resources for the service of Society as a whole.

To develop Professional competence and capability in students and faculties which will make the best use of their intrinsic potential. This will cater to the need and upliftment of the society and inculcate ethical values. It will create and disseminate knowledge in all spheres and play a vital role in the Socio- Economic Growth of the nation.

ELECTRONICS AND COMMUNICATION ENGINEERING

III SEMESTER

SUBJECT CODE	NAME OF SUBJECT	TEACHING PERIOD			Credit
		L	T	P	
03BEC101	Mathematics-III	3	1	0	4
03BEC102	Electronic Devices & Circuits	3	0	0	3
03BEC103	Circuit Analysis & Synthesis	3	1	0	4
03BEC104	Electronic Measurements & Instru.	3	0	0	3
03BEC105	Electronic Materials and processes	3	1	0	4
03BEC106	Data Structures & Algorithms	3	0	0	3
03BEC201	Electronics Workshop Lab	0	0	2	1
03BEC202	Computer Programming Lab-I	0	0	3	2
03BEC203	Electronics Lab-I	0	0	3	2

03BEC204	Electronic Measurement & Instru. Lab	0	0	3	2
03BEC301	Discipline & Co- Curricular activities :	0	0	4	1
TOTAL		18	3	15	29

IV SEMESTER

SUBJECT CODE	NAME OF SUBJECT	TEACHING PERIOD			Credits
		L	T	P	
04BEC101	Mathematics-IV	3	1	0	4
04BEC102	Analog Electronics	3	0	0	3
04BEC103	Digital Electronics	3	1	0	4
04BEC104	Electromagnetic Field Theory	3	1	0	4
04BEC105	Random Variables & Stochastic Process	3	1	0	4
04BEC106	Object Oriented Programming	3	0	0	3
04BEC201	Computer Programming Lab-II	0	0	3	2
04BEC202	Electronics Lab-II	0	0	3	2
04BEC203	Digital Electronics Lab	0	0	2	1
04BEC204	Humanities	0	0	2	1
04BEC301	Discipline & Co- Curricular activities :	0	0	4	1
TOTAL		18	4	14	29

V SEMESTER

SUBJECT CODE	NAME OF SUBJECT	TEACHING PERIOD			CREDITS
		L	T	P	
05BEC101	Signals & Systems	3	1	0	4
05BEC102	Linear Integrated Circuits	3	0	0	3
05BEC103	Telecommunication Engg.	3	1	0	4
05BEC104	Analog Communication	3	0	0	3
05BEC105	Microwave Engg. -I	3	1	0	4
05BEC106	Advanced Data Structures	3	0	0	3
05BEC201	Electronic Engineering Design Lab	0	0	2	1
05BEC202	Microwave Engg. Lab	0	0	3	2
05BEC203	Communication Lab-I	0	0	3	2
05BEC204	Signal Processing Lab-I	0	0	3	2
05BEC301	Discipline & Co- Curricular activities :	0	0	4	1
TOTAL		18	3	15	29

VI SEMESTER

SUBJECT CODE	NAME OF SUBJECT	TEACHING PERIOD			CREDITS
		L	T	P	
06BEC101	Microwave Engg.-II	3	1	0	4
06BEC102	Microprocessor and Microcontroller	3	0	0	3
06BEC103	Industrial Electronics	3	1	0	4
06BEC104	Digital Communication	3	0	0	3
06BEC105	Control Systems	3	1	0	4
06BEC106	Optimization Techniques	3	0	0	3
06BEC201	Communication Lab-II	0	0	2	1
06BEC202	Microprocessor Lab	0	0	3	2
06BEC203	Unix Shell Programming Lab	0	0	3	2
06BEC204	Industrial Electronics Lab	0	0	3	2
06BEC301	Discipline & Co- Curricular activities :	0	0	4	1
TOTAL		18	3	15	29

VII SEMESTER

SUBJECT CODE	NAME OF SUBJECT	TEACHING PERIOD			CREDITS
		L	T	P	
07BEC101	Antenna & Wave Propagation	3	0	0	3
07BEC102	Digital Signal Processing	3	1	0	4
07BEC103	Wireless Communication	3	0	0	3
07BEC104	IC Technology	3	0	0	3
07BEC105	VLSI Design	3	1	0	4
07BEC106	Operating System	3	0	0	3
07BEC201	Signal Processing Lab-II	0	0	3	2
07BEC202	Wireless Communication Lab	0	0	3	2
07BEC203	Training Seminar& Industrial Visit	0	0	3	2
07BEC204	Project (Stage I)	0	0	3	2
07BEC301	Discipline & Co- Curricular activities :	0	0	4	1
TOTAL		18	2	16	29

VIII SEMESTER

SUBJECT CODE	NAME OF SUBJECT	TEACHING PERIOD			CREDITS
		L	T	P	
08BEC101	Computer Networks	3	1	0	4
08BEC102	Radar & TV Engineering	3	1	0	4
08BEC103	Optical Communication	3	0	0	3
08BEC104.1 08BEC104.2 08BEC104.3	ELECTIVE SUBJECT (ANY ONE) IMAGE PROCESSING AND PATTERN RECOGNITION VHDL MICROCONTROLLER AND EMBEDDED SYSTEMS	3	1	0	4
08BEC201	Computer Network Programming Lab	0	0	3	2
08BEC202	Industrial Economics & Management	0	0	2	1
08BEC203	VLSI & Optical Fiber Lab	0	0	3	2
08BEC204	Project(Stage-II)	5	0	0	5
08BEC205	Seminar	3	0	0	3
08BEC301	Discipline & Co- Curricular activities :	0	0	4	1
TOTAL		20	3	12	29

III SEMESTER

MATHEMATICS-III

Course/Paper: 03BEC-101
BEC Semester-III

Course Objective:

The main aim of teaching mathematics - III to develop the thinking ideas of students. In this we made the choice with great care, using past and present techniques, research experience and resulting the temptation to include everything which is important in Engineering Mathematics. Hence the student should learn to recognize the guiding principles and ideas behind the scenes which are more important than formal manipulations.

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 .

UNIT3 : 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.

Text Books:

1. Johnson- probability and statistics for engineers, pearson education.

Reference

1. B.S.Grewal- higher engineering mathematics : Khanna Pub.
2. Chandrika Prasad- Mathematics for engineers
3. gaur and Kaul- engineering mathematics, Vol I & II;JPH

Course Outcomes:

By studying Mathematics – III the students are able to understand laplace and fourier transform. By studying complex variable the students identifying ordinary point, singular point and regular point for the given ordinary differential equations. By using the Z-transforms students find the particular solution of the differential equation without finding the general solution and students are able to solve the applications of differential equations with boundary and initial conditions.

ELECTRONIC DEVICES & CIRCUITS

Course/Paper: 03BEC-102
BEC Semester-III

Course Objective:

To familiarize the student with the semiconductor physics, analysis and design of basic transistor, construction and working of JFET and MOSFET amplifier circuits and their frequency response characteristics.

UNIT 1 : SEMICONDUCTOR PHYSICS : Mobility and conductivity, charge densities in a semiconductor, Fermi Dirac distribution, carrier concentrations and fermi levels in semiconductor, 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 frequency 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 frequency. Analysis of DC and differential amplifiers, Miller's Theorem. Cascading Transistor amplifiers, Darlington pair. Emitter follower, source follower.

Text Books:

1. J.Milliman & C.C. Halkias – Integrated Electronics: TMH
2. Robert Boylestand & L.Nashelsky Electronic devices & circui theory
3. Sedra Smith- Microelectronic Circuits, Oxford Press, India.

Reference:

1. Rajeev tiwari – "electronic devices & circuits", genius publication.
2. H.P.Tiwari "electronic devices & cuircuit", Ashirwad pub.
3. J.B.Gupta "Electronic Devices & Communication", Katson

Course Outcomes:

Upon completion of the subject, students will be able to:

- Design and analyze the circuitry of BJT & FET.
- Analyze the different types of amplifiers, operation and its characteristics.

CIRCUIT ANALYSIS & SYNTHESIS

Course/Paper: 03BEC-103
BEC Semester-III

Objectives:

- Designs of this subject to students to have a firm grasp the basics of electrical circuits.
- Emphasis on the basic theorems & network reduction techniques of analysis which helps to develop the ability to design practical circuits used for real time applications.
- Understanding the behavior of networks containing R, L, & C elements, when they suddenly switched on to a source is very important in several practical conditions, & this behavior of the network is covered in transient analysis.
- Detail average of topics relative to filters & attenuators emphasis the students to have best knowledge in electronics circuits.
- Study of 2-port networks in detail, helps the students to analyze the problems in electronic circuits & singles.

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

Text Books:

1. Engineering Circuit Analysis by Willian Hayt and Jack E.Kemmerlly McGraw Hill Company.
2. Circuits & Networks by A.Sudhakar and Shyammohan S .Palli, Tata Mc.Graw Hill
3. Electric circuits by A. Chakrabarthy, Dhanipat Rai &Sons.
4. Kuo, Franklin F – Network Analysis and synthesis, II Ed, 1999, John Willy & Sons
5. Desoer, C. and Duh, E.S- E.S. Basic Circuit theory, Mc Graw Hill.

Reference

1. Schoum's Outline series on circuit analysis.
2. K.M. Soni – circuit theory " S.K. Kataria & Sons"

Course Outcomes:

1. Exhaustive coverage of basic network reduction techniques and Theorems helps the students in easy reduction of Electrical circuits
2. Coverage of Two-Port networks will helps the students to analyze the complex electronic circuits
3. Design of Filters & Attenuators will helps the students in practical design electrical & electronic circuits

ELECTRONIC MEASUREMENTS & INSTRUMENTATION

Course/Paper: 03BEC-104
BEC Semester-III

Course Objectives:

The course aims to provide adequate knowledge about working and design of electrical and electronic instruments, sensors that are widely used in measurement. It aims at providing working knowledge of the simulation software Lab VIEW which is widely used in industry. The application of statistical techniques in evaluating the performance of an instrument is emphasized.

UNIT 1: ELECTRONIC INSTRUMENTS FOR MEASURING BASIC PARAMETERS: -

Voltage Measurement – Integrating type Voltmeter (Voltage to frequency Converter), Successive Approximation Type Voltmeter, Ramp type Digital Voltmeter, Digital Multimeter, Q Meter , Digital Frequency Meter.

UNIT 2: OSCILLOSCOPES:-Multi input Oscilloscopes. Dual Trace Oscilloscopes, Dual Bea Oscilloscopes, Sampling Oscilloscopes. Analog – Storage Oscilloscope. Principle of Secondary emissions. Digital Storage Oscilloscope – Principle of operation. Waveform reconstruction, Comparison between analog & digital storage Oscilloscope.

UNIT 3: A.C. BRIDGES: -Generalized treatment of four arm, A.C. Bridges, Sources & Detectors, Measurement of self inductances with the help of Maxwell's Bridges, Hay's Bridge, Anderson's Bridges De-sauty Bridge for Capacitance Measurement, Wein's Bridge for Capacitance and frequency measurement. Measurement of Earth Resistance.

UNIT 4: SIGNAL GENERATION:-Signal Analysis **-** Measurement Technique, Wave Analyzers, Frequency - selective wave analyzer, Heterodyne wave analyzer, Harmonic distortion analyzer, Spectrum analyzer.

UNIT 5: PROCESS CONTROL: -Diaphragms, Seismic Accelerometers, Ultrasonic Flow meters, Principle of Optical fibers, Acceptance angle & numerical aperture, Photoelectric Tachometer, Variable reluctance tachometer, stroboscope. Introduction to Programmable logic control

Text Books

1. Golding E.W and Widdis F.G., 'Electrical Measurements and Measuring Instruments', Fifth Edition, Wheeler and Co., New Delhi, 2000.

Reference

1. H.S.Kalsi – "Electronic Tns. & Measurement" TMH
2. W.D.Cooper – "Electronic Tns. & Measurement technique", PHI
3. A.K. Sawhney- "Electrical & Electronic Measurement & ins." Dhanpat Ray Pub.
4. J.B.Gupta "electronic measurement & instrumentation", katson pub.

Course Outcomes:

Upon a successful completion of this course, the student will be able to.

- Describe the fundamental concepts and principles of instrumentation.
- Explain the operations of the various instruments required in measurements.
- Apply the measurement techniques for different types of tests.
- To select specific instrument for specific measurement function.
- Learners will apply knowledge of different oscilloscopes like CRO, DSO.
- Students will understand functions, specification, and applications of signal analyzing instruments.

ELECTRONIC MATERIALS & PROCESSES

Course/Paper: 03BEC-105
BEC Semester-III

Course Objectives:

The course aims to provide adequate knowledge about dielectric, magnetic, semiconductor materials and 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.

Text Books:

1. S.O.Kasap – Principal Of electrical engineering material and process, Mc Graw Hill

Reference

1. B.D.Indu – Electrical Engineering Materials. Jain Brothers
2. S.P.Seth and P.V.Gupta – Acourse of electrical engineering materials, Dhanpat rai Pub.
3. preeti maheshwari – electronic material & process, New Age Pub.

Learning Outcomes:

1. The student learns about fabrication of semi conductors into devices.
2. The student learns about dielectrics and magnetic materials along with their engineering applications.

DATA STRUCTURES & ALGORITHMS

Course/Paper: 03BEC-106
BEC Semester-III

Course Objectives:

- To provide a foundation on generic programming based on over loading concepts, inheritance and virtuality.
- To inculcate ability to grasp the behavior of data structures such as stacks, queues, trees, hash tables, search trees, graphs and their representation and to apply them in problem solving.
- To provide a working knowledge on searching and sorting techniques and to write programs to solve problems on arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.

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 un weighted graphs, BFS, DFS, Minimum cost spanning trees, Single source shortest path. Sorting **-** Bubble sort, insertion sort, merge sort, selection sort, quick sort, heap sort.

Text Books:

1. Harowitz & Sawhni : Data Structure in pascal (BPB Pub.)

Reference

1. Langran , Augensteln & Tenenbaum data structure using C & C++, PHI,
2. Kruse, Leung & Tondo : data structure & Program Design in C, Pearson Education.
3. Prkati trivedi “Data Structure Algorithm”,

Course Outcomes:

1. Understanding of fundamental concepts of abstract data types and general standard data structures.
2. Ability to design linear data structures stacks, queues and linked lists.
3. Ability to design nonlinear data structures, trees and graphs, and to implement their operations.
4. Ability to implement different searching and sorting techniques.
5. Ability to apply different searching and sorting techniques for real world problems.

ELECTRONICS WORKSHOP- LAB

Course/Paper: 03BEC-201
BEC Semester-III

Course objectives

- This course intends to provide an overview of the principles and operation of electronic components.
- To understand the operation of power supply circuits and voltage regulators.
- To understand the characteristics of the active devices.
- To Understand the construction of simple electronic circuits.

1. Identification, Study & Testing of various electronic components :
(a) Resistances-Various types, Colour coding (b) Capacitors-Various types, Coding, (c) Inductors
(d) Diodes (e) Transistors (f) SCRs (g) ICs (h) Photo diode (i) Photo transistor (j) LED (k) LDR
(l) Potentiometers
2. Study of symbols for various Electrical & Electronic Components, Devices, Circuit functions etc.
3. To study and perform experiment on CRO demonstration kit.
4. Soldering & desoldering practice.
5. (a) To Design & fabricate a PCB for a Regulated power supply.
(b) Assemble the Regulated power supply using PCB and test it.
6. To study and plot the characteristics of following Opto-Electronic devices –
(a) LED (b) LDR (C) Photovoltatic cell (d) Opto-coupler
(e) Photo diode (f) Photo transistor (g) Solar cell
7. To study the specifications and working of a Transistor radio kit and perform measurements on it.
8. To study the specifications and working of a Tape Recorder kit.
9. To prepare design layout of PCBs using software tools.
10. To fabricate PCB and testing of electronics circuit on PCB.
11. To design and test regulated power supply using ICs
12. To study the specifications and working of a VCD Player.
13. To study the specifications and working of color TV.

Course Outcomes.

After completion of this course Student able

- To Identify all the electronic components.
- To understand principle and working of basic electronic components.
- To construct simple electronic circuits.

COMPUTER PROGRAMMING LAB-I

Course/Paper: 03BEC-202
BEC Semester-III

Course Objectives:

To provide a comprehensive working knowledge on the object oriented language C and to provide implementation experience on abstract data types, linear and nonlinear data structures for problem solving. To provide a working knowledge on generic programming based on over loading concepts, inheritance and virtuality. To inculcate ability to grasp the behaviour of data structures such as stacks, queues, trees, hash tables, search trees, graphs and their representation and to apply them in problem solving. To provide an application oriented working knowledge on searching and sorting techniques and to write programs to solve problems on arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.

Program in C

1. Simple array and sorting algorithm implementations.
2. Addition, multiplication and transpose of sparse matrices represented in array form.
3. Polynomial addition, multiplication (8_{th} degree polynomials), using array & linked lists.
4. Implementation of stack and queue using array & linked lists.
5. Implementation of circular queue using array.
6. Infix to postfix/prefix conversion.
7. Binary search tree creation and traversing.
8. Generation of spanning trees for a given graph using BFS & DFS algorithms.
9. AVL tree implementation (creation, insertion, deletion).
10. Symbol table organization (Hash Table).

Course Outcomes:

- An ability to apply knowledge of mathematics, science, and engineering to real-world problems.
- Ability to model, understands, and develops complex software for System Software as Well as Application Software.
- Understanding of fundamental concepts of abstract data types and general standard data structures.
- Ability to design linear data structures stacks, queues and linked lists.
- Ability to design nonlinear data structures, trees and graphs, and to implement their operations.
- Ability to implement different searching and sorting techniques.
- Ability to apply different searching and sorting techniques for real world problems.

ELECTRONICS LAB I

Course/Paper: 03BEC-203
BEC Semester-III

Course Objectives:

1. To introduce the students the operational principle of CRO, Diodes, and their models.
2. To study the operational principle and analysis of single and multi stage amplifiers.
3. To study the operational principle and analysis of power amplifiers.

4. To introduce the students about rectifiers.

1. Study the following devices:
(a) Analog & digital multimeters
(b) Function/ Signal generators
(c) Regulated d. c. power supplies (constant voltage and constant current operations)
(d) Study of analog CRO, measurement of time period, amplitude, frequency & phase angle using Lissajous figures.
2 Plot V-I characteristic of P-N junction diode & calculate cut-in voltage, reverse Saturation current and static & dynamic resistances.
3 Plot V-I characteristic of zener diode and study of zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator.
4 Plot frequency response curve for single stage amplifier and to determine gain bandwidth product.
5 Plot drain current - drain voltage and drain current – gate bias characteristics of field effect transistor and measure of I_{dss} & V_p
6 Application of Diode as clipper & clamper
7 Plot gain- frequency characteristic of two stage RC coupled amplifier & calculate its bandwidth and
compare it with theoretical value.
8 Plot gain- frequency characteristic of emitter follower & find out its input and output resistances.
9 Plot input and output characteristics of BJT in CB, CC and CE configurations. Find their hparameters.
10 Study half wave rectifier and effect of filters on wave. Also calculate theoretical & practical ripple factor.
11 Study bridge rectifier and measure the effect of filter network on D.C. voltage output & ripple factor.

Course Outcomes.

After completion of this course Student able to:

- To Identify the various electronic circuits.
- To understand principle and working of basic electronic components.
- To construct simple electronic circuits.

ELECTRONIC MEASUREMENT & INSTRUMENTATION LAB

Course/Paper: 03BEC-204
BEC Semester-III

Course Objectives:

1. To provide students adequate knowledge about working and design of electrical and electronic instruments, sensors that are widely used in measurement.
2. It aims at providing working knowledge of the instruments which is widely used in industry.

1. Measure earth resistance using fall of potential method.
2. Plot V-I characteristics & measure open circuit voltage & short circuit current of a solar panel.
3. Measure unknown inductance capacitance resistance using following bridges
(a) Anderson Bridge (b) Maxwell Bridge
4. To measure unknown frequency & capacitance using Wein's bridge.
5. Measurement of the distance with the help of ultrasonic transmitter & receiver.

6. Measurement of displacement with the help of LVDT.
7. Draw the characteristics of the following temperature transducers:
(a) RTD (Pt-100) (b) Thermistors (c) Thermocouple
8. Draw the characteristics between temperature & voltage of a K type thermocouple.
9. Measure the speed of a Table Fan using stroboscope.
10. Measurement of strain/ force with the help of strain gauge load cell.
11. Study the working of Q-meter and measure Q of coils.
12. To study the working of Spectrum analyzer and determine the bandwidth of different signals.

Course Outcomes:

Upon a successful completion of this course, the student will be able to.

- Apply the measurement techniques for different types of tests.
- To select specific instrument for specific measurement function.
- Students will understand functions, specification, and applications of signal analyzing instruments.

IV SEMESTER

MATHEMATICS-IV

Course/Paper: 04BEC-101
BEC Semester-IV

Course Objective:

The main aim of the mathematics-IV is to examine the constructive abstract methods of mathematics when illustrated with suitable numerical techniques. Computational methods which were developed for purely theoretical reasons suddenly becomes of great importance in engineering mathematics. It follows that the most important objective and purpose in engineering mathematics seems to be that the student become familiar with mathematical thinking's.

UNIT 1 : N**UMERICAL ANALYSIS -** Finite differences – Forward, Backward and Central dfferences.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.

Text Books:

1. B.S.Grewal : Higher Engineering Mathematics, Khanna Publications, 2009.
2. M.K. Jain S.R.K. Iyengar and R.K.Jain: Numerical methods for Scientific andEngineering Computation,Wiley Eastern

Reference

1. B.S.Grewal- higher engineering mathematics : Khanna Pub.
2. Chandrika Prasad- Mathematics for engineers
3. Johnson- probability and statistics for engineers, pearson education.
4. gaur and Kaul- engineering mathematics, Vol I & II;JPH

Course Outcomes:

1. The students can learn about the algebraic and transcendental equation and they find the roots of the equation by iterative methods.
2. The students can interpitate the large data of interpolation through formulae of interpolation.
3. Students learn how to fit the curve by using least squares method.
4. By studying Trapezodial rule and simpson's rule to improve the differentiation and integration techniques.
5. By studying the Runge-kutta methods student can able to bring out approximate solutions of first order ordinary differential equations and can be extended to higher order.

ANALOG ELECTRONICS

Course/Paper: 04BEC-102
BEC Semester-IV

Course Objective:

To familiarize the student with the analysis and design of basic transistor feedback amplifier circuits and their frequency response characteristics, tuned amplifiers, oscillators, multivibrator and power amplifiers.

.**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

Text Books:

1. J.Milliman & C.C. Halkias – Integrated Electronics: TMH
2. Robert Boylestand & L.Nashelsky Electronic devices & circui theory

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Reference

1. Sedra Smith- Microelectronic Circuits, Oxford Press, India.
2. Rajeev tiwari "Analog Electroncs", Genius pub.
3 .J.B.Gupta "Electronic Devices & circuits" Katson pub.

Course Outcomes:

Upon completion of the subject, students will be able to:

- Design and analyze the DC bias circuitry of BJT & FET.
- Analyze the different types of feedback amplifiers, operation and its characteristics.
- Design circuits like feedback amplifiers, tuned amplifiers, oscillators using the transistors.

DIGITAL ELECTRONICS

Course/Paper: 04BEC-103
BEC Semester-IV

Course objectives:

This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able toconvert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

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 Gray decoder, 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.

Text Books:

1. Morris Mano – Digital Circuits & Logic Design; PHI

Reference

1. Gree- Dgital Electronics, pearson education
2. Brtee- digital computer fundamental, TMH
3. Mano – Digital Design, pearson education.
4. shahlivahnan "digital electronics", vikahs pub.

Course Outcomes:

Upon completion of the course, students should possess the following skills:

- Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray, and BCD.
- Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
- Be able to design and analyse small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
- Be able to design and analyse small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

ELECTROMAGNETIC FIELD THEORY

Course/Paper: 04BEC-104

BEC Semester-IV

Course Objectives:

- To introduce the student to the fundamental theory and concepts of electromagnetic waves and transmission lines, and their practical applications.
- To study the propagation, reflection, and transmission of plane waves in bounded and unbounded media.

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.

Text Books:

1. W.H.Hayt Jr. – Engineering electro magnetics, TMH
2. Cheng –field and wave electromagnetic, pearson education

Reference

1. Grifiths – introduction to electromagnetic "2/E PHI" .
2. S.P.Seth "electromagnetic field theory".
3. Sadiku "Electromagnetic field theory"
4. Sediken ioxted –
5. H.P. Tiwari "electromagnetic field theory", Ashrwad pub.

Course Outcomes:

Upon successful completion of the course, students will be able to:
Study time varying maxwell's equations and their applications is electromagnetic problems.
Determine the relationship between time varying electric and magnetic field and electromotive force.
Use maxwells equations to describe the propagation of electromagnetic waves in vacuum.
Show how waves propagate in dielectrics and lossy media

RANDOM VARIABLES & STOCHASTIC PROCESSES

Course/Paper: 04BEC-105
BEC Semester-IV

Course Objective:

The primary objective of this course is:

- To provide mathematical background and sufficient experience so that the student can read, write, and understand sentences in the language of probability theory, as well as solve probabilistic problems in signal processing and communication engineering.
- To introduce students to the basic methodology of probabilistic thinking and to apply it to problems.

UNIT 1 : **PROBABILITY** :Definitions, sample, space & events, joint & conditional probability, dependent events.

UNIT 2 : **RANDOM VARIABLES :** Introduction, distribution & density functions, discrete & continuous random variables, special distributions : binominal, poisson, uniform, exponential, normal, rayleigh. conditional distribution & density functions.

UNIT 3 : MULTIPLE RANDOM VARIABLES :
Vector random variable, joint distribution functions, joint probability density function, conditional distribution & density functions. Statistical independence, distribution & density function of sum of random variable, one function of one random variable ,one function of two random variable, two function of two random variable.

UNIT 4 : OPERATION ON SINGLE & MULTIPLE RANDOM VARIABLES :
Mean & variance, moments, chebyshev's inequality, Central limit theorem, characteristic functions & moment generating function, covariance & correlation coefficient of multiple random variable.
UNIT 5: STOCHASTIC PROCESSES :

Introduction, random process concept, stationary & independence, ergodicity, correlation, functions Gaussion Random Process, Transmission of Random process through linear systems. Power spectral Density, Cross Spectral density,

TEXT BOOK

1 T. Veerarajan, "*Probability, Statistics and Random Processes*", Tata McGraw – Hill Publishing Company Limited, New Delhi, 2004.

Reference

1. Populis – "random variable & stochastic process" TMH.
2. Schoum's Outline – "RVSP"
3. Schoum's "analog and Digital Communication".
4. "Random Variable & stochastic processes", CBC Pub.

Course Outcomes:

Upon completion of the subject, students will be able to compute:

- simple probabilities using an appropriate sample space.
- Simple probabilities and expectation form probability density functions.
- Likelihood ratio tests from pdfs for statistical engineering problems.
- Least square and maximum likelihood estimators for engineering problems.

OBJECT ORIENTED PROGRAMMING

Course/Paper: 04BEC-106
BEC Semester-IV

Course Objectives:

Modern Computerization methods have matured in the problem solving aspects and presently use the concepts of object oriented treatment of issues. Data sets are used with more functional aspects using the concept of classes and objects with a distinct programming methodology which has become predominant. Many other important software development techniques are based upon the fundamental ideas employed in object-oriented programming. The CSE students are already exposed to preliminaries using C++. Now this course introduces Java and OOPs programming at a higher platform.

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.

Text Books:

1. Java Fundamentals- A comprehensive Introduction, Hebert Schildt and Dale SkrienTMH.

Reference

1. folk – file structure: an objecti oriented approach to C++, pearson education
2. balaguruswamY– object oriented programming in C++, TMH
3. Kelley : A book on C, Pearson Education.
4. sunil K Panday "Thinking in C++" Katson Pub.

Course Outcomes :

Upon successful completion of this course, students would be able to learn:

1. **Knowledge:** They can describe the principles of object-oriented programming, apply the concepts of data encapsulation, inheritance, and polymorphism to large-scale software and also acquire the concepts of Graphical User Interfaces.
2. **Professional Skill:** They can Design and develop object-oriented computer programs apart from that they can develop programs with Graphical User Interfaces capabilities.
3. **Transferable Skill:** They can formulate problems as steps so as to be solved systematically.
4. **Attitude:** They can integrate robustness, reusability, and portability into large-scale software development with team-work in mind.

COMPUTER PROGRAMMING LAB-II

Course/Paper: 04BEC-201
BEC Semester-IV

Course Objectives:

To provide the students, knowledge of important software development techniques are based upon the fundamental ideas employed in object-oriented programming.

Programs in C++

1. Write a program to perform the complex arithmetic.
2. Write a program to perform the rational number arithmetic.
3. Write a program to perform the matrix operations. (Transpose, addition, subtraction, multiplication, test if a matrix is symmetric/ lower triangular/ upper triangular)
4. Implement Morse code to text conversion and vice-versa.
5. To calculate Greatest Common Divisor of given numbers.
6. To implement tower of Hanoi problem.

Program in Java

7. To implement spell checker using dictionary.
8. To implement a color selector from a given set of colors.
9. To implement a shape selector from a given set of shapes.

10. By mapping keys to pens of different colors, implement turtle graphics.
11. To implement a calculator with its functionality.
12. To implement a graph and display BFS/DFS order of nodes.

Course Outcomes :

1) Ability to model, understand and develop complex software for System Software as well as Application Software.
2) An ability to function effectively within team.
3) Recognition of the need for, an ability to engage in life-long learning.

ELECTRONICS LAB II

Course/Paper: 04BEC-202
BEC Semester-IV
Course Objectives:

1. To provide students adequate knowledge about working and design of common amplifiers.
2. To introduce the students about the testing and design of voltage regulators.
3. To provide the students about the working of various oscillators.

1. Plot gain-frequency characteristics of BJT amplifier with and without negative feedback in the emitter circuit and determine bandwidths, gain bandwidth products and gains at 1kHz with and without negative feedback.
2. Study of series and shunt voltage regulators and measurement of line and load regulation and ripple factor.
3. Plot and study the characteristics of small signal amplifier using FET.
4. Study of push pull amplifier. Measure variation of output power & distortion with load.
5. Study Wein bridge oscillator and observe the effect of variation in R & C on oscillator frequency
6. Study transistor phase shift oscillator and observe the effect of variation in R & C on oscillator frequency and compare with theoretical value.
7. Study the following oscillators and observe the effect of variation of C on oscillator frequency: (a) Hartley (b) Colpitts
8. Design Fabrication and Testing of k-derived filters (LP/HP).
9. Study of a Digital Storage CRO and store a transient on it.
10. To plot the characteristics of UJT and UJT as relaxation.
11. To plot the characteristics of MOSFET and CMOS.

Course Outcomes:

To study and analyze the performance of negative as well as positive feedback circuits. After completion of this course Student able to:

- To find the characteristics of the amplifiers, voltage regulators and oscillators.
- To test the basic electronic components in a real time applications
- To construct simple electronic circuits.

DIGITAL ELECTRONICS LAB

Course/Paper: 04BEC-203
BEC Semester-IV

Course objectives:

This course provides the knowledge of switching theory and the design techniques of digital circuits. The main objectives are:

- To learn basic techniques for the design of digital circuits
- To study and perform the experiments of digital circuits design.

1. To study and perform the following experiments.
(a) Operation of digital multiplexer and demultiplexer.
(b) Binary to decimal encoder.
(c) Characteristics of CMOS integrated circuits.
2. To study and perform experiment- Compound logic functions and various combinational circuits based on AND/NAND and OR/NOR Logic blocks.
3. To study and perform experiment -Digital to analog and analog to digital converters.
4. To study and perform experiment- Various types of counters and shift registers.
5. To study and perform experiment - Interfacing of CMOS to TTL and TTL to CMOS ICs.
6. To study and perform experiment- BCD to binary conversion on digital IC trainer.
7. To study and perform experiment -
(a) Astable (b) Monostable (c) Bistable Multivibrators and the frequency variation with different parameters, observe voltage waveforms at different points of transistor.
8. To study and perform experiment -Voltage comparator circuit using IC-710.
9. To study and perform experiment- Schmitt transistor binary circuit.
10. Design 2 bit binary up/down binary counter on bread board.

Course Outcomes:

Upon completion of the course, students should possess the following skills:

- Be able to design and analyse small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
- Be able to design and analyse small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

HUMANITIES

Course/Paper: 04BEC-204
BEC Semester-IV

Course Objectives:

To enable the student to understand in brief, the history of Indian constitution and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely. Demand and supply, production function, concept relating to national product, International trade.

UNIT 1 : INDIA- Brief History of Indian Constitution- framing, features, fundamental rights, duties, directive principles of state. History of Indian national movement, Socio economic growth after independence.
UNIT 2 : SOCIETY – Social Groups- Concepts and types, socialization- concept and theory, social control; concept, social problem in contemporary India, status and role.

UNIT 3 : THE FUNDAMENTALS OF ECONOMICS – Meaning, definition and importance of economics, Logic of choice, Central Economic Problems, Positive and Normative approaches, economic systemssocialism and capitalism.
UNIT 4 : MICROECONOMICS –Law of demand and supply, Utility approach, Indifference curves, Elasticity of demand & supply and applications, Consumer surplus, Law of returns to factors and returns to scale.
UNIT 5: MACRO ECONOMICS –Concept relating to national product-National income and its measurement, Simple Keynesian theory, Simple multiplier, Money and banking,- Meaning, Concept of international trade, Determination of exchange rate, Balance of payments. Characteris tics of Indian Economy.

Course Outcomes:

1) To study fundamental concepts, features and duties of Indian constitution.
2) To learn the concepts of demand and supply.
3) To learn different types of market environment under various types of competition.
4) To gain the knowledge of new economic environment in post – liberalization scenario.

V SMESTER

SIGNALS & SYSTEMS

Course/Paper: 05BEC-101
BEC Semester-V

Course Objective:

This is a core subject, basic knowledge of which is required by all the engineers.
This course focuses on:

- To get an in-depth knowledge about signals, systems and analysis of the same using various transforms.

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.
Text Books:

1. A.V.Oppenheim, A.S. Willsky and I.J Young – "signal & system", PHI

Reference

1. Taub & Schilling – "Principles of communication system", TMH

2. Prokins & Monalaskys – digital signal processing : Principle Algoriths applications, PHI.
3. sanjay sharma"signal system" Katson pub.
4. fahruk hussain "Signal system"

Course Outcomes:

Upon completing this course the student will be able to:

- Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.
- Express periodic signals in terms of Fourier series and express the spectrum and express the arbitrary signal (discrete) as Fourier transform to draw the spectrum.
- Understands the principle of linear system, filter characteristics of a system and its bandwidth, the concepts of auto correlation and cross correlation and power Density Spectrum.
- Can design a system for sampling a signal.
- For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.

LINEAR INTEGRATED CIRCUITS

Course/Paper: 05BEC-102
BEC Semester-V
Course Objective:

- To learn about differential amplifier and internal schematic of IC 741.
- To study the various applications of Operational amplifier
- To gain better knowledge about multiplier IC's and PLL
- To get knowledge about Analog to digital and digital to analog converters
- To know different monolithic Ic's and its applications

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.

Text Book:

1. R.A.Gayakwad – Op- Amplifier & Linear ICs, PHI

Reference

1. Taubay – Oprational Amplifier
2. K.R.Botker – integrated circuits, pearson education.
3. J.B.Gupta “linear integrated circuit” , Katson pub.
4. sanjay sharma “op-Amp & linear integrated circuit” , Katson pub.

COURSE OUTCOME:

Upon completion of this course students will be able to

1. Analyze differential amplifier and know how this is applied in IC741.
2. Design various applications of Operational Amplifiers
3. Interpret analog multiplier IC’s, PLL IC and its applications.
4. Acquire knowledge on analog to digital and digital to analog converters.
5. Design waveform generators using IC741&IC555 and analyze regulators and power supplies.

TELECOMMUNICATION ENGINEERING

Course/Paper: 05BEC-103
BEC Semester-V

Course Objectives:

- To introduce the student to the fundamental theory and concepts of electromagnetic waves and transmission lines, and their practical applications.
- To learn switching, singling and traffic in the context of telecommunication network.
- To expose through the evolution of switching systems from manual and electromechanical systems to stored-program-controlled digital systems.
- To study signalling, packet switching and networks.

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, ð-section & T-section attenuators, stub matching, Transmission equalizers Filters, constant K-section, Ladder type, ð-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, Numbering Plan, Fascimile services.

Text Book:

1. Vishwanathan – Telecommunication switching systems & Networks, PHI

Reference

1. W. Fraser – Telecommunications (BPB Publication)
2. Cole – Introduction to Telecommunication, Pearson Education.
3. Umesh Sinha "Telecommunication", laxmi pub.

Course Outcomes:

On completion of this course, it is expected that the student will be able to:

- Understand the main concepts of telecommunicating network design
- Analyze and evaluate fundamental telecommunication traffic models.
- Understand basic modern singling system.
- Understand the concept of packet switching.

ANALOG COMMUNICATION

Course/Paper: 05BEC-104
BEC Semester-V

Course objectives:

This course aims at:

- Developing and understanding of the design of analog communication system.
- Study of analog modulation techniques.
- Subject will develop analytical abilities related to circuit members.
- Establishing a firm foundation for the understanding of telecommunications systems, and the relationship among various technical factors when such systems are designed and operated.

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.

Text Books

1. Communication Systems by Simon Haykins John Wiley & Sons , 4th Edition.

2. Electronic Communications – Dennis Roddy and John Coolean , 4th Edition , PEA, 2004
3. Communication Systems – B.P. Lathi, BS Publication , 2004.
4. Electronics & Communication System – George Kennedy and Bernard Davis , TMH 2004.

Reference

1. Taub & D.L. Schilling – "principles of communication Systems " TMH.
2. G.Kennedy – "Electronic Communiocation system", TMH.
3. B.P.Lathi – "Communication System", John willy.
4. sanjay sharma "analog communication", katson pub.

Course Outcomes:

Upon completion of the subject, students will be able to

- Conceptually understand the baseband signal & sysem.
- Identify various elements, processes, and parameters in telecommunication systems and describe their functions, effects, and interrelationship.
- Design procedure of AM transmission & reception, analyze, measure, and evaluate the performance of a telecommunication system against given ciriteria.
- Understand basic knowledge of FM transmission & reception
- Understand various types of SSB transmission & reception.
- Design typical telecommunication systems that consist of basic and essential building blocks.

MICROWAVE ENGINEERING-I

Course/Paper: 05BEC-105
BEC Semester-V

Course Objectives

The objectives of the course are:

- To develop the knowledge on transmission lines for microwaves, cavity resonators and wave guide components and applications.
- To enable the students understand and analyze the operation of Microwave tubes like klystron, magnetron, travelling wave tube, etc.,
- To familiarize with microwave solid state devices.
- To understand the scattering matrix parameters and its use.
- To introduce the student the microwave test bench for measure different parameters like attenuation, VSWR, etc.,

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. Velocitymodulation, 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.

Text Books

1. S.Y.Lio – "Microwave devices & circuits", PHI
2. R.E.Collin – " Foundation for microwave engineering", Mc Graw Hill

Reference

1. Sisodia V.L.Gupta – "Microwave Engineering", New Age.
2. sachin chauhan "microwave- I",Genius pub.
3. Kulkarni "microwave & Radar Engg.", Laxmi pub.

Course Outcomes

- Upon completion of the course, the students will be able to
- Understand the significance of microwaves and microwave transmission lines.
- Analyze the characteristics of microwave tubes and compare them.
- Be able to list and explain the various microwave solid state devices.
- Can set up a microwave bench for measuring microwave parameters.

ADVANCED DATA STRUCTURES

Course/Paper: 05BEC-106
BEC Semester-V

Course Objectives:

- To inculcate ability to grasp the behavior of advance data structures such as stacks, queues, trees, mergeable heaps, graphs and their representation and to apply them in problem solving.
- To provide a working knowledge on searching and sorting techniques and to write programs to solve problems on arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.

UNIT 1 : ADVANCED TREES - Definitions and operations on weight balanced trees (Huffman trees), 2-3 trees and Red-Black trees. Augmenting Red-Black trees to dynamic order statistics and interval tree applications. Operations on disjoint sets and its Union-Find problem. Implementing sets, discitionerics, priority queues and concatenable queues using 2-3 trees.

UNIT 2 : MERGEABLE HEAPS - Mergeable Heap operations, binomial trees, implementing binomial heaps and its operations. 2-3-4- trees and 2-3-4 heaps. Structure and potential function of Fibonacci heap. Implementing Fibonacci Heap**.**

UNIT 3 : GRAPH THEORY DEFINITIONS - Definitions of Isomorphism, Components, Circuits,

Fundamental Circuits, Cut-sets, Cut-Vertices, Planer and dual graphs, Spanning trees, Kuratovski's two graphs.

UNIT 4 : GRAPH THEORETIC ALGORETHMS - Algorithms for connectedness, finding all spanning trees in a weighted graph and planarity testing. Breadth first and depth first search, topological sort, strongly connected components and, articulation point.

UNIT 5 : APPLICATION OF GRAPHS- Single source shortest path and all pair shortest path algorithms. Min-Cut Max-Flow theorem of network flows, Ford-Fulkerson Max Flow algorithms.

Text Books:

1. Horwitz and Sawhni – Fundamental Of Data structure, Galgotia book sourse.

Reference

1. Narsing Deo – Graph theory with application to engineering and computer Science, PHI.
2. Coremen – Introduction to Algorithm, PHI.
3. Vineet Khanna "advance Data Structure", Genius Pub.

Course Outcomes:

1. Ability to design linear data structures stacks, queues and linked lists.
2. Ability to design nonlinear data structures, trees and graphs, and to implement their operations.
3. Ability to implement different searching and sorting techniques.
4. Ability to apply different searching and sorting techniques for real world problems.

ELECTRONIC ENGINEERING DESIGN LAB

Course/Paper: 05BEC-201
BEC Semester-V

Course Objects

- To design and analyses of adder, subtractor using IC741.
- To understand the operations of differentiator and integrator using IC 741.
- To design and analyses of active filter.
- To construct and understand of the different multivibrator using IC 555.
- To construct and analyses different waveform generators IC741.

1. Op-Amp characteristics and get data for input bias current, measure the output-offset voltage and reduce it to zero and calculate slew rate.
2. Op-Amp in inverting and non-inverting modes.
3. Op-Amp as scalar, summer and voltage follower.
4. Op-Amp as differentiator and integrator.
5. Design LPF and HPF using Op-Amp 741
6. Design Band Pass and Band reject Active filters using Op-Amp 741.
7. Design Oscillators using Op-Amp (i) RC phase shift (ii) Hartley (iii) Colpitts
8. Design (i) Astable (ii) Monostable multivibrators using IC-555 timer
9. Design Triangular & square wave generator using 555 timer.
10. Design Amplifier (for given gain) using Bipolar Junction Transistor.

Course Outcomes

At the end of the lab

- Student able to design circuits using operational amplifiers for various applications.
- Able to design multivibrator circuits using IC555 timer.

MICROWAVE ENGINEERING LAB

Course/Paper: 05BEC-202
BEC Semester-V

Course objectives:

This course presents the practice of microwave engineering components characteristics measurements of different parameters.

1. Study of various microwave components and instruments like frequency meter, attenuator, detector & VSWR meter.
2. Draw V-I characteristics of microwave source like Gunn diode/ Reflex Klystron.
3. Measurement of frequency and wavelength in a rectangular waveguide.
4. Measurement of VSWR (small as well as large values) & reflection coefficient.
5. Measure an unknown impedance with smith chart.
6. Draw the following characteristics of Gunn Diode
(i) Output power and frequency as a function of voltage
(ii) Square wave modulation by PIN diode.
7. Drawing polar pattern of Horn antenna.
8. To observe the action of directional coupler and its use in separating incident & reflected wave.
9. Study of Magic Tee, Circulator, isolator
10. Study of spectrum analyzer & its use in observing the response of
(i) High frequency amplifier
(ii) Low pass, high pass, band pass, band reject filters.

Course outcomes:

After completion of the course the students must be able to know the following.

- The characteristics of all microwave engineering component
- The measurement of the different parameters.

COMMUNICATION LAB-I

Course/Paper: 05BEC-203
BEC Semester-V

Course Objectives:

- To design analyses of various modulation and demodulation techniques.
- To generate various pulse modulation techniques
- To design and find AGC characteristics.
- To generate analyses of Multiplexing techniques

1. Harmonic analysis of a square wave of a modulated wave form.
2. Observe the Amplitude modulated wave form & measure modulation index. Demodulation of AM signal.
3. Generation & Demodulation of DSB – SC signal.
4. Modulate a sinusoidal signal with high frequency carrier to obtain FM signal. Demodulation of the FM signal.
5. To observe the following in a transmission line demonstrator kit :
(a) The propagation of pulse in non reflecting transmission line.
(b) The effect of losses in transmission line.
(c) Transmission with standing waves on a Transmission line.
(d) The resonance characteristics of a half-wave length long X-mission line.

6. (a) To observe the operation of sampling and sample & hold circuits.
(b) To study the effect of sampling time (sampling pulse width).
(c) To study the effects of changing the sampling frequency & observing aliasing phenomena.
7. To study & observe the operation of a super heterodyne receiver.
8. To study & observe the amplitude response of automatic gain controller (AGC).
9, 10. PAM, PWM & PPM: Modulation and demodulation.

Course Outcomes:

At the end of the lab

- Students will understand the different types of modulation techniques.
- Will be capable to understand the different pulse modulation techniques.
- Will be able understand and design of AGC circuits.

SIGNAL PROCESSING LAB-I

Course/Paper: 05BEC-204
BEC Semester-V

Course Objectives:

This course focuses on:

- To get practical knowledge about signals, systems and analysis of the same in MATLAB Environment:

1. Generation of continuous and discrete elementary signals (periodic and non-periodic) using mathematical expression.
2. Generation of Continuous and Discrete Unit Step Signal.
3. Generation of Exponential and Ramp signals in Continuous & Discrete domain.
4. Continuous and discrete time Convolution (using basic definition).
5. Adding and subtracting two given signals. (Continuous as well as Discrete signals)
6. To generate uniform random numbers between (0, 1).
7. To generate a random binary wave.
8. To generate random sequences with arbitrary distributions, means and variances for following :
(a) Rayleigh distribution
(b) Normal distributions: N(0,1).
(c) Gaussion distributions: N (m_x, $ó x_2$)
9. To plot the probability density functions. Find mean and variance for the above distributions

Course Outcomes:

Upon completing this course the student will be able to:

- To test the characteristics of signals on real time MATLAB software.

VI SEMESTER

MICROWAVE ENGINEERING-II

Course/Paper: 06BEC-101
BEC Semester-VI

Course Objectives

The objectives of the course are:

- To develop the knowledge on transmission lines for microwaves, cavity resonators and wave guide components and applications.
- To familiarize with microwave semiconductor devices.
- To understand the scattering matrix parameters and its use.
- To introduce the student the microwave test bench for measure different parameters like attenuation, VSWR, etc.,

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.

Text Book:

1.S.Y.Lio – "Microwave devices & circuits", PHI
2.R.E.Collin – " Founsdation for microwave engineering", Mc Graw Hill

Reference

1. K.C. Gupta – "Microwaves", New Age.
2. sachin chauhan- "microwave engg-2" genius pub.
3. kulkarni –"microwave engg"- laxmi pub.

Course Outcomes

Upon completion of the course, the students will be able to:

- Understand the significance of microwaves and microwave transmission lines.
- Analyze the characteristics of microwave tubes and compare them.
- Be able to list and explain the various microwave solid state devices.
- Can set up a microwave bench for measuring microwave parameters.

MICROPROCESSOR AND MICROCONTROLLER

Course/Paper: 06BEC-102
BEC Semester-VI

Course Objectives:

The course objectives are:

- To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.

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.

Text Books:

1. D. V. Hall, Microprocessors and interfacing, TMGH, 2nd Edition 2006
2. Kenneth. J. Ayala, The 8051 microcontroller, 3rd ed.,cengage learning.

Reference

1. R .Goankar-microprossesor architecture,, Programing And Application. Wiley Eastern Ltd.
2. INTEL-Microcontroller handbook.
3. Ayle- 8051 Microcontroller,penram press.
4. rahul srivastav – 8085 microprcessor- neelkant pub.
5. B.Ram “microprocessor & Programming”
6. D.S.Sherawt “Microprocessor”, katson pub.

Course Outcomes:

Upon completion of the course:

- The student will learn the internal organization of popular 8085/8051 microprocessors/microcontrollers.
- The student will learn hardware and software interaction and integration.
- The students will learn the design of microprocessors microcontrollers – based systems.

INDUSTRIAL ELECTRONICS

Course/Paper: 06BEC-103
BEC Semester-VI

OBJECTIVES

- To get an overview of different types of power semi-conductor devices and their switching characteristics.

- To understand the operation, characteristics and performance parameters of controlled rectifiers.
- To study the characteristics of DC and AC drives
- To learn the different modulation techniques of pulse width modulated inverters and to understand the harmonic reduction methods.
- To know the practical application for power electronics converters in conditioning the power supply.

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.

TEXT BOOK:

G. K. Mithal, "Industrial Electronics", Khanna Publishers, Delhi, 2000

Reference

1. Biswanth paul, Industrial Electronics And Control, Prentice Hall Of India.
2. S.N. biswas, Industrial Electronics.Dhanpat Rai& Co.
3. Morris, Industrial Electronics,Tata Mc-Graw Hill.
4. p. s. bhimra – industrial Electronics- laxmi pub.

Course Outcome:

After going through this course the student gets a thorough knowledge on construction operation V-I characteristics commutation firing and protection of various power semiconductor devices, focused analysis of thyristor device, steady-state and transient state analysis of all the power converters, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

DIGITAL COMMUNICATION

Course/Paper: 06BEC-104
BEC Semester-VI

Course Objectives:

- To understand different digital modulation techniques such as PCM, DM and various shift keying techniques.
- Understand the concepts of different digital modulation techniques.
- To study about different error detecting and error correction codes like block codes, cyclic codes and convolution codes

- To study the advantages of spread spectrum techniques and performance of spread spectrum, PN codes in jamming, noise etc.

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.

Text Books:

1. Principles Of Communication Systems-Herberet Taub, Donald L Schiling, Goutham saha,3rf edition, Mc Graw Hill 2008
2. digital and anolog communiation systems- Sam Shanmugam, John Wiley,2005
3. Digital Communications- John G.Proakis, Masoud Salehi – 5 th Edition, Mcgraw-Hill, 2008

Reference

1. Taub & D.L. Schilling – "principles of communication Systems " TMH.
2. B.P.Lathi – "Communication System", John willy.
3. Prokasis-"Digital communication" Pearson Education.
4. sanjay sharma-"digital communication" katson pub.
5. chakrobaty –"digital communication" laxmi pub.

Course Outcomes:

At the end of the course, the student will be able to:

- Understand basic components of digital communication systems.
- Design optimum receivers for digital modulation techniques.
- Analyze the error performance of digital modulation techniques.
- Know about different error detection and error correction codes like block codes, cyclic codes and convolution codes.
- Understand the advantages of spread spectrum techniques and performance of spread spectrum, PN codes in jamming, noise etc.

CONTROL SYSTEMS

Course/Paper: 06BEC-105
BEC Semester-VI

OBJECTIVE: *In this course it is aimed to introduce to*

- The students the principles and applications of control systems in everyday life.
- The basic concepts of block diagram reduction,

- Time domain analysis solutions to time invariant systems.
- Deals with the different aspects of stability analysis of systems in frequency domain and time domain.
- Concept on multi input and multi output 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.

TEXT BOOKS:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and sons.
3. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

Reference

1. I.J. Nagrath and M gopal: control system Engineering, New Age.
2. M Gopal:. Control system, TMH
3. B.C Kuo: Automatic Control System, PHI.
4. K.M.soni : Automatic Control System, Katson pub.

OUTCOMES:

After going through this course, the student gets knowledge on

- Open loop and closed loop systems, concept of feedback in control systems,
- Mathematical modeling and transfer function derivations of translational and rotational systems
- Transfer function representation through block diagram algebra and signal flow graphs,
- Time response analysis of different ordered systems through their characteristic equation and time-domain specifications
- Stability analysis of control systems in s-domain through R-H criteria and root-locus techniques
- Frequency response analysis through bode diagrams

With which he/she can be able to apply the above conceptual things to real world electrical and Electronic problems and applications.

OPTIMIZATION TECHNIQUES

Course/Paper: 06BEC-106
BEC Semester-VI

The main aim of teaching Optimization techniques is to emphasize the relevance of fundamentals and applications of Mathematics in Programming Problem. Mathematics is the basic of all branches of modern business and science and technology. It deals with using the constructive results of mathematics to solve a problem in applied science or Engineering field.

It helps the students in choosing a technique that improve the quality and efficiency of actual computation.

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

Text Book:

1. S . S. Rao: optimization _ Theory & application . Wiley Eastern .
2. H.A. Taha: Operation Reserch And Introduction. Mc millan Co.

Reference Book:

1. A.O.Converse: Optimization , Halt Pinchort Inc..
2. jain & rawat " Optimization technigue" CBC

Learning Outcomes:

1. By learning the first order differential equations student can able to find the solutions of many applications in engineering field.
2. By learning the linear and non linear programming ,student can able to find the solutions in mathematical programming problems.

COMMUNICATION LAB-II

Course/Paper: 06BEC-201
BEC Semester-VI

Course Objectives:

- This course presents the practice of digital communication including signal design, modulation methods, demodulation methods, data formatting schemes, and to simulate the various keying techniques using virtual Instrumentation software.

1. (a) To observe sampling of analog signal. Identify & solve the aliasing problem.
(b) To observe the Transmission of two signals over a single channel using sampling methods.
2. TDM-PAM: Modulation & demodulation.
3. Operation of a PCM encoder & decoder.
4 TDM-PCM: Modulation & demodulation.
5. Observe the performance of a Delta modulation system & to derive from it a delta sigma modulation system.

6. To generate and study the various data formatting schemes (Unipolar, Bi-polar, Manchester, AMI etc.).
7. Generate ASK signals, with and without carrier suppression. Demodulation of these two types of modulated signal.
8. Generate the FSK wave forms & demodulate the FSK signals based on the properties of
(a) Tuned circuits (b) PLL
9. Generate the PSK signals and demodulate it.

Simulation using any virtual Instrumentation Software:

10. To carry out convolution in both continuous time and discrete time systems.
11. Companding and multiplexing of PCM signals.
12. Perform various keying Techniques: PSK, ASK, FSK & MSK.

Course Outcomes:

After completion of the course student must be able to:

- Assess different digital modulation and demodulation techniques.
- Compute the bandwidth and transmission power by analyzing time and frequency domain spectra of signal required under various modulation schemes.
- Apply suitable modulation schemes and coding for various applications.

MICROPROCESOR LAB

Course/Paper: 06BEC-202
BEC Semester-VI

Course Objectives:

To provide the practical environment to understand the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques on 8085 microprocessor kit.

1. Study the hardware, functions, memory structure and operation of 8085 microprocessor kit.
2. Program to perform integer division: (i) 8-bit by 8-bit (ii) 16-bit by 8-bit.
3. Transfer of a block of data in memory to another place in memory in the direct and reverse order.
4. Searching a number in an array and finding its parity.
5. Sorting of array in: (i) Ascending (ii) Descending order
6. Programme to perform following conversion: (i) BCD to ASCII (ii) BCD to Hexadecimal
7. Programme to multiply two 8-bit numbers.
8. Programme to generate and sum 15 fibanocci numbers.
9. Programme for rolling display of message “INDIAN”.
10. To insert a number at correct place in a sorted array.
11. Serial and Parallel data transfer on output port 8155 & 8255 & designing of disco light, running light, and sequential lights on off by above hardware.
12. Generation of different waveform on 8253/ 8254 programmable timer.

Course Outcomes

- Demonstrate experimentally basic programming of Microprocessor.
- Exhibit microprocessor interfacing with various peripherals for various applications.
- Demonstrate experimentally basic programming of microcontroller.
- Exhibit microprocessor interfacing with various peripherals for various applications.

UNIX SHELL PROGRAMMING LAB

Course/Paper: 06BEC-203
BEC Semester-VI

Course Objectives:

To provide the students practical environment to understand the basics of unix shell commands, and to write the shell script.

1. Use of Basic Unix Shell Commands: ls,mkdir,rmdir,cd,cat,banner,touch,file,wc,sort,cut,grep, dd,dfspace,du,ulimit.
2. Commands related to Inode,I/O redirection and piping, process control commands, mails.
3. Shell Programming: Shell script exercises based on following
(i) Interactive shell scripts
(ii) Positional parameters
(iii) Arithmetic
(iv) if-then-fi, if-then-else-fi, nested if-else
(v) Logical operators
(vi) else + if equals elif, case structure
(vii) while, until, for loops, use of break
(viii) Metacharacters
(ix) System administration: disk management and daily administration
4. Write a shell script to create a file in $USER /class/batch directory. Follow the instructions
(i) Input a page profile to yourself, copy it into other existing file;
(ii) Start printing file at certain line
(iii) Print all the difference between two file, copy the two files at $USER/CSC/2007 directory.
(iv) Print lines matching certain word pattern.

5. Write shell script for-
(i) Showing the count of users logged in,
(ii) Printing Column list of files in your home directory
(iii) Listing your job with below normal priority
(iv) Continue running your job after logging out.
6. Write a shell script to change data format .Show the time taken in execution of this script.
7. Write a shell script to print files names in a directory showing date of creation & serial number of the file.
8. Write a shell script to count lines, words and characters in its input(do not use wc).
9. Write a shell script to print end of a Glossary file in reverse order using Array. (Use awk tail)
10. Write a shell script to check whether Ram logged in, Continue checking further after every 30 seconds till success.

Course Outcomes

- Demonstrate experimentally basic Unix shell commands.
- To write the shell script for various real time applications.

INDUSTRIAL ELECTRONICS LAB

Course/Paper: 06BEC-204
BEC Semester-VI

OBJECTIVES

- To get an practical overview of different types of power semi-conductor devices and their switching characteristics.
- To study and obtain the waveforms of various performance parameters of controlled rectifiers.
- To know the practical application for power electronics converters in conditioning the power supply.

1. Study the characteristics of SCR.
1.1 Observe the terminal configuration.
1.2 Measure the breakdown voltage.
1.3 Measure latching and holding current.
1.4 V-I characteristics.
2 Perform experiment on triggering circuits for SCR.
2.1 R-triggering circuit.
2.2 R-C triggering circuit.
2.3 UJT triggering circuit.
3 Study and obtain the characteristics of Diac.

4 Study and obtain the waveforms for single-phase half-wave controlled converter.
5 Study and obtain the waveforms for single-phase half controlled symmetrical and asymmetrical bridge converters.
6 Study and obtain the waveforms for single-phase fully controlled bridge converter.
7 Study and obtain the waveforms for voltage-commutated chopper.
8 Study and obtain the waveforms for current-commutated chopper.
9 Perform experiment on single phase PWM inverter.
10 Perform experiment on buck, boost and buck-boost regulators.
11 Perform experiment on Motor control – open loop & closed loop.

Course Outcome:

After going through this course the student gets a thorough knowledge on construction operation V-I characteristics commutation firing and protection of various power semiconductor devices, focused analysis of thyristor device, steady-state and transient state analysis of all the power converters, with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

VII SEMESTER

ANTENNA & WAVE PROPAGATION

Course/Paper: 07BEC-101
BEC Semester-VII

Course Objectives:

- Understand basic terminology and concepts of Antennas.
- To attain knowledge on the basic parameters those are considered in the antenna design process and the analysis while designing that.
- Analyze the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis.
- To have knowledge on antenna operation and types as well as their usage in real time field.
- Aware of the wave spectrum and respective band antenna usage and also to know the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure.

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.

.**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 phasemeasurements

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.

Text Books:

1. Antennas for All Applications – John D. Kraus and R. J. Marhefka, and Ahmad S. Khan TMH, New Delhi, 4th ed., (Special Indian Edition) 2010.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

Reference

1. J.D.Kraus, ' Anteenas', Mc –graw Hill.
2. C.A.Balanis,' Antenna Theory' Harper& row.
3. K.D. Prasad,'Anteena and Wave propagation', SATYA Prakashan, New delhi.
4. A.K.Gautam "Antenna & Wave propagation", Katson Pub.

Course Outcomes:

Student will be:

- Aware of parameter considerations viz. antenna efficiency, beam efficiency, radiation resistance etc. in the design of an antenna.
- Capable to analyze the designed antenna and field evaluation under various conditions and formulate the electric as well as the magnetic fields Equation set for Far field and near field conditions.
- Understand the Array system of different antennas and field analysis under application of different currents to the individual antenna elements
- Understand the design issues, operation of fundamental antennas like Yagi-Uda, Horn antennas and helical structure and also their operation methodology in practice.
- Design a lens structure and also the bench step for antenna parameter measurement of testing for their effectiveness.
- Knowledge about the means of propagation of Electromagnetic wave i.e. free space propagation and also about frequency dependent layer selection, its respective issues for an effective transmission of information in the form of EM wave to a remote location and related issues.

DIGITAL SIGNAL PROCESSING

Course/Paper: 07BEC-102
BEC Semester-VII

Course Objectives:

- To provide background and fundamental material for the analysis and processing of digital signals.
- To familiarize the relationships between continuous time and discrete time signals and systems.
- To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.

- To study the designs and structures of digital (IIR & FIR) filters from analysis to synthesis for a given specifications.
- The impetus is to introduce a few real-world signal processing applications.
- To acquaint in FFT algorithms, multi-rate signal processing techniques and finite word length effects.

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.

Text Books

1. J.G.Proakis , D.G. Manolakis and D. Sharma, Digital Signal Processing - Principles, Algorithms and Applications, Pearson Education, 2006
2. Simon Haykin & Barry van veen, Signals and Systems, 2nd edition, John Wiley publication, 2004/2005

Reference

1. Scahafer Buck-Discreate Time Signal Prossecing , Person Education Asia.
2. Prokis & Manolaski- Digital Signal Processing, PHI.
3. S.K.Mitra- Digital Signal Processing,TMH.
4. Faruq Hussain –" Digital Signal Processing"
5. sanjay sharma – "digital signal processing" Katson Pub.

Course Outcomes:

On completion of this subject, the student should be able to:

- Perform the frequency and Z-transform analysis on signals and systems.
- Understand the inter relationship between DFT and various transforms.
- Design a digital filter for a given specification.
- Understand the fast computation of DFT and appreciate the FFT processing.
- Understand the tradeoffs between normal and multi rate DSP techniques and finite length word effects.

WIRELESS COMMUNICATION

Course/Paper: 07BEC-103
BEC Semester-VII

Course Objectives

- To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
- To enable the student to analyze and understand wireless and mobile cellular communication systems over a stochastic fading channel
- To provide the student with an understanding of Co-channel and Non- Co-channel interference
- To give the student an understanding of cell coverage for signal and traffic, diversity techniques and mobile antennas.
- To give the student an understanding of frequency management, Channel assignment and types of handoff.

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 the GSM 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,

TEXT BOOKS

1. Mobile Cellular Telecommunications — W.C.Y. Lee, Mc Graw Hill, 2nd Edn., 1989.
2. Wireless Communications – Theodore. S. Rapport, Pearson Education, 2nd Edn., 2002.
3. Mobile Cellular Communication – Gottapu sashibhushana Rao, Pearson, 2012.

Reference

1. William Stallings- Wireless Communication& Network,Pearson education, Asia .
2. Richharia M- Sattelite communication, mac Millan.
3. R.P.Yadav –"wirless Communication "
4. modani – "wirless Communication" Genius pub.

Course Outcomes

By the end of the course, the student will be able to analyze and design wireless and mobile cellular systems.

- The student will be able to understand impairments due to multi path fading channel.
- The student will be able understand the fundamental techniques to overcome the different fading effects.
- The student will be able to understand Co-channel and Non Co channel interference
- The student will be able to familiar with cell coverage for signal and traffic, diversi techniques and mobile antennas.
- The student will have an understanding of frequency management, Channel assignment and pes of handoff.

IC TECHNOLOGY

Course/Paper: 07BEC-104
BEC Semester-VII

Course Objectives

- Give exposure to different steps involved in the fabrication of ICs using MOS transistor, CMOS/BICMOS transistors and passive components.
- To understand the concepts of pattern transfer, introduction to photolithography, proximity printers etc.
- Give exposure to the design rules to be followed to draw the layout of any logic circuit.

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.

TEXT BOOKS:

1. S.M.Sze- VLSI Technology, TMH.
2. kang- CMOS circuit design,TMH .

Reference

1. D.Nagchoudhary-principles of microelectronic Technology,Wheeler Publishing.
2. P.k. malhotra – "I C Technology" CBC
3. Arti sharma – "IC Technology"- Genius Pub.

Course Outcomes

Upon successfully completing the Course, the student should be able to:

- Acquire qualitative knowledge about the fabrication process of integrated circuit using MOS transistors,
- Choose an appropriate invert depending on specifications required for a circuit
- Understand and learn the concept of testing and adding extra hardware to improve testability of system.

VLSI DESIGN

Course/Paper: 07BEC-105
BEC Semester-VII

Course Objectives

- To introduce the students about the MOS technology, NMOS and CMOS fabrication, CMOS logic gates, basic physical design of simple gates and their layout issues
- To Understand the basic concepts of VHDL.

UNIT 1 : INTRODUCTION TO MOS TECHNOLOGY- Basic MOS transistors, Enhancement Modetransistor 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.

TEXT BOOKS:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition
2. CMOS VLSI Design – A Circuits and Systems Perspective, Neil H. E Weste, David Harris, Ayan Banerjee, 3rd Ed, Pearson, 2009.
3. VLSI Design – M. Michael Vai, 2001, CRC Press.

Reference

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1. Pucknell, Kamaran Esragian- Basic VLSI Design.
2. kang- CMOS circuit design,TMH .
3. Stephen Brown -Fundamental of design logic with VHDL , TMH.
4. P.k.malhotra-"VLSI Desgin " CBS

Course Outcomes

Upon successfully completing the Course, the student should be able to:

- Acquire qualitative knowledge about the MOS technology, electrical properties of MOS circuits, CMOS logic circuits.
- Knowledge of the basic physical design of simple Gates ,VHDL.

OPERATING SYSTEMS

Course/Paper: 07BEC-106
BEC Semester-VII

Course Objectives:

- To understand basic components of computers.
- To explore the operations on process in depth.
- To explore the concept of information management.
- To understand the concept of Dead lock.

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, Programthreats, User authentication, Firewall.

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

TEXT BOOKS:

1. Andrew S.Tanenbaum- modern Operating System , PHI
2. JPeterson , a. Silberschatz – operating System Concepts .

Reference

1. H.M.Deitl- An introduction to Operating sytem , Addision wesely.
2. Rajeev Chaupra “Operating System” S.Chand.

Course Outcome:

- After this course students understand the concept of operating systems and capable to work in real time environment.

SIGNAL PROCESSING LAB-II

Course/Paper: 07BEC-201
BEC Semester-VII

Course Objectives:

- To designs digital (IIR & FIR) filters from analysis to synthesis for a given specifications using software MATLAB
- To generate and test the waveforms using DSP Kits.

1. Realising a given block diagram having multiplier, adder/subtractor and system (Discrete/Continuous) with given Impulse response. Calculating output for given input.
2. To simulate the transmitter and receiver for BPSK

3. To design and simulate FIR digital filter (LP/HP).
4. To design and simulate IIR digital filter (LP/HP).
5. To study the architecture of TMS320C6XXX DSP kits using Bloom with DSP.
6. To generate wave form (SINE, COSINE, SQUARE & TRIANGULAR).
7. Verification of Sampling Theorem.
8. Verification of linear/circular convolution.
9. To design FIR and FIR digital filter (LP/HP).

Course Outcomes:

- Able to analyze and design digital filters on paper and implement the design by using MATLAB software.

WIRELESS COMMUNICATION LAB

Course/Paper: 07BEC-202
BEC Semester-VII

Course Objectives:

- To attain knowledge on the basic parameters those are considered in the antenna design process and the measurement of antenna characteristics.
- To design and testing of various antennas.

1. Measurement of antenna characteristics :
Radiation Pattern on polar plots, Beam width and Gain of main lobe for the following types of antennas.
(a) Half wave and quarter wave dipole
(b) Folded dipole
(c) Yagi UDA multiple element folded dipole
(d) Hertz Antenna
(e) End fire array and broad side array
(f) Helix antenna
(g) Paraboloid reflector antenna
(h) Loop antenna
(i) Ground plane antenna
(j) Log periodic antenna
(k) Rhombus antenna
(l) Slot antenna
2. Demonstration of modeling of wire antenna using appropriate design software.
3. Simulation of antenna arrays using appropriate software.
4. Design and testing of microstrip rectangular patch antenna using appropriate software.
5. Investigate the transmission characteristics of the link and measure the gain of the microstrip patch antennas. Draw the antenna radiation diagram.
6. Radar Trainer: Working of Doppler radar, velocity of moving object, time and frequency measurement and other applications.
7. To perform Modulation, Demodulation and BER measurement using CDMA – DSSS Trainer.
8. To establish analog/digital communication link and transmit & receive three signals (audio, video, tone) simultaneously using Satellite Communication Trainer.
9. To study GPS Receiver, establishing link between GPS satellite & GPS trainer and measure of latitude & longitude.

Course Outcomes:

Student will be:

- Aware of parameter considerations viz. antenna efficiency, beam efficiency, radiation resistance etc. in the design of an antenna.

- Understand the design issues, operation of fundamental antennas like Yagi-Uda, Horn antennas and helical structure and also their operation methodology in practice.

TRAINING SEMINAR & INDUSTRIAL VISIT

Course/Paper 07BEC 203
IPE semester VII

Industrial visit (20 marks) is for the duration of 10 days at the end of V semester and Practical Training (80 marks) is for the duration of 30 days at the end of VI semester. Both will be evaluated during the VII semester.

PROJECT STAGE-I

Course/Paper: 08BEC-204
BEC Semester-VIII

OBJECTIVE:

The objective of the project work is to enable the students in convenient groups of not more than 3 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution.
The student should select any one of the topics offered from the department or select one on his own duly approved from the department. Candidate is required to submit the detailed synopsis of the work that he would complete in the part-II.
Each student shall finally produce a comprehensive report covering back ground information, literature survey, problem statement, project work details and conclusion. This final report shall be typewritten form as specified in the guidelines.

VIII SEMESTER

COMPUTER NETWORKS

Course/Paper: 08BEC-101
BEC Semester-VIII

Course Objectives:

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To introduce UDP and TCP Models.

- To learn switching, singling and traffic in the context of telecommunication network.
- To expose through the evolution of switching systems from manual and electromechanical systems to stored-program-controlled digital systems.
- To study signalling, packet switching and 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 systemarchitecture. Broadband ISDN. ATM Protocol architecture, Recognition Algorithm in ATM Networks,Congestion control Algorithms.

Text Books:

1. J. E Flood, "Telecommunications Switching and Traffic Networks," Pearson Education, 2006.
2. Tyagarajan Viswanathan, "Telecommunications Switching Systems and Networks," Prentice Hall of India Pvt. Ltd., 2006.

Text Books:

1. Tanenbaum- Computer Network , Pearson Education of Asia .

Reference:

1. Tanenbaum- Computer Network , Pearson Education of Asia .
2. Frouzan – Data communication and Networking , TMH .
3. Stallings- Data& Commuter communication, persons Educationn Asia .

Course Outcomes:

On completion of this course, it is expected that the student will be able to:

- Understand the main concepts of telecommunicating network design
- Analyze and evaluate fundamental telecommunication traffic models.
- Understand basic modern singling system.
- Understand the concept of packet switching.

RADAR & TV ENGINEERING

Course/Paper: 08BEC-102
BEC Semester-VIII

Course Objectives

- Radar fundamentals and analysis of the radar signals.
- To understand various technologies involved in the design of radar transmitters and receivers.
- To learn various radars like MTI, Doppler and tracking radars and their comparison.

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.

TEXT BOOK

1. Introduction to Radar Systems — Men* I. Skolnik, TMH Special Indian Edition, 2nd Ed.. 2007.

Reference

1. M.I.Skonik –'introduction to radar system' mc –graw Hill.
2. N.S.Nagaraja, "Elements of Electronic Navigation" , TMH .
3. R.R.Gulati-Monochromaic & colour television, Wiley Eastern.
4. Kulkarni "microwave & radar engg." Laxmi pub.

Course Outcomes

Alter completion of the course, the student will be able to

- Understand radar fundamentals and analysis of the radar signals.
- Understand various radar transmitters and receivers.
- Understand various radars like MT1. Doppler and tracking radars and their comparison.

OPTICAL COMMUNICATION

Course/Paper: 08BEC-103
BEC Semester-VIII

Course Objectives:

- To have a detailed study of optical fibres, fibre materials, optical sources.
- To have a knowledge of optical fibre communication systems and optical fibre measurements.

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.

Text Book:

1. Gerd Keiser- Optical Fiber Communication,TMH .
2. J.N.Senior - Optical Fiber Communication,PHI

Reference Books

1. J.gowar- . - Optical Communication system ,PHI.
2. preeti maswari-"Optical communicatio" Genius Pub.

Course Outcomes:

- Knowledge of working of basic optical communication systems
- Ability to evaluate alternative models of optical communication system design .

IMAGE PROCESSING AND PATTERN RECOGNITION

Course/Paper: 08BEC-104.1
BEC Semester-VIII

Course Objectives

Provide the student with the fundamentals of image processing.

- Give the students a taste of the applications of the theories taught in the subject. This will be achieved through the project and some selected lab sessions. Introduce the students to some advanced topics in digital image processing.
- Give the students a useful skill base that would allow them to carry out further study should they be interested and to work in the field.

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. Methodsfor knowledge representation, searching, spatial, temporal and common sense reasoning, and logic andprobabilistic inferencing. Applications in expert systems and robotics

Text Books:

1. Rafel c. Gonzalez-Digital Image processing , Pearson eduction Asia .

Reference:

1. Nick Effard- Digital Image Processing, Pearson Education asia .
2. jain A.K- - Digital Image Processing, PHI.

Course Outcomes

Upon successfully completing the course, the student should

- Have an appreciation of the fundamentals of Digital image processing including the topics of filtering, transforms and morphology, and image analysis and compression.
- Be able to implement basic image processing algorithms in MATLAB.
- Have the skill base necessary to further explore advance d topics of Digital Image Processing.
- Be in a position to make a positive professional contribution in the field of Digital Image Processing.
- At the end of the course the student should have a clear impression of the breadth and practical scope of digital image processing and have arrived at a level of understanding that is the foundation for most of the work currently underway in this field.

VHDL

Course/Paper: 08BEC-104.2
BEC Semester-VIII

Course objectives:

This course provides in-depth knowledge and design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

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.

Text Books:

1. Stephen brown and Zvokunki Vransic- Fundamental of digital logic circuit, TMH .

Reference:

1. D.L.PERRY – vhdl3 ED, TMH.
2. Morris Mano- Digital Logic & Computer Design , PHI .
3. J.Bhaskar- Vhdl premier- prentice hall.

Course Outcomes:

Upon completion of the course, students should possess the following skills:

- Be able to design and analyse small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
- Be able to design and analyse small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

MICROCONTROLLER AND EMBEDDED SYSTEMS

Course/Paper: 08BEC-104.3
BEC Semester-VIII

The objective of this course is to introduce 8051 version of microcontroller & its architecture and inter facing concepts of various devices.

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.

Text Books:

1. David simon –An Embedded softwaerprimer, pearson Education Asia .

Reference

1. K.J. Ayle- The 8051 Microcontroller, penram International .

2. M.A.Mazdi & J.G.Mazidi-The 8051 Microcontroller And Embedded , Pearson Education Asia .

Course Outcomes:

Upon completion of the course:

- The student will learn the internal organization of popular 8051 microcontrollers.
- The student will learn hardware and software interaction and integration.
- The students will learn the design of microcontrollers – based systems.

COMPUTER NETWORK PROGRAMMING LAB

Course/Paper: 08BEC-201
BEC Semester-VIII

Course Objectives:

- To Study and use of common TCP/IP protocols and term viz. telnet rlogin ftp, ping,finger, Socket, Port etc.
- To study and simulate the network protocols on LAN training kit.
- To study and development of client server application.

1. **DATA STRUCTURES USED IN NETWORK PROGRAMMING:** Representation of unidirectional, Directional weighted and unweighted graphs.
2. **ALGORITHMS IN NETWORKS:** computation of shortest path for one source-one destination and one source –all destination.
3. Simulation of M/M/1 and M/M/1/N queues.
4. Simulation of pure and slotted ALOHA.
5. Simulation of link state routing algorithm.

   Case study : on LAN Training kit
6. Observe the behavior & measure the throughput of reliable data transfer protocols under
7. various Bit error rates for following DLL layer protocolsa.
8. Stop & Wait
9. Sliding Window : Go-Back-N and Selective Repeat
10. Observe the behavior & measure the throughput under various network load conditions for
11. following MAC layer Protocols
12. Aloha
13. CSMA, CSMA/CD & CSMA/CA
14. Token Bus & Token Ring

    DEVELOPMENT OF CLIENT SERVER APPLICATION:
15. Develop ‘telnet’ client and server which uses port other than 23.
16. Write a finger application which prints all available information for five users currently logged on and are using the network for longest duration. Print the information in ascending order of time.

Course Outcomes:

On completion of this course, it is expected that the student will be able to:

- Understand the main concepts of telecommunicating network design
- Analyze and evaluate fundamental telecommunication traffic models.

INDUSTRIAL ECONOMICS & MANAGEMENT

Course/Paper: 08BEC-202
BEC Semester-VIII

Course Objectives:

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely. Theory of profitability ,New Industrial policy, Principles of Management, Total Quality Management.

UNIT 1 : Organizational forms, Profit maximization and other objectives of industrial firms, Theory of profitability, Economies of scale. Financing of Industries- Need and sources of finance, Role of special financial institutions, Investment criteria-NPV, IRR.

UNIT 2 : Approaches to industrial location analysis, Productivity analysis, Input-Output analysis, Concentration of economic power.New Industrial Policy – Critical analysis, Role of technology and entrepreneurship in industrial development.

UNIT 3: Management – Principles of management, functions-planning, Organization staffing, Directing,Controlling, Coordination, Decision making.

UNIT 4 : Production Management – Total quality management, JIT, Quality circle, Quality-ISO9000,ISO14000, KANBAN, Bench marking, Effective communication.

UNIT 5: Labour Legislations.

Text Books:

Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

References:

1) Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2004.
2) Shim & Siegel: Financial Accounting (Schaum's Outlines), 2/e TMH, 2004
3) Chary: Production and Operations Management, 3/e, TMH, 2004.
4) Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson, 2003.
5) Narayanaswamy: Financial Accounting-A Managerial Perspective, PHI, 2005.
6) Peterson & Lewis: Managerial Economics, 4th Edition, Pearson Education, 2004.
7) Raghunatha Reddy & Narasimhachary: Managerial Economics & Financial Analysis, Scitech, 2005.
8) S.N.Maheswari & S.K. Maheswarial, Financial Accounting, Vikas, 2005.
9) Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2004.
10) Dwivedi: Managerial Economics, 6th Ed., Vikas, 2002.
11) Yogesh Maheswari: Managerial Economics, 2nd Ed., PHI, 2005

Course Outcomes:

1. To study fundamental concepts in Industrial economics.
2. To learn different types of market environment under various types of competition.
3. To gain the knowledge of new economic environment in post – liberalization scenario.

VLSI & Optical fiber LAB

Course/Paper: 08BEC-203
BEC Semester-VIII

Course Objectives:

1. To design and make Device Level Layout of electronic circuits.
2. To design the Logic gates using appropriate software like VHDL/FPGA.
3. To have a detailed study of optical fibres and to perform the experiments based on Fibre optic Trainer.

PART-I

1. BJT/FET Amplifier in various configuration..
2. Counters, Shift Registers & Sequence Decoders.
3. Various circuits with Op-Amp.

PART-II

4. 3-input NAND gate.
5. Half adder.
6. D-Latch.
7. Serial in-serial out shift register.

PART-III

To perform following experiments based on Fiber Optic Trainer.

8. To set up Fiber Optic Analog link.
9. To set up fiber Optic Digital link.
10. Measurement of Propagation loss and numerical aperture.
11. Characterization of laser diode and light emitting diode.

PROJECT STAGE II

Course/Paper: 08BEC-204
BEC Semester-VIII

OBJECTIVE:

The objective of the project work is to enable the students in convenient groups of not more than 3 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution.

The student should select any one of the topics offered from the department or select one on his own duly approved from the department. Candidate is required to submit the detailed synopsis of the work that he would complete in the part-II

Each student shall finally produce a comprehensive report covering back ground information, literature survey, problem statement, project work details and conclusion. This final report shall be typewritten form as specified in the guidelines.

SEMINAR

Course/Paper: 08BEC-205
BEC Semester-VIII

OBJECTIVE

The students are to select one technical topic related its branch for Seminar. The student is to submit the synopsis for assessment and approval. Progress for preparation of the seminar topic would be continuously assessed from time to time. Two periods per week are to be allotted and students are expected to present the seminar Progress. A faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain the attendance.

Students have to give a final presentation for 15 minutes on his topic. Students are encouraged to use various teaching aids such as over head projectors, power point presentation and demonstrative models. This will enable them to gain confidence in facing the placement interviews