B.TECH. ELECTRONICS AND COMMUNICATION SECOND YEAR SYLLABUS SESSION 2013-14

DETAILED SYLLABUS

SEMESTER III

MATHEMATICS-III
BTEC 301

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

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

UNIT 5

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

Reference Books:

1. Engineering Mathematics, T Veerarajan, TMH
2. Mathematical Techniques, Jordan, Oxford
3. Advance Engineering Mathematics, Potter, Oxford
4. Advanced Engineering Mathematics, Irvin Kreyszig, Wiley
5. Mathematical Methods, Dutta, D., New Age
6. Text BOOK Of Engineering Mathematics, Dutta, New Age

ELECTRONIC DEVICES & CIRCUITS
BTEC 302

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 circuit 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, mid-band 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.

Reference Books:

1. Millman's Integrated Electronics, Millman &Parekh, TMH
2. Electronic Devices And Circuits, Salivahanan, TMH
3. Millnman's Electronic Devices And Circuits (Special Indian Edition), Millman & Halkias, TMH
4. Electronic Devices And Circuits, Bogart, Pearson
5. Electronic Devices And Circuit Theory, Boylestad, Pearson
6. Electronic Devices And Circuits, Cheruku, Pearson

CIRCUIT ANALYSIS & SYNTHESIS
BTEC 303

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, y-parameters, h-parameters, ABCD parameters, Equivalence of two ports, transformer equivalent, interconnection of two port networks, Image parameters, Attenuation & phase shift in symmetrical T and π networks.

UNIT 5

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

Reference Books:

1. Franklin F. Kuo, "Network Analysis and synthesis", 2nd Edition, Wiley India Pvt Ltd.
2. Behrouz Peikari, "Fundamentals of Network Analysis & synthesis", Jaico Publishing House, 2006.
3. Circuits And Networks: Analysis And Synthesis, Sudhakar, TMH
4. Network Analysis And Synthesis, Ghosh & Chakrabarti, TMH

ELECTRONIC MEASUREMENTS & INSTRUMENTATION
BTEC 304

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

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

UNIT 5

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

Reference Books:

1. David A. Bell, "Electronic Instrumentation and Measurements", 2nd Ed., PHI , New Delhi 2008
2. Oliver and Cage, "Electronic Measurements and Instrumentation", TMH, 2009.
3. Alan S. Morris, "Measurement and Instrumentation Principles", Elsevier (Buterworth Heinmann), 2008.

ELECTRONIC MATERIALS & PROCESSES
BTEC 305

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.

Reference Books:

1. Principles Of Electronic Materials And Devices, S O Kasap, TMH
2. Electronics Engineering Material And Devices, J Allison, TMH
3. Electronics Material And Processes Hand
4. BOOK, Charles Harpa, Ronald Sampson, TMH
5. Introduction To Materials Science For Engineers, Shackelford, Pearson
6. Elements Of Materials Science & Engineering, Van Vlack, Pearson
7. Material Science For Electrical And Electronic Engineers, Jones, Oxford

DATA STRUCTURES & ALGORITHMS
BTEC 306

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 (pre-order, 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.

Reference Books:

1. Data Structures (Special Indian Edition) (Schaums' Outlines Series), Lipschutz & Pai, TMH
2. Data Structures And Algorithms, Pai, TMH
3. Data Structure Using C (Sigma Series), Mukherjee, TMH
4. Introduction To Data Structures With Applications, Tremblay, TMH
5. Data Structure Using C, Krishnamoorthy, TMH
6. Data Structures, Keogh, Wiley

ELECTRONICS WORKSHOP
BTEC 307

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
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 & de soldering 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.

COMPUTER PROGRAMMING LAB-I
BTEC 308

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 (8th 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).

ELECTRONICS LAB I
BTEC 309

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 h-parameters.
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.
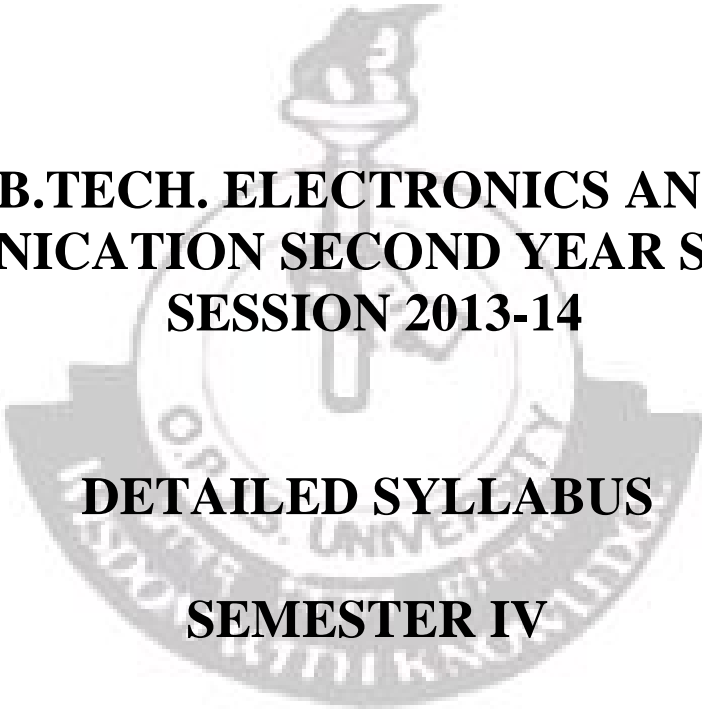
ELECTRONIC MEASUREMENT & INSTRUMENTATION LAB
BTEC 310

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.

B.TECH. ELECTRONICS AND COMMUNICATION SECOND YEAR SYLLABUS SESSION 2013-14

DETAILED SYLLABUS

SEMESTER IV

MATHEMATICS-IV
BTEC 401

UNIT 1

N**UMERICAL ANALYSIS:** Finite differences – Forward, Backward and Central differences, Newton's forward and backward differences, interpolation formulae, Stirling's formula, Lagrange's interpolation formula.

UNIT 2

NUMERICAL ANALYSIS: Integration-Trapezoidal rule, Simpson's one third and three-eighth rules. Numerical solution of ordinary differential equations of first order - Picard's method, 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.

Reference Books:

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

ANALOG ELECTRONICS
BTEC 402

UNIT 1

FEEDBACK AMPLIFIERS: Classification, Feedback concept, Transfer gain with feedback, General characteristics of negative feedback amplifiers, Analysis of voltage-series, voltage-shunt, currentseries 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, A-stable, mono-stable and bi-stable multivibrators. Schmitt trigger. Blocking oscillators

UNIT 3:

HIGH FREQUENCY AMPLIFIERS: Hybrid π model, conductances and capacitances of hybrid π 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, push-pull amplifiers with and without transformers. Complementary symmetry & quasi complimentary symmetry amplifiers

Reference Books:

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

DIGITAL ELECTRONICS
BTEC 403

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 sub-families, 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: Min-term, Max-term, 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, De-multiplexer, encoder, Octal to binary, BCD to excess-3 encoder, Diode switching matrix. Design of logic circuits by multiplexers, encoders, de-coders and de-multiplexers

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

Reference Books:

1. Digital Circuit & Logic Design, Samuel C.Lee, Eee
2. Modern Digital Electronics, R.P. Jain, TMH

3. Digital Principles And Applications (Special Indian Edition), Leach & Malvino, TMH
4. 2000 Solved Problems In Digital Electronics (Sigma Series), Bali, TMH
5. Digital Fundamental, Floyd & Jain, Pearson
6. Digital Logic And Computer Design, Mano, Pearson
7. Digital Systems: Principles And Applications, Tocci, Pearson
8. Digital Design, M.Morris Mano, Pearson
9. Digital Electronics Principal & Intigrated Ckt, Maini, Wiley
10. Digital Logic Design Principals, Palbanian, Wiley
11. Digital Electronics, Kharate, Oxford

ELECTROMAGNETIC FIELD THEORY
BTEC 404

UNIT 1

INTRODUCTION: Vector Relation in rectangular, cylindrical, spherical and general curvilinear co-ordinate 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 mapping 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.

Reference Books:

1. Engineering Electro-magnetic, (With Cd), Hayt, TMH
2. Electromagnetics (Sie) (Schaum's Outlines Series), Edminister, TMH
3. Electromagnetics With Applications, Jd Kraus, TMH
4. Electromagnetic Field Theory And Transmission Lines, Raju, Pearson
5. Field & Wave Electromagnetic, Cheng, Pearson
6. Elements Of Engineering Electromagnetics, Rao, Pearson
7. Electromagnetic For Engineers, Ulaby, Pearson
8. Fundamentals Of Electromagnetics For Engineers, Rao, Pearson

RANDOM VARIABLES & STOCHASTIC PROCESSES
BTEC 405

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

Reference Books:

1. Classical Electrodynamics, Jackson, Wiley
2. Probability, Statistics And Random Processes, Veerarajan,
3. Probability, Random Variables And Stochastic Processes, Papoulis, TMH
4. Probability, Random Variables And Random Signal Principles, Peebles, TMH
5. Probability And Random Processes With Application To Signal Processing, Stark, TMH
6. Probability And Random Processes For Electrical Engineering, Leongarcia, Pearson
7. Probability & Measure, Billingsley, Pearson
8. An Introduction To Probability Theory & Its App., Feller, Wiley
9. Probability & Statistics In Engg., Hines, Wiley

OBJECT ORIENTED PROGRAMMING
BTEC 406

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, operator precedence, Switch and loop statements.

UNIT 5

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

Reference Books:

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

DATA BASE MANAGEMENT SYSTEM
BTEC 407

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

INTERNAL OF RDBMS: Physical data organization in sequential, indexed, random and hashed files. Inverted and multi list structures.

UNIT 5

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

Reference Books:

1. Date C J, "An Introduction To Database System", Addision Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3. Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley
4. Leon & Leon, "Database Management System", Vikas Publishing House.
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication
6. Majumdar & Bhattacharya, "Database Management System", TMH
7. Ramakrishnan, Gehrke, "Database Management System", McGraw Hill
8. Kroenke, "Database Processing: Fundamentals, Design and Implementation",
9. Pearson Education.
10. Maheshwari Jain, "DBMS: Complete Practical Approach", Firewall Media, New
11. Delhi.

COMPUTER GRAPHICS
BTEC 408

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

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

UNIT 5

RENDERING: Ray tracing, anti-aliasing, Gourard and Phong Shading, Curves and Surfaces: Parametric Representation, Bezier and B-Spline curves.

Reference Books:

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

COMPUTER PROGRAMMING LAB-II
BTEC 409

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 colour selector from a given set of colours.
9. To implement a shape selector from a given set of shapes.
10. By mapping keys to pens of different colours, implement turtle graphics.
11. To implement a calculator with its functionality.
12. To implement a graph and display BFS/DFS order of nodes.

ELECTRONICS LAB II
BTEC 410

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.

DIGITAL ELECTORNICS LAB
BTEC 411

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) Mono-stable
(c) Bi-stable 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.

HUMANITIES
BTEC 412

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. Characteristics of Indian Economy

B.TECH ELECTRONICS AND COMMUNICATION
THIRD YEAR SYLLABUS
SESSION 2013-14

DETAILED SYLLABUS

SEMESTER V

SIGNALS AND SYSTEMS
BTEC 501

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

Reference Books:

1. P. Ramakrishna Rao, `Signal and Systems' 2008 Ed., Tata McGraw Hill, New Delhi
2. Chi-Tsong Chen, `Signals and Systems', 3rd Ed., Oxford University Press, 2004
3. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'Signals & System', Pearson Education, 2nd Ed., 2003.

LINEAR INTEGRATED CIRCUITS
BTEC 502

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, saw-tooth 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, LM565 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 a stable and mono-stable multi vibrators, Zero crossing detector, Schmitt trigger,

Reference Books:

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

TELECOMMUNICATION ENGINEERING
BTEC 503

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

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

UNIT 5

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

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Reference Books:

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1. Digital Telephony, Bellamy, Wiley
2. Fields And Waves In Communication Electronics 3ed By Ramo, Wiley

ANALOG COMMUNICATION
BTEC 504

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 & de-emphasis, 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.

Reference Books:

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

MICROWAVE ENGINEERING-I
BTEC 505

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 & multi-cavity klystrons, Velocity modulation and electron bunching (analytical treatment), Applegate diagram and applications of two cavity klystrons.
Construction, working and operation of Reflex klystron, Applications and practical considerations, Velocity modulation, power output and frequency characteristics of a Reflex klystron, Electron admittance

UNIT 4

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

UNIT 5

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

Reference Books:

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

ADVANCED DATA STRUCTURES
BTEC 506 A

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

Reference Books:

1. " Data Structures using C" by A.M. Tanenbaum.
2. "The C Programming Language" by Kerninghan.
3. "An introduction to data structures with applications: by Trembly and Sorenson.
4. "Fundamentals of Data structures" by Horowitz and Sahani.

COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS
BTEC 506 B

UNIT 1:

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

UNIT 2:

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

UNIT 3:

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

UNIT 4:

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

UNIT 5:

STATISTICAL METHODS: Curve fitting methods – method of least squares, fitting a straight line, parabola, Corelation and Linear regression

Reference Books:

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

ELECTRONIC ENGINEERING DESIGN LAB
BTEC 507

To design the following circuits, assemble these on bread board and test them. Simulation of these circuits with the help of appropriate software

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.

MICROWAVE ENGINEERING LAB
BTEC 508

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.

COMMUNICATION LAB-I
BTEC 509

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. PAM, PWM & PPM: Modulation and demodulation.

SIGNAL PROCESSING LAB-I
BTEC 510

Simulation 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 (mx, σx2)
9. To plot the probability density functions. Find mean and variance for the above distributions

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DETAILED SYLLABUS

SEMESTER VI

MICROWAVE ENGINEERING-II
BTEC 601

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.

Reference Books:

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

MICROPROCESSOR AND MICROCONTROLLER
BTEC 602

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

Reference Books:

1. 8051 Microcontroller: Hardware, Software And Application., V Udayashankara, M
2. Mallikarjunaswamy, TMH
3. Introduction To Microprocessors, Mathur, TMH
4. Modern Microprocessors, Korneev, Wiley
5. The 8085 Microprocessor: Architecture, Programming And Interfacing, K. Udaya Kumar, Pearson
6. Microprocessor Interfacing And Applications, B.P.Singh, New Age
7. Microprocessor: Architecture, Programming And Application For 8085, Goankar, Penram International
8. Microprocessor: Architecture, Programming And System Featuring In 8085, William A.Routt, Delmur Pub
9. The 8051 Microcontrollers & Embedded Systems, Mazidi, Pearson

INDUSTRIAL ELECTRONICS
BTEC 603

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.

Reference Books:

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

DIGITAL COMMUNICATION
BTEC 604

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 3

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.

Reference Books:

1. Analog And Digital Communication, Hwei Hsu, Debjani Mitra, TMH
2. Digital Commnunication, Amitabha Bhattacharya, TMH
3. Schaums Outline And Digital Communication, Hwei Hsu, TMH
4. Taub's Principles Of Communication Systems, Taub & Schilling, TMH
5. Electronic Communication Systems, Kennedy, TMH
6. Analog And Digital Communication, Sudakshina Kundu, Pearson
7. Digital Communication, Sklar & Ray, Pearson
8. Digital Communication, Ian Glover, Pearson
9. Modern Digital And Analog Communication Systems, Lathi, Oxford
10. Digital Communications, Simon Haykin, Wiley
11. Digital And Analog Communication Systems, K.Sam Shanmugam, Wiley

12. An Introduction To Analog And Digital Communication System, Simon Haykin, Wiley
13. Information Theory And Network Coding, Raymond W, Springer
14. Principle Of Digital Communication, J.Das, New Age
15. Digital Commnunication, Barry John, Le, Edward, David.G, Springer

CONTROL SYSTEMS
BTEC 605

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

Reference Books:

1. Control System Engineering, S Palani, TMH
2. Control Systems, Manjita Srivastava, Mahesh Srivastava, Smriti Bhatnagar, TMH
3. Schaum's Outline Of Feedback And Control Systems, Allen Stubberud, Ivan Williams,
4. Joseph Distefano, TMH

5. Control Systems: Principles & Design, M. Gopal, TMH
6. Control Systems Engineering, S. K. Bhattacharya, Pearson
7. Design Feedback Controk System, Stefani, Oxford
8. Systems And Control, Zak, Oxford
9. Automatic Control Systems, B. C. Kuo, Wiley
10. Control Systems Engg., Norman S. Nise, Wiley
11. Control System, N.K.Sinha, New Age
12. Control System Engineering, J.Nagrath, New Age
13. Control System, Ghosh, Pearson

NEURAL NETWORKS
BTEC 606 A

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

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

UNIT 5

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

Reference Books:

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

PARALLEL COMPUTATION & ARCHITECTURE
BTEC 606 B

UNIT 1

INTRODUCTION - Synchronous and asynchronous paradigms of parallel computing.

UNIT 2

HARDWARE TAXONOMY – Flynn's classification, Handler's classification, Software taxonomy, Kung's taxonomy, SPMD

UNIT 3

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

UNIT 4

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

UNIT 5

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

Reference Books:

1. Kai Hwang, "Advanced Computer Architecture", Mc Graw Hill

2. Hwang and Briggs, "Advanced Computer Architecture", Mc Graw Hill

OPTIMIZATION TECHNIQUES
BTEC 606 C

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

Reference Books:

1. Hiller and Lieberman, Introduction to Operation Research (Seventh Edition) Tata McGrawHill Publishing Company Ltd
2. Ravindren Philips and Solberg, Operation Research Principles and Practice (Second Edition) John Wiley & Sons.

COMMUNICATION LAB-II
BTEC 607

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.

MICROPROCESOR LAB
BTEC 608

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.

UNIX SHELL PROGRAMMING LAB
BTEC 609

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.

INDUSTRIAL ELECTRONICS LAB
BTEC 610

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.

B.TECH. ELECTRONICS AND COMMUNICATION FOURTH YEAR SYLLABUS SESSION 2013-14

DETAILED SYLLABUS

SEMESTER VII

ANTENNA & WAVE PROPAGATION
BTEC 701

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 2

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 3

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

UNIT 4

RADIO WAVE PROPAGATION: Mechanism of radio wave propagation, Reflection, Refraction interference and diffraction of radio waves, Theory of ground wave, space wave and sky wave propagation. Plane earth reflection, Reflection factors for horizontal and vertical polarizationns. 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

Reference Books:

1. Antennas, John Kraus, Ronald Marhefka, TMH
2. Electromagnetic Waves And Radiating Systems, E.C. Jordan And K.G. Balmain, PHI

3. Antenna Theory: Analysis And Design, Constantine A. Balanis , John Wiley & Sons
4. Antenna Theory & Design, Robert S. Elliott, John Wiley & Sons
5. Antennas And Wave Propagation, G. S. N. Raju , Pearson
6. Antennas And Wave Propagation, A.R. Harish, M. Sachidananda, Oxford
7. Antenna Hand
8. BOOK: Antenna Theory, Y. T. Lo, S. W. Lee, Springer
9. Antenna Theory And Practice, Chatterjee, R., New Age International

DIGITAL SIGNAL PROCESSING
BTEC 702

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.

Reference Books:

1. Digital Signal Processing, Sanjit K Mitra, TMH
2. Digital Signal Processing, S.Salivahanan A Vallavaraj, C.Gnanapriya, TMH

3. Digital Signal Processing: Principals, Algorithms And Applications, John G.Proakis,
4. Dimitris G Manolakis, PHI
5. Digital Signal Processing, A.V. Oppenheim And R.W. Schaffer, PHI
6. Digital Signal Processing, Thomas J. Cavicchi, John Wiley & Sons
7. Digital Signal Processing, Emmanuel Ifeachor, Barry Jervis, Pearson
8. Digital Signal Processing, Chi-Tsong Chen, Oxford
9. Digital Signal Processing, Engelberg, Shlomo, Springer
10. Digital Signal Processing For Measurement , D Antona, Gabriele, New Age International

WIRELESS COMMUNICATION
BTEC 703

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, 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

Reference Books:

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

IC TECHNOLOGY
BTEC 704

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 SiO2, Ion Implantation and Ion Implantation Systems Oxidation. Growth mechanism and Deal-Grove Model of oxidation, Linear and Parabolic Rate co-efficient, Structure of SiO2, Oxidation techniques and system, Oxide properties

UNIT 3

CHEMICAL VAPOUR DEPOSITION AND LAYER GROWTH: CVD for deposition of dielectric and poly-silicon – 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

Reference Books:

1. VLSI Technology, Sze, TMH
2. Semiconductor Devices: Modelling And Technology, Nandita Dasgupta, Amitava Dasgupta, PHI
3. Fundamentals Of Semiconductor Fabrication, Gary S. May, S.M.Sze, John Wiley & Sons
4. Semiconductor Devices: Physics And Technology, Simon M. Sze, John Wiley & Sons
5. Introduction To System Design Using Integrated Circuits, Sonde, B.S., New Age
6. International Micro-Nano-fabrication technologies And Applications, Cui, Zheng, Springer

VLSI DESIGN
BTEC 705

UNIT 1

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

UNIT 2

BASIC ELECTRICAL PROPERTIES OF MOS CIRCUITS: Ids versus Vds relationship, Aspects of threshold voltage, Transistor Transconductance gm. The NMOS inverter, Pull up to Pull-down ratio for a NMOS Inverter and CMOS Inverter (Bn/Bp), 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

Reference Books:

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

ADVANCED MICROPROCESSORS
BTEC 706 A

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

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

UNIT 5

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

Reference Books:

1. The 8088 AND 8086 microprocessors By Walter A. Trebel & Avtar Singh (PHI)
2. 8086 Microprocessor By Uffenbeck (PHI)
3. The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium And Pentium Pro Processor Architecture, programming and interfacing. By Barry B. Brey (PHI)

ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS
BTEC 706 B

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

KNOWLEDGE SYSTEMS ARCHITECTURE; Rule based, non-production, uncertainty knowledge system building tools.

UNIT 5

KNOWLEDGE ACQUISITION: General concepts, learning by induction.

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Reference Books:

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1. Char nick "Introduction to Artificial Intelligence", Addision Wesley.
2. Rich & Knight, "Artificial Intelligence".
3. Winston, "LISP", Addison Wesley.
4. Marcellous, "Expert Systems Programming", PHI.
5. Elamie, "Artificial Intelligence", Academic Press.

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OPERATING SYSTEMS
BTEC 706 C

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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.

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Reference Books:

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1. Operating Systems, Dhamdhere, TMH

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

SIGNAL PROCESSING LAB-II
BTEC 707

Modelling and simulation using MAT LAB
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).
DSP Lab using TMS320C6XXX DSP Kits
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).

WIRELESS COMMUNICATION LAB
BTEC 708

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 micro-strip rectangular patch antenna using appropriate software.

5. Investigate the transmission characteristics of the link and measure the gain of the micro-strip patch antennas. Draw the antenna radiation diagram.

6. Radar Trainer: Working of Doppler radar, velocity of moving object, time and frequency measurementand 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

B.TECH. ELECTRONICS AND COMMUNICATION FOURTH YEAR SYLLABUS SESSION 2013-14

DETAILED SYLLABUS

SEMESTER VIII

COMPUTER NETWORKS
BTEC 801

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

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

UNIT 5

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

Reference Books:

1. Computer Network, Leon And Garcia, TMH
2. Data Communication And Networking(Sie), Forouzan, TMH
3. computer Network, Tanenbaum, Pearson
4. Computer Networking, Kurose, Pearson
5. Computer Networking And Inernet, Halsell, Pearson
6. Digital Telephony, 3rd Ed, James Irvine & David Harle, Wiley
7. Line Communication System: Telecommunication Switching Approach, Das, Apurba, New Age

8. Telecommunication Switching And Networks, Gnanasivam, New Age

RADAR & TV ENGINEERING
BTEC 802

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 mono-pulse 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

TV TRANSMITTER: 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.

Reference Books:

1. Radar Principles, By Peyton Z. Peebles, Oxford
2. Radar Hand BOOK, By Merrill I. Skolnik, Oxford
3. Television Engineering And Video System, By Rg Gupta, TMH
4. Television & Video Engineering, By Dhake, TMH
5. Modern Television Practice – Principle, R.R. Gulati, New Age
6. Monochrome And Colour Tv, By R.R. Gulati, New Age

7. Components, And Circuits Hand BOOK (Hardcover), By Ferril Losee, New Age

OPTICAL COMMUNICATION
BTEC 803

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, Mono-mode 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

Reference Books:

1. Optical Fibre And Laser: Principles And Applications, De, Anuradha, New Age
2. Opto Electronics And Fibre Optics Communication, Sarkar, D.C,
3. Optical Fiber Communications: Principles And Practice, G P Agrawal, Govind P Agrawal, Wiley
4. Optical Fiber Communications: Principles And Practice, John Senior, PHI
5. Fiber Optics Communications, Joseph C Palais, PHI
6. Fiber- Optic Communications Technology, Lowell L Scheiner, PHI

IMAGE PROCESSING AND PATTERN RECOGNITION
BTEC 804 A

UNIT 1

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

UNIT 2

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

UNIT 3

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

UNIT 4

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

UNIT 5

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

Reference Books:

1. Digital Image Processing Using MATLAB, Gonzalez, Woods and Eddins, Gatesmark Publishing
2. Applications of Pattern Recognition, Fu, K.S., CRC Press
3. Digital Image Restoration, Andrews, H.C. Hunt, B.R Prentice Hall, Englewood Cliffs.

4. Applications of Digital Signal Processing, Oppenheim, A.V. Prentice Hall Englewood Cliffs.
5. Digital Image Processing, Gonzalez, R.C. & Wintz, P.A., Reading, Addison-Wesley.
6. Digital Image Processing, Pratt, W.K., New York: Wiley
7. Digital Image Processing of Remotely Sensed Data, Hord, R.M., Academic Press.
8. Pattern Recognition: Human and Mechanical, Watanabe, S., Wiley
9. Fundamentals of Digital Image Processing, Jain, A.K., Prentice Hall

VHDL
BTEC 804 B

UNIT 1:

INTRODUCTION: Fundamental & history of various hardware description language, Design flow of ASICs 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.

Reference Books:

1. VHDL: Programming By Example, Douglas Perry, Oxford
2. The Designer's Guide To Vhdl, Peter J. Ashenden, Oxford
3. VHDL (Text BOOK Binding), Douglas L. Perry, Thh
4. VHDL For Programmable Logic, Skahill, Pearson
5. Introductory VHDL : From Simulation To Synthesis,Yalamanchili, Pearson

MICROCONTROLLER AND EMBEDED SYSTEMS
BTEC 804 C

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 op-codes, 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.

Reference Books:

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

COMPUTER NETWORK PROGRAMMING LAB
BTEC 805

1. **PRELIMINARIES:** Study and use of common TCP/IP protocols and term viz. telnet rlogin ftp, ping, finger, Socket, Port etc.

2. **DATA STRUCTURES USED IN NETWORK PROGRAMMING:** Representation of unidirectional, Directional weighted and un-weighted graphs.

3. **ALGORITHMS IN NETWORKS:** computation of shortest path for one source-one destination and one source –all destination.

4. SIMULATION OF NETWORK PROTOCOLS:

(i) Simulation of M/M/1 and M/M/1/N queues.

(ii) Simulation of pure and slotted ALOHA.

(iii) Simulation of link state routing algorithm.

5. CASE STUDY: ON LAN TRAINING KIT

(i) Observe the behaviour & measure the throughput of reliable data transfer protocols under various Bit error rates for following DLL layer protocols

a. Stop & Wait

b. Sliding Window: Go-Back-N and Selective Repeat

(ii) Observe the behaviour & measure the throughput under various network load conditions for following MAC layer Protocols

a. Aloha

b. CSMA, CSMA/CD & CSMA/CA

c. Token Bus & Token Ring

6. DEVELOPMENT OF CLIENT SERVER APPLICATION:

(i) Develop 'telnet' client and server which uses port other than 23.

(ii) 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.

INDUSTRIAL ECONOMICS & MANAGEMENT
BTEC 806

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

VLSI & Optical Fiber LAB
BTEC 807

PART-I
Schematic design and make Device Level Layout of following circuits.
1. BJT/FET Amplifier in various configuration..
2. Counters, Shift Registers & Sequence Decoders.
3. Various circuits with Op-Amp.

PART-II

Design of following circuits using appropriate software like VHDL/ FPGA
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.