B-Tech syllabus

ELECTRONICS & COMMUNICATION ENGINEERING

Basic Electronics (BTEC – 205)

Section -A

Brief review of Band Theory, transport phenomenon in semiconductors, Electrons and holes in Intrinsic semiconductor, Donor and acceptor Impurities, chargedensities in semiconductor. PN Junction, Reverse and Forward bias conditions, Diode Characteristic and parameter, Ideal vs. Practical diode. equivalent circuits and frequency response. rectification-half and full wave, Zener and Avalanche diode, its role as regulator, photodiode.

Section - B

Bipolar junction transistor (BJT) and their characteristics as circuit and gain elements. Two port network analysis, h-parameters and trans-conductance. Equivalent circuits for JFET and MOSFET, enhancement mode and depletion mode MOSFETS. Unijunction transistor (UJT), UJT characteristics, parameters and circuit operation.

Section - C

Bias for transistor amplifier: fixed bias, emitter feed back bias. Feedback principles. Types of feedback, Stabilization of gain, reduction of non-linear distortion, change of inputs and output resistance by negative feedback in amplifier. Amplifiers coupling, types of coupling, Amplifier pass band, Eq circuits for BJT at high frequency response of CE, RC-Coupled amplifiers at mid, low and high frequencies.

Section - D

Semi conductor processing, active and passive elements, Integrated circuits, bias for integrated circuits. Basic operational amplifier, applications of operational amplifier – adder, subtractor, Integrator, differentiator and comparator, Photo transistor: its characteristics and applications.

Reference Books:-

1. A.P.Malvino.Electronic Principles.

2. J.D. Ryder Electronic Fundamentals and Applications.

3. J.Millman and C.C.Halkias Electronic Circuits & Devices.

4. J.Millman & C.C.Halkias Integrated Circuits & Devices.

5. N.N.Bhargava & Kulshrestha, Electronic Devices.

Basic Electronics Lab (BTEC-208)

List of Experiments:

1. (a) To study the use and scope of using an oscilloscope as a measuring device in an electronic laboratory.

(b) To study the use and scope of using a millimeter (digital and analog) as a measuring device in an electronics laboratory.

(c) To study the use and scope of function generator as a signal source in an electronics laboratory.

Set up an experiment to:

2. Draw forward bias and reverse bias characteristics of a p-n junction diode and use it as a half wave and full wave rectifier.

3. Draw the characteristics of a zener diode and use it as a voltage regulator.

4. Draw characteristics of common base configuration of p-n-p transistor.

5. Draw characteristics of common emitter configuration of an npn transistor.

6. Draw characteristics of common drain configuration of a MOSFET.

7. Find the voltage and current gain of single stage common emitter amplifier.

8. Draw the characteristics curve of UJT.

9. Find the voltage gain of single stage voltage series feedback amplifier.

10. Use operational amplifier as

I) Inverting amplifier

II) Non-inverting amplifier

III) Comparator

11. Use operational amplifier as

I) Integrator

II) Differentiator

12. Use operational amplifier as

I) Adder

II) Precision amplifier

13. Find the overall voltage gain and current gain of a two stage RC coupled amplifier. Basic electronics should stress on interfacing with real life devices and general-purpose linear units. Emphasis is on system design and not on discrete components, some of the components around which exercises can be built are

1. SCR as triacs and power control.

2. Power supplies starting with zener.

3. Op to compliers and isolations where photo diode, transistors, leds are used.

4. Laser diode (laser pointer)

5. Op amps

6. Op amps for instrument amplifiers.

Note: - Record to be maintained in the laboratory record book for evaluation. Usage of readboard approach to be encouraged.

SEMESTER – III

Numerical Analysis & Computer Programming (BTEC – 301)

SECTION – A

INTRODUCTION TO COMPUTER PROGRAMMING: Review of computer programming in C and C++ languages. Arithmetic expressions, simple programs. The emphasis should be more on programming techniques rather than the language itself. FINITE DIFFERENCES & INTERPOLATION : Various difference operators and relation between them. Newton's forward and backward interpolation formulae. Central difference Interpolation formula. Gauss's forward and backward interpolation formulae. Lagrenge's interpolation formula and Newton's divided difference formulae.

SECTION- B

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS : Bisection method, method of false position, secant method, Iteration method, Newton- Raphson method, eneralized Newton-Raphson method.

SOLUTION OF SIMULTANEOUS ALGEBRAIC EQUATIONS : Jacobi's method, Gauss-eidal method, relaxation method.

SECTION – C

NUMERICAL DIFFERENTIATION AND INTEGRATION: Formulae for derivatives .Trapezoidal rule, Simpson's 1/3rd and 3/8th rules, Boole's and Weddle's rules, Romberg's integration.

SECTION – D

NUMERICAL SOLUTION OF P.D.E.: Finite difference approximations of partial derivatives, solution of Laplace equation (Standard 5-point formula only) Onedimensional heat equation (Schmidt method, Crank – Nicolson DuFort method and Frankel method) and wave equation.

Text books:

1. Numerical Methods in Engg. & Sciences : B.S.Grewal : Khanna Publishers.

2. Numerical methods for Scientific & Engg. Computations: M.K.Jain,

S.R.K.Iyengar & R.K.Jain; Wiley Eastern Ltd.

Reference books:

1. Computer Oriented Numerical methods : U.Rajaramanm Orebtuce; Hall of India.

Principles of Engineering Economics and Management (BTEC – 302)

SECTION - A

ECONOMICS

Definitions, Nature & scope of Economics, Economics Systems-meaning of Capitalism, Socialism & mixed economy.

DEMAND AND SUPPLIES ANALYSIS

Law of demand and supply, exception to the law of demand, Elasticity of demand and supply and their types, Methods of measuring elasticity of demand and supply.

SECTION - B

THEORY OF PRODUCTION

Scales of production, Law of returns, Break even analysis.

MONETARY SYSTEM

Monetary policy – Meaning, objectives, methods, Fiscal policy – Meaning & objectives of fiscal policy in a developing country like India, Functions of Reserve Bank of India and commercial banks.

ECONOMICS & BUSINESS ENVIRONMENT

Privatization –Growth of private capitalism in India, Business/Trade Cycles – Meaning, Characteristics & classification, foreign capital & economic development.

SECTION - C

MANAGEMENT PRINCIPLES

Meaning & types of Management, Concept of Scientific Management, Management By Objectives, System Approach to Management.

FINANCIAL MANAGEMENT

Meaning, functional areas of financial management, Sources of Finance, Meaning of financial accounting, accounting principles-concepts & conventions, Importance of final accounts – profit & loss a/c and balance sheet, Need and importance of capital budgeting.

MARKETING MANAGEMENT

Introduction to marketing management, Market segmentation, Developing & managing advertising programs, Deciding on media & measuring effectiveness.

SECTION - D

PRODUCTION MANAGEMENT

Procedure for production planning & Control, Plant Location & Lay-out, Routing,

Scheduling, CPM & PERT,

QUALITY MANAGEMENT

Statistical Quality Control, Introduction Control Charts, X Charts, R Charts, Control Charts for C

(N. of defects per unit), Control chart for P(Fraction Defective), Advantages & Limitations of

SQC Quality Circles:- Structure, functions & Limitations.

Text Books :-

1. Business Organisation & Management – B.P.Singh – T.N.Chabra – Dhanpat Rai & Sons.

2. Modern Economic Theory – K .K. Dewett – S.Chand & Co.

Reference Books :-

1. Marketing Management – Philip Kotler – Prentice Hall of India Pvt. Ltd.

2. Financial Management - I.M. Pandey - Vikas Publishing House Pvt. Ltd.

3. Indian Economic – Ruddar Dutt, K.P.M.Sundaram – S.Chand & Co.

4. Advanced Economic Theory – H.L.Ahuja – S.Chand & Co.

5. Production Operation Management.- Dr. B.S. Goel – Pragati Prakashan.

6. Statistical Quality Control – Grant, Leaven worth – Tata Mc. Graw Hill.

7. Personnel Management – Edwin B.Flippo – Tata Mc. Graw Hill.

8. Management – A Global Perespective – Harold Krontz – Tata Mc. Graw Hill.

Digital Electronics (BTEC – 303)

SECTION A

Binary, octal & Hexadecimal number systems and their inter conversion. Binary arithmetic (Addition & Subtraction, Multiplication & Division), 1's & 2's complements, 9's & 10's complement, BCD code, BCD Addition, Gray Code, Error Detection and Correction , Hamming code.

SECTION – B

Logic functions (OR, AND, NOT, NAND, NOR, XOR), Elements of Boolean Algebra (Theorems truth tables and relation's) Negative & Positive logic, Saturated & non saturated logic , fan in, fan-out, Logic IC's, de Morgan's Theorem, minterms and maxterms Karnaugh mapping, K-map representation of logical function for 2, 4 variable, simplification of Boolean equations with the help of K-map, Various minimization techniques, Quine's method and Quines Mc-Cluskey method, Half adder, full adder, half subtractor, full subtractor, serial and parallel binary adder.

SECTION – C

Introduction and performance criteria for logic families, various logic families - DCTL, RTL, DTL, TTL & EC working and their characteristics in brief, MOS Gates and GMOS Gates, comparison of various logic families.

SECTION – D

Various kinds of Flip-Flop: RS Flip-Flop, Clocked RS Flip-Flop, Edge triggered D Flip-Flop, Flip-Flop Switching time, J/K Flip-Flop, JK Master Slave Flip flop. 555 timer as an astable multivibrator, shift registers: serial in serial out, parallel in parallel out, Ring counters, asynchronous counters, synchronous counters. D/A Converter, A/D Converter, clipping and clamping circuits, astable, monostable, bistable multivibrators using transistor.

BOOKS:

1. Malvino and Leach, Digital Principles and Applications.

2. Taub and Schilling, Digital Integrated Electronics.

3. Samuel C Lee, Digital Circuits and Logic Design 4.

4. Pulse, Digital and Switching Waveforms – Millman and Taub.

5. R.P.Jain – Modern Digital Electronics.

6. Floydd – Digital Fundamentals.

CIRCUIT THEORY (BTEC – 304)

SECTION – A

Laplace Transformation: Laplace transformation and its applications to circuit theory in obtaining steady state and transient response of linear circuit. **Fourier Analysis:** of complex waveform, solution of linear circuit impressed with complex waveform, power and power factor associated with complex wave.

SECTION- B

Two Port network: Network elements, classification of networks, symmetrical two port network, Equivalent T and π representation in parameter form, ladder and lattice networks, Parameter representation: Z parameter (open circuit impedance parameter), Y parameter (short circuit admittance parameter), Hybrid parameter (h- parameter representation), ABCD parameter representation, condition of reciprocity & symmetry in two port networks, different type of interconnection of two port network including series, parallel and cascade connection ,iterative and image impedances.

SECTION-C

ANALYSIS OF NETWORK Using Graph Theory: Graph for given network, classification of graph and sub graphs, incidence , tie set and cut set matrices, terminology used in Network Graph, properties of tree in a graph, variable solution of network using graph theory and matrix from the concept of network function. **Coupling Circuit:** Dot convention, coefficient of coupling, mutual inductances, loop and nodal equation for coupling circuits.

SECTION – D

Network Synthesis: Driving point functions, P.R functions , properties of P.R functions, Hurwitz polynomials, properties of Hurwitz polynomial functions, synthesis of reactive network by Foster & Cauer's method: Form-I & Form-II for LC networks,Synthesis of RC network by Foster & Cauer Form.

Books:

1. Circuit Theory By Chakravorty.
2. Network and Circuit by A.Sudhakar,Tata Mc Graw Hill.
3. Network Analysis by M.E Valkenburg.
4. Network Analysis by Sundaram Seshu & N Balbanian John.
5. Network Analysis and Synthesis by D Roy Choudhary.

6. Network Analysis and Synthesis By Soni Gupta.

7. Network Analysis by Schaum Series.

COMMUNICATION THEORY (BTEC – 305)

SECTION – A

REPRESENTATION OF FREQUENCY AND TIME DOMAIN

Introduction to Information, message and signals, classification of signals. The discrete and continuous spectrum, power spectrum energy density spectrum, diracdelta function, sampling theory and approximation.

SECTION – B

RANDOM SIGNAL THEORY

Discrete probability theory, continuous random variables, statistically independent random variable probability density functioning sums, transformation density function with discrete components, ergodic process, correlation function, spectral density with noise.

SECTION – C

NOISE

Atmospheric, thermal, shot and partition noise, figure and experimental determination of noise figure, shot noise in temperature-limited diode and space charge limited diodes, shot noise in triodes.

TRANSMISSION THROUGH NETWORKS

Networks with random input, auto correlation, spectral density and probability density I/P – O/P relationship, envelope of sine waves plus Guassian noise, optimum system and non-linear systems, max. Criterion, equivalent noise band width.

SECTION – D

BASIC INFORMATION THEORY

Definition of Information, Units of information, Entropy, Uncertainty and information rate of Communication, Redundancy, Relation between system capacity and information concept of message, discrete systems, discrete noisy channel, Continuous systems, comparison of existing system.

BOOKS:

1. Communication Systems : G.Kennedy.

2. Principles of Communication Systems: Taub & Schilling.

3. Communication Systems: B.P.Lathi.

4. Signals and Systems : S. Haykin.

5. Information and Transmission : Schwartz.

6. Elements of Communication Theory : J.C.Hancock.

ANALOG ELECTRONICS CIRCUITS (BTEC – 306)

SECTION – A

MULTISTAGE AMPLIFIERS General cascaded systems, RC Coupled amplifiers, Transformers coupled amplifiers, direct-coupled amplifiers, cascaded amplifiers, Darlington compound configuration, Multistage frequency effects.

SECTION – B

HIGH FREQUENCY RESPONSE OF TRANSISTOR AMP. High Freq. Model for CE amplifiers , approximate CE high freq. Model with resistive load , CE short circuit gain . HF Current gain with resistive load. LARGE SIGNAL AMPLIFIER Analysis and design of Class A , B , AB amplifiers , Push pull amplifiers , transformer less output stages, distortion calculations, high power amplifiers.

SECTION – C

TUNED AMPLIFIERS General bahaviour of tuned amplifiers, Resonance, Series and parallel resonant circuit, calculations of circuit impedance at resonance. Variation of impedance with frequency, Q-Factor of a circuit and coil. Bandwidth of a series and parallel resonant circuit advantage and disadvantage of tuned amplifiers, single tuned amplifiers, voltage gain and frequency response of single tuned amplifiers , double tuned amplifiers , Analysis and design of Class C amplifiers. WIDE BAND AMPLIFIERS

High freq. and low freq. Compensation, pulse rise-time and fall-time response, wideband amplifier using bipolar and FET devices.

SECTION – D

FEEDBACK AMPLIFIERS

Feedback concept, characteristics of negative and positive feedback, Effect on I/P & O/P impedances, gain freq. response and noise. REGULATED POWER SUPPLIES Unregulated power supplies, Zener diode voltage regulators, and transistor series and shunt regulators. OPAMP voltage regulators, IC voltage regulators. Introduction to SMPS.

BOOKS:

1. Electronic devices and Circuit Theory: Boylstad & Naschelsky

2. Electronic circuits : Schilling and Belove.

3. Electronic Devices & Circuits : Millman & Halkias.

Numerical Analysis & Computer Programming Lab (BTEC- 307)

WRITE DOWN AND EXECUTE FOLLOWING PROGRAMS USING C/C++ LANGUAGE

1. To find the roots of non-linear equation using Bisection method/Muller's method.

2. To find the roots of non-linear equation using Newton's method/Muller's method.

3. Curve fitting by least-squares approximations.

4. To solve the system of linear equations using Gauss-Elimination method.

5. To solve the system of linear equations using Gauss-Seidal iteration method.

6. To solve the system of linear equations using Gauss-Jordan method.

7. To solve integral equation numerically using Trapezoidal rule.

8. To solve integral equation numerically using Simpson's rule.

9. Find the largest Eigen value of a matrix by power – method.

10. To find numerical solution of ordinary differential equations by Euler's method.

11. To find numerical solution of ordinary differential equations by Runge-Kutta method.

12. To find numerical solution of partial differential equation/laplace equation/ wave equation/heat equation.

13. To find numerical solution of ordinary differential equations by Milne's method.

14. To solve a given problem using Newton's forward interpolation formula.

15. To solve a given problem using Lagrange's forward interpolation formula.

DIGITAL ELECTRONICS LAB (BTEC– 308)

LIST OF EXPERIMENTS

1. Verify truth tables of AND, OR, NOT, NAND, NOR and XOR gates.

2. Implement (i) half adder (ii) full adder using AND – OR gates.

3. Implement full adder using NAND gates as two level realization.

4. Implement full subtractor using 8 to 1 multiplexer.

5. Verify truth tables of RS & JK flip flops and convert JK flip fops into D type & T type flip fops.

6. Use 555 timer as (i) monostable (ii) astable multivibrator.

7. (a) Use of 4-bit shift register for shift left and shift right operations.

(b) Use 4-bit shift register as a ring counter.

8. Implement mod – 10 counter and draw its output wave forms.

9. Implement 4-bit DAC using binary weighted resistance technique/R-2R ladder network technique.

10. Implement 8 – bit ADC using IC (ADC 0800/0801).

11. a) Implement (i) Single level clipping circuit (ii) Two level clipping circuit. a. Implement clamping circuit to clamp, at peak +ve voltage/peak –ve voltage of an input signal.

ADDITIONAL EXERCISES:

1. Construct bounce less switch.

2. Construct a pulser of 1 Hz and 10 Hz, 1k Hz and manual.

3. Construct logic state detector.

4. Construct opto – sensor based.

a. Measurement rotational speed of motor.

b. Measurement time elapse between two events.

c. Measurement of linear velocity.

d. Measurement of acceleration.

5. Construct a memory using TTL Circuits. Read and write data onto a memory from bus.

6. Construct a security latch that can be operated by an identity card.

NOTE:-Record to be maintained both electronically and hard copy for evaluation.

ANALOG ELECTRONICS CIRCUITS LAB (BTEC – 309)

LIST OF EXPERIMENTS

1. UJT relaxation oscillator and its use as a triggering device.

2. To study amplifying action of CE transistor amplifier.

3. To determine the frequency response of a RC coupled common emitter amplifier.

4. To study frequency response of single tuned voltage amplifier.

a) Inductively coupled.

b) Capacitively coupled.

5. To study frequency response of Current Series Negative Feedback Amplifier.

6. To study frequency response of Voltage Shunt Negative Feedback Amplifier.

7. To study frequency response of Current Shunt Negative Feedback Amplifier.

8. To study performance of Class B Amplifier.

9. To study performance of Class C Amplifier.

10. To study the performance of Hartley & Colpitts Oscillators.

11. To study the performance of RC Phase Shift Oscillator.

SEMESTER – IV

COMMUNICATION SYSTEMS – I (BTEC – 401)

SECTION – A

Base Band Signals and Systems.

Introduction, Definition of Communication, Communication System Block Diagram, Need for Wireless Communication, Need of Modulation, General Definition of Modulation, types of various signals, Basic Transmission signals.

AM Transmission and Reception

i) **Analog Modulation: -** Theory, power & current calculation, AM modulation of a complex wave.

ii) AM Transmission:

Introduction, Generation of Amplitude Modulation, Low Level and High Level Modulation. Basic Principle of AM Generation; Square Law Diode Modulation, Amplitude Modulation in Amplifier Circuits, Vander Bijl Modulation, Suppressed Carrier AM Generation (Balanced Modulator), Ring Modulator, Product Modulator/Balanced Modulator, High Power Linear Modulators.

iii) AM Reception:

Tuned Radio Frequency (TRF) Receiver, Super hetrodyne Receiver, Basic Elements of AM Super-hetrodyne Receiver, RF Amplifier, Neutralization of RF Amplifiers, Class of operation of RF Amplifiers, High power RF Amplifiers, Image Frequency Rejection, Cascade RF Amplifiers, Methods of increasing Bandwidth, Frequency conversion and Mixers, Additive Mixing, Bipolar Transistor Additive Mixer, Self Excited Additive Mixers, Multiplicative Mixing, Multiplicative Mixer using Dual Gate MOSFET, Tracking and Alignment, IF Amplifier, AM Detector, Square Law Detector, Envelope or Diode Detector, AM Detector with AGC, Distortion in Diode Detectors, AM Detector. Circuit using Transistor, Double hetro-dyne Receiver, AM receiver using a Phase Locked Loop (PLL), AM receiver characteristics.

SECTION – B

FM Transmission and Reception

i) **Frequency Modulation**: Theory of FM, Mathematical Analysis of FM, Spectra of FM signals, Narrow/Wide Band FM.

ii) FM Transmission:

FM Allocation Standards, Generation of FM by Direct Method, Varactor Diode, Modulator, Indirect Generation of FM, The Armstrong Method, RC Phase Shift Method, Frequency Stablished Reactance, FM Transmitter, FM Stereo Transmitter.

iii) FM Reception:

Direct Methods of Frequency Demodulation, Travis Detector/Frequency Discrimination (Balanced slope Detector), Foster Seely or Phase Discriminator, Radio Detector, Indirect Method of FM Demodulation, FM Detector using PLL, Zero Crossing Detector as a Frequency Demodulator, Pre-emphasis and De-emphasis, Limiters, The FM Receiver, RF Amplifier, FM Stereo Receiver, Transceiver.

SECTION – C

Theory of Phase modulation, PM & FM, Comparison of AM & FM, Comparison of PM & FM , SSB Transmission and Reception: SSB Transmission**:** Introduction, Advantage of SSB Transmission, Generation of SSB, The Filter method, The Phase – shift Method, The Third Method, AM Compatible SSB Modulation, Pilot Carrier SSB, Independent Side-band systems (ISB), Vestigial Side-band (CSSB) Receiver, ISB/Suppressed Carrier Receiver.

SECTION – D

Pulse Modulation Transmission and Reception:

Introduction, Pulse amplitude Modulation (PAM), Natural PAM Frequency spectra for PAM, PAM Time Multiplexing Flat-top PAM, PAM Modulator Circuit, Demodulation of PAM Signals, Pulse Time Modulation (PTM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), PPM Demodulator.

BOOKS:

1. Modern Communication Theory – Sharma & Sinha.
2. Communication Systems – Taub & Schilling.
3. Electronic Communication systems – George Kennedy.
4. Modern Electronic Communication – Ashok Raj.

Electronic Measurement & Measuring Instruments (BTEC – 402)

SECTION – A

ELECTRONIC INSTRUMENTS

Electronic voltmeter, VIVM Transistor voltmeter, Electronic Multimeter, CRO's study of various stages in brief, measurement of voltage, current phase and frequency, special purpose oscilloscope measurement of inductance, capacitance, effective resistance at high frequency, Q meters, LCR meter.

SECTION – B

INSTRUMENTS FOR GENERATION AND ANALYSIS OF WAVEFORMS

Signal generators, function generator, wave analyzer, harmonic distortion analyzer, spectrum analyzer, spectrum analysis.

INSTRUMENT TRANSFORMER

Current and potential transformers, constructional features, ratio and phase angle error.

SECTION – C

TRANSDUCERS

Principles of operation, qualitative treatment of strain gauge, LVDT, thermocouple, piezo-electric crystal and photoelectric transducers.

DATA ACQUISITION SYSTEM

Necessity of recorders, Recording Requirements, Graphic Recorders, Strip chart Recorders, agnetic tape Recorders, Digital Tape Recorders.

SECTION – D

DISPLAY DEVICES

Electronic Indicating Instruments, seven segment display, Fourteen segmental display, Nixie tube.

TELEMETERY

Introduction, Method of data transmission, Types of Telementary Systems and applications.

BOOKS RECOMMENDED

1. A.K.Sawhney – Electrical and Electronic Measurements and Instrumentation.

2. B.Stout - Basic Electrical Measurements.

3. D.Cooper – Electronic Instrumentation and Measurement Techniques.

4. Terman & Petit – Electronics Measurement.

ELECTRONIC LOGIC CIRCUIT DESIGN (BTEC – 403)

SECTION – A

INTRODUCTION: The switching circuit, classification of switching circuits.

SEQUENTIAL CIRCUITS: Asynchronous and synchronous circuits, state diagram and state table.

SECTION – B

SEQUENTIAL LOGIC DESIGN: Introduction, register, application of shift register, ripple or asynchronous counters, synchronous counters, up down counters, modulo counters, Decade counter. Design of counters (Binary & non-Binary)

SYNCHRONOUS SEQUENTIAL CIRCUIT DESIGN:

Sequential circuits, introductory example, finite state model – Basic definition, capabilities and limitation of finite state machines, state equivalence & machine minimization, simplification of incompletely specified machines, Extraction of maximal compatibles, synthesis & analysis of synchronous sequential circuits.

SECTION – C

DESIGN OF ASYNCHRONOUS SEQUENTIAL CIRCUITS:

Introduction to asynchronous circuits, timing diagram, state diagram & flow tables, fundamental mode circuits, synthesis, state assignment in asynchronous sequential circuits, pulse mode circuits.

SECTION – D

HAZARDS:

Introduction, gate delays, generation of spikes, production of static hazards in combinational networks, elimination of static hazards, design of hazard free combinational networks, hazard free asynchronous circuit design, dynamic hazards, essential hazards.

DECOMPOSITION OF SEQUENTIAL SYSTEMS:

Advantage of modularity, types of decomposition, conditions for serial and parallel decomposition.

BOOKS RECOMMENDED:

1. Switching and finite automata theory – ZVI Kohavi.
2. Logical design of switching circuits – Douglas Lewin.

NETWORK ANALYSIS AND SYNTHESIS (BTEC – 404)

SECTION – A

TRANSIENT RESPONSE:

Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using lap lace transform.

NETWORK FUNCTIONS:

Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, restrictions on pole and zero locations for driving points functions and transfer functions, Time domain behavior from the pole zero plot.

SECTION – B

CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS:

Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance, parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter connection of two port networks.

SECTION – C

TOPOLOGY: Principles of network topology, network analysis using graph theory.

TYPES OF FILTERS AND THEIR CHARACTERISTICS: Filter fundamentals, high-pass, low-pass, band-pass and band-reject Filters.

SECTION – D

NETWORK SYNTHESIS: Positive real functions, Synthesis of one port and two port networks, elementaryIdeas of Active networks

TEXT BOOKS:

1. Network Analysis & Synthesis: Umesh Sinha; Satya Prakash Pub.

2. Network Analysis & Synthesis: F.F.Kuo; John Wiley & sons Inc.

REFERENCE BOOKS:

1. Introduction to modern Network Synthesis: Van Valkenburg John Wiley.

2. Network Analysis: Van Valkenburg; PHI.

3. Basic circuit theory: Dasoer Kuh, Mc Graw Hill.

4. A course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.

5. Circuit Analysis: G.K.Mittal; Khanna Publication.

6. Networks and systems: D.Roy Choudhary; New Age International

PULSE SHAPING & WAVE GENERATION (BTEC – 405)

Section – A

Linear Wave Shaping: RC, RL and RLC Circuits:

The High – Pass RC Circuit (Sine, pulse, step, Square, Exponential & Ramp Circuits), the High – Pass Circuit as a Differentiator, The Low Pass RC circuit, The Low – Pass RC circuit as an Integrator, RL Circuits, RLC circuits.

Steady – State Switching Characteristics of devices:

The semi conductor diode, the temperature dependence of p-n charac, Diode transition capacitance, Avalanche diode, Diode Resistance, Transistor as a SWITCH, Transistor at Cut – Off, Break down Voltages, Latching Voltages, Reach – Through, Transistor SWITCH in Saturation, I/P Charac, Temp. Variation of Saturation parameters.

Section – B

(a) Clipping & Comparator circuits:

Clipping (limiting) circuits, Diode clippers, clipping at two independent levels, comparators, Applications of voltage comparators.

(b) Clamping & Switching Circuits:

Clamping Operation, Clamping circuit with source and diode resistance, clamping circuit theorem, Practical clamping circuits, Transistor as a SWITCH, SWITCH with inductive load, Damper diodes, SWITCH with capacitive load.

Section – C

Logic Circuits: Digital operation of a system, OR-gate, AND – gate, NOT – gate, INHIBIT – operation, XOR – gate, De- Morgan's Laws, NAND and NOR gates, Registers, Dynamic Registers, Diode Matrices, Resistor – Transistor Logic (RTL and RCTL), Direct coupled Transistor logic (DCTL) Low – level logic, comparison of logic gates.

Section – D

Multi Vibrators: Stable states of a binary, Fixed – bias Transistor binary, Self-bias transistor binary, Monostable multi vibrators.

Sampling gates:

Basic operating principle of gates, Uni-directional diode gate and its other forms, Bidirectional gates using transistors.

Books:

1. The art of Electronics: Paul Horowitz, Winfield Hill.

2. Pulse Shaping & Wave Generation: Milman & Taub.

3. Integrated Electronics: Millman & Halkias.

4. Electronics Devices & Circuits: Millman & Halkias.

SYSTEM SOFTWARE (BTEC – 406)

SECTION- A

Machine Architecture, instruction set, addressing modes of the chosen machine, arithmetic & logic operations, floating point operations. C Programming: Reviews of syntax of C with emphasis on feature like pointers. Bit operations, Pre-processor, files.

SECTION - B

Assemblers, Cross Assemblers: Two pass assembler design. Data structure and algorithms. Macro processor: Definitions, nested macro – definitions, macro expansion, conditional macro-expansion.

SECTION – C

Linking, Loading, and Relocation, Static and Dynamic linking, Loading and relocation. Editors, debuggers, interactive programming environments.

SECTION – D

DOS: Introduction to interrupts, structure of the interrupt vector table, internet types, software interrupts, Hardware interrupts, interrupts at a glance, interrupts calla from C, internal structure of DOS, Booting Dos, Com & Exe Programs, BIOS, Memory resident programs. Running Batch file. Programming Examples of Text handling, file management, interface and device drivers, programming in C.

Suggested Text Books & References

1. Donovan, J.J., "System Programming", Tata McGraw Hill.

2. Dhamdhare, D.M., " Introduction to System Software", Tata McGraw Hill.

3. Dhamdhare, D.M., " System Programming & Operating System", Tata McGraw Hill.

COMMUNICATION SYSTEMS LAB – I (BTEC – 407)

LIST OF EXPERIMENTS:

1. To study the Amplitude Modulation and demodulation experimental boards.

2. To study the frequency Modulation and demodulation experimental boards.

3. To study the function of a superhetrodyne receiver.

4. To study the operation of a phased lock loop.

5. To study the operation of a single mode band transmission system.

6. To study the operation of a balanced Modulator.

7. To study the vestigial sideband Transmission system.

8. To study the PAM, PWM, PPM, techniques.

Electronic Measurement and Instrumentation – Lab(BT EC – 408)

1. Measurement of displacement using LVDT.

2. Measurement of distance using LDR.

3. Measurement of temperature using R.T.D.

4. Measurement of temperature using Thermocouple.

5. Measurement of pressure using Strain Gauge.

6. Measurement of pressure using Piezo – Electric Pick up.

7. Measurement of distance using Capacitive Pick up.

8. Measurement of distance using inductive.

9. Measurement of speed of DC Motor using Magnetic Pick up.

10. Measurement of speed of DC Motor using Photo Electric Pick up.

MAT - LAB (BTEC – 409)

LIST OF EXPERIMENTS

i) Roots of a quadratic equation.

ii) Guessing a number.

iii) Units conversion.

iv) Factorial Program

v) Simulation of an RC circuit.

vi) I-V characteristic of a MOSFET.

vii) Finding average with a dynamic array.

viii) Writing a binary file.

ix) Reading a binary file.

x) Plotting one and two-dimensional graphs using various MATLAB 2-D Plot types.

xi) Using functions in MATLAB environment. The teacher concerned will give at least 10 more exercises to solve non-trivial problems using MATLAB environment.

Books:

a. Programming in MATLAB, Marc E.Herniter, Thomson ASIA Ptc Ltd. Singapore (2001).

b. MATLAB, The Language of Computing; The Maths work Inc.

ELECTRONIC CIRCUIT SIMULATION LAB (BTEC – 410)

LIST OF EXPERIMENTS

1. Familiarization with electronic circuit simulation tool.

Designing with electronic circuit simulation tool.

2. Design a full wave rectifier.

3. Design a full wave bridge rectifier.

4. Design a Voltage regulator using Zener diode.

5. Design a common emitter single stage amplifier.

6. Verify the operations of OR, AND, NOT, NOR, NAND and XOR gates.

7. Design a ring counter and twisted ring counter.

8. Design a mod – 8 up and down counter.

9. Design a square wave generator using IC555 timer.

10. Design a biased diode clipper.

SEMESTER – V

MICROPROCESSOR THEORY & APPLICATIONS (BTEC – 501)

SECTION – A

Introduction:

 Evolution of microprocessor, General Architecture, resistors, ALU, System buses.

 Instruction cycle, fetch cycle, execute cycle, machine cycle, T states.

 Architecture of 8085, block diagram, pin diagram, instruction formats.

 Addressing Modes:- Direct addressing, indirect addressing, indexed, register direct, register indirect, implicit addressing mode, Timing diagrams.

SECTION – B

Instruction Set & Programming:

 Typical instruction set of 8085, data manipulation, data transfer, status management instructions.

 Development of Assembly language program.

SECTION – C

Interrupts & data transfer:

 Interrupts: Hardware & Software Interrupts, polled and vectored interrupts, level and edge triggered interrupts, enabling, disabling and masking of interrupts.

 Data transfer schemes: DMA, memory mapped, I/o, mapped, schemes of I/o interfacing.

 Interfacing of RAM, ROM Chips with a microprocessor, bus contention, concept of wait states.

SECTION – D

Peripheral devices & applications of microprocessor:

 Description of 8251, 8255, 8253, 8257, 8259, 8279.

 A temp. monitoring system, water level control, traffic control, Generation of square waves using

I/o port and SOD lines.

Books Suggested:-

1. Microprocessor & Architecture, programming and application by Gaonkar.

2. Fundamentals of microprocessor & microcomputers – B.Ram.

3. An introduction to microprocessor – A.P.Mathur.

ELECTROMAGNETIC FIELD THEORY (BTEC – 502)

Section A
INTRODUCTION: Review of vector analysis, Scalar and Vector product, gradient, divergence, curl and their physical interpretation, line integral, surface integral, volume integral, stokes theorem, rectangular, cylindrical and spherical co-ordinate system and their transformations.

Section B
ELECTROSTATICS:
Coulomb's Law electrostatic force, Electric field intensity, Electric potential, Electric potential difference, Electric dipole and equipotential surfaces, Electric flux density, displacement flux, Gauss's Law, Capacitance and Capacitors, electrostatic energy.

MAGNETOSTATICS: Inductors and magnetic inductance, back emf, Faradays law of EM induction, Amperes law in differential vector form, Magnetic scalar & vector potential, self & mutual inductance, equation of continuity for steady currents, magnetic field intensity (H), Magnetic flux density (B), ampere force law (Biot Savart Law), energy stored in magnetic field.

Section C
TIME VARYING FIELDS: Equation of continuity for time varying fields, inconsistency of amperes law, displacement current, Maxwell field equation in differential & integral form and their interpretation, uniform plane wave and relation between E and H in uniform plane wave, Intrinsic impedance, boundary conditions.

EM WAVES: wave equation for free space and conducting medium, phasor on exponential notation of Maxwell's equations, wave propagation in free space and lossy dielectric medium, conductors 7 dielectrics, wave propagation in good dielectrics and good conductors, depth of penetration, reflection & refraction of plane waves at surface of perfect conductor and

dielectric (both normal & oblique incidence), surface impedance, energy flow and Poynting theorem.

Section D

TRANSMISSION LINE THEORY: Transmission line as a distributed circuit, basic transmission line equation , equation of transmission line terminated with any load impedance, infinite transmission line, characteristic impedance, open & short circuited line, Reflection coefficient, standing wave ratio and its relation with reflection coefficient, impedance matching.

Text Books :

1. Electro-magnetic Waves and Radiating System : Jordan & Balmain, PHI.

Reference Books :

1. Engineering Electromagnetic: Haytl TMH

2. Electro-Magnetic: Krauss JDF; Mc Graw Hill

MICROELECTRONICS & LIC (BTEC – 503)

Section A

INTEGRATED CIRCUIT TECHNOLOGY: Classification of Integrated Circuits, Monolithic technology,

Planar Processes, Fabrication of Devices-diodes, BJT,FET and passive components, Thick and Thin

Film technology, Ion implantation Technology, Hybrid Integrated Circuits.

Section B

DIFFERENTIAL & CASCADE AMPLIFIERS: balanced ,unbalanced output differential amplifiers, FET

differential amplifier, current mirrors, level translators, cascade configuration of amplifiers.

OPERATIONAL AMPLIFIERS: Introduction to ideal op-amp, characteristic parameters, interpretation

of data sheets, practical op-amp, its equivalent circuit and op-amp circuit configuration.

Section C

OP-AMP WITH NEGATIVE FEEDBACK: Block diagram representation of feedback amplifier, voltage series feedback, voltage shunt feedback, differential amplifiers.

FREQUENCY RESPONSE OF AN OP-AMP: frequency response, compensating network, frequency response of internally compensated op-amp and non-compensated op-amp. High frequency op-amp equivalent circuit, open loop gain vs. frequency, closed loop frequency response, circuit stability, and slew rate.

Section D

OP-AMP APPLICATIONS: Peaking amplifier, summing, scaling, averaging and instrumentation amplifiers, voltage to current converter, current to voltage converter, very high input impedance circuit, integration, differentiation, wave shaping circuit, active filters, oscillators, comparators and 555 timer.

Reference books:

1. Op-amp & Linear Integrated Circuits, 2nd Edition by Ramakant A. Gayakward

2. Linear Integrated Circuits by D. R. Chaudhary

3. Integrated Circuits by K. R. Botkar

INDUSTRIAL ELECTRONICS (BTEC-504)

SECTION A

CHARACTERISTICS OF SELECTED DEVICES: PNPN diode, fast recovery diodes, Schottky diode, SCR, triggering methods and commutation circuits, Series and parallel connection ofSCRs, Diac, Triac, Power diodes, Power MOSFETs., applications.

SECTION B

CONTROLLED RECTIFIER: Single-phase half wave and full wave converter with resistive

RL & R-L-E Freewheeling diode, three phase rectifiers, Bridge rectifiers -half controlled and

fully controlled.

SECTION C

INVERTER, CHOPPER AND CYCLOCONVERTER: Voltage driven, current driven, bridge,

parallel, , control of output voltage-PWM schemes, harmonic reduction, types of choppers,

step up and step down cycloconverter.

MOTOR CONTROL: D.C. and A.C. motor control reversible drives, closed loop control,commutatorless d.c. motor control.

SECTION D

SWITCHED MODE POWER SUPPLIES: Basic principle, step-up and step-down circuits, integrated circuits for Switched Mode regulators. Induction Heating, effect of frequencies and Power requirements, Dielectric heating and

applications.

Suggested Test Books And References:-

1. Power Electronics - P.C.Sen, Tata McGraw Hill Publishing Co., Ltd.,1987.

2. Power Electronics and Control - S.K.Dutta, Prentice Hall of India Pvt. Ltd.,1986

COMMUNICATION SYSTEM – II (BTEC- 505)

Section A:-

PULSE MODULATION:- Sampling process, pulse – amplitude modulation , other forms of pulse modulation, Bandwidth – noise trade off, quantization process, pulse code modulation, noise considerations in PCM system, Time- division multiplexing, digital multiplexers, virtues, limitations and modifications of PCM, delta modulation, linear prediction, differential pulse code modulation Adaptive differential pulse code modulation.

Section B:-

DIGITAL MODULATION TECHNIQUES: - Binary phase – shift keying, differential phase shift keying, differentially – encoding PSK (DEPSK), Quadrature phase shift keying (QPSK), M-ary PSK, Quadrature amplitude shift keying (QASK). Binary frequency shift keying, similarity of BFSK and BPSK, M-ary FSK, Minimum shift keying (MSK)

Section- C:-

DATA TRANSMISSION: - A base band signal receiver, probability of error, the optimum filter, white noise: the matched filter, probability of error of the matched filter, coherent reception: correlation, phase shift keying (PSK), frequency shift keying (FSK), Non coherent detection of FSK, differential PSK.

Section D: -

SPREAD SPECTRUM MODULATION: - Pseudo-noise sequences, direct sequence spread spectrum, processing gain, frequency HOP spread spectrum, Linear Block Codes, Convolution codes.

Books:- 1. COMMUNICATION SYSTEM – SIMON HAYKINS

2. PRINCIPLES OF COMMUNICATION SYSTEM – TAUB AND SCHILLING

3. ELECTRONICS COMMUNICATION SYSTEM – WAYNE TOMASI

4. INFORMATION THEORY, CODING AND CRYPTOGRAPHY BY RANJAN BOSE.

MICROPROCESSOR LAB (BTEC – 506)

List of Experiments :

1. Study of 8085 Microprocessor Trainer kit.

2. Write a program using 8085 for

(a) 8 bit two numbers addition.

(b) 16 bit two numbers addition

3. Write a program using 8085 for

(a) Two 8 bit numbers subtraction

(b) Two 16 bit numbers subtraction

4. Write a program for multiplication of two 8 bit numbers using 8085.

5. Write a program for division of two 8 bit numbers division using 8085

6. Write a program for sorting a list of numbers in ascending & descending order.

7. Code conversion-Binding to Gray & Gray to binary .

8. Write a program for finding square of a number using look up table & verify

9. Write a program for temp control using 8085 & 8255 PPI

10. Write a program for water level control using 8085 & 8255 PPI

11. Generate different waveforms using DAC after interfacing it with a microprocessor kit-use 8255 PPI port.

INDUSTRIAL ELECTRONICS LAB(BTEC-507)

List of experiments

1. To draw the characteristics of SCR.

2. To draw the characteristics of DIAC.

3. To draw the characteristics of TRIAC.

4. To vary the speed of a dc motor with the help of an SCR.

5. To determine the ripple factor of a full wave rectifier using SCR for various firing angles.

6. To control the firing angle of thyristor by varying

i) dc bias alone

ii) dc bias with superimposed ac.

7. To vary the firing angle of an SCR using a phase shift circuit and a peaking transformer.

8. To vary the frequency of an inverter circuit

9. To determine frequency of a relaxation oscillator for various values of C.

10. To obtain the average current of an SCR as a function of resistance**.**

COMMUNICATION SYSTEMS LAB (BTEC – 508)

List of Experiments:

1. To study the signal sampling and reconstruction techniques.

2. To study Pulse Code Modulation.

3. To study Delta Modulation and De-Modulation.

4. To study Adaptive Delta Modulation and De-Modulation.

5. To study Delta Sigma Modulation and De-Modulation.

6. To study Time Division Multiplexing (PAM) .

7. To study Time Division Multiplexing (PCM).

8. To study Amplitude shift Keying.

9. To study Phase shift Keying.

10. To study Frequency shift Keying.

ELECTRONICS DESIGN LAB (BTEC-509)

List of experiments

1. Design of Power Supply of 12 V

2. Design a Single stage amplifier

3. Design a combinational Circuits which multiplies two, two bit binary numbers.

4. Design a MOD-8 counter using J-K F/F.

5. (a) Design of Differentiator to differentiate a input signal that varies in frequency from 10Hz to 1 KHz

(b) Design a Integrator circuit to process input sinusoidal Wave forms p to 1

KHz by input amplitude is 10 mV

6. (a) Design a Second order LPF at a high cut off frequency of 1 KHz.

(b) Design a Second order HPF cut off filter of 1 KHz with a pass band gain of 2

7. (a) Design a wideband pass filter with FL=200 KHz and FH=1KHz and a pass band gain of 4

(b) Design a 60 Hz active notch filter.

8. Design a square wave generator using 555 timer.

9. Design a R.C. phase shift Oscillator using 741 IC

10. Design a Wein bridge oscillator using 741 IC

SEMESTER – VI

COMPUTER ARCHITECTURE (BTEC-601)

Section-A

Basic structure of computer hardware and software - Addressing methods and machine programme sequencing- Computer arithmetic - logic design and fast adders - multiplication - Booth's algorithm -Fast multiplication -integer division - floating point numbers - Control unit - instruction execution cycle - sequencing of control signals - hardwired control – PLAs - micro programmed control - control signals - microinstructions- micro program sequencing- Branch address modification- Prefetching of microinstructions- emulation-Bit-slice processors

Section-B

Memory organization-Semiconductor RAM memories-internal organization-Bipolar and MOS devices – Dynamic memories - multiple memory modules and interleaving - cache memories - mapping functions – replacement algorithms - virtual memory - address translations - page tables memory management units – Secondary memory - disk drives - organization and operations - different standards .

Section-C

Input-output organizations - accessing I/O devices - direct memory access (DMA) - interrupts – interrupt handling - handling multiple devices - device identification - vectored interrupts - interrupt nesting – Daisy chaining - I/O interfaces - serial and parallel standards - buses - scheduling - bus arbitration – computer peripherals - printers - plotters - VDUs .

Section-D

Pipelining: What is pipelining? The Basic pipeline for DLX, the major hurdle of pipelining – pipeline hazards, what makes pipelining hard to implement? Instruction – level parallelism: Concepts and challenges, overcoming Data Hazards with Dynamic scheduling.

Text Books :

Hamacher C V, " Computer Organization - 3rd Edition" , McGraw Hill., NewYork ,1990

References :

1) Pal Chaudhary P, "Computer Organization and Design " , Prentice Hall, New Delhi.

2) Bartee T C, "Digital Computer Fundamentals ", McGraw Hill, New York, 1977.

3) Hayes J P , "Computer Organization and Architecture - 2nd Edition ", Mc Graw Hill.

4) anenbaum A S , "Structured Computer Organization - 3rd Edition", Prentice Hall.

5) Goankar ,"Microprocessors Architecture Programming and Applications ", John Wiley.

6) Douglas V Hall ,"Microprocessors & Interfacing to 8085 Introduction to", Tata McGraw Hill.

7) Ghose Sridhar ,"Microprocessors for Engineers and Scientists"

8) Lance A Leventhal," Introduction to Microprocessors" Prentice Hall.

ANTENNA AND WAVE PROPAGATION (BTEC – 602)

SECTION – A

Radiation of Electromagnetic Waves:-

Retarded potentials, Radiation from a small current element, fields of a short Dipole, Power radiated by a current element, Radiation from a half wave dipole and quarter wave monopole.

Antenna Parameters:

Antenna patterns, Isotropic Radiators, Radiation pattern, Gain, Directivity, Antenna Efficiency, Aperture, Reciprocity Theorem, Radiation resistance, Beam width.

SECTION – B

Antenna Arrays;

Arrays of two point sources, Broadside array, End fire array, Collinear arrays, Parasitic arrays, Multiplication of pattern, Linear array with 'n' point sources, Binomial arrays, Antenna gain, Antenna aperture and its relation to gain, antenna terminal impedance, antenna temperature and signal to noise ratio.

SECTION – C

Special Purpose Antennas:

Reflector type antennas, Lens antenna, V and rhombic antennas, traveling wave antennas, Yagi antenna, Slotted and horn antennas, Basic idea of wide band antennas.

Antenna Measurements:

Measurement of field strength, antenna impedance, radiation pattern, radiation resistance, gain, directivity and effective length.

SECTION – D

Plane earth reflection, space wave and surface wave, The surface wave, Elevated Dipole antennas above a plane earth, wave tilt of the surface wave, spherical earth propagation, Troposheric wave.

Ionospheric Propagation:

Reflection and Refraction of waves by the ionosphere, Regular and Irregular variation, Attenuation factor, Effect of earth's magnetic field, wave propagation in ionosphere.

Books Recommended:

1. J.D.Kraus, "Antennas", McGraw Hill.

2. F.C.Jordan & D.C.Balmann, Electromagnetic waves and radiating systems", P.H.I.

3. K.D.Prasad, "Antenna & Wave Propagation" Satya Prakashan.

ADVANCED MICROPROCESSOR & MICROCONTROLLERS (BTEC– 603)

SECTION – A

Introduction:

Introduction to microprocessors and microcomputers, Architecture of 8086 : BIU, the queue, segment registers, instruction pointer, EU, Flag registers, addressing modes of 8086, instruction set of 8086, RAM/ROM address decoding.

SECTION – B

Programs with an assembler: Program format, segment & end directives, Data & address naming directives- EQU, DB, DW,DD, assume directives. Programs using 8086, conditional and unconditional jump, loop and string instructions, Interfacing of 8086 to : keyboards-alpha numeric displays and stepper motor.

SECTION – C

Microprocessor 80286 : Architecture, signal and system connection, operating modes

Microprocessor 80386, 80486: System and operating modes, RISC machines, optical computers.

SECTION – D

Microprocessors and Micro controllers:

Introduction, Microprocessors and Micro controllers, The Z80 and the 8051, four bit, Eight bit, Sixteen bit, thirty-two bit Micro controllers, Development System for Micro controllers.

The 8051 Architecture:

Introduction, 8051 Micro controller Hardware, Input/output Pins, Ports and Circuits, External Memory, Counters and Timers, Serial Data input/output, Interrupts.

Suggested Books:-

1. Microprocessor & interfacing program & Hardware Tata McGraw Hills by D.V.Hall.

2. 8088/8086 microprocessor programming, interfacing, Hardware & application: Tribel & single PHI.

3. Advanced Microprocessor & interfacing: B.Ram TMH.

4. 8086 microprocessors by B.S.Chhabra.

5. The 8051 Micro controller Architecture, programming & Applications : Kenneth J. Ayala.

LINEAR CONTROL SYSTEMS (BTEC – 604)

SECTION – A

Introduction:

The control system, historical development of automatic control system, sampled data digital control system.

Mathematical Models of Physical Systems:

Differential equation of physical systems, transfer function, block diagram algebra, signal Flow graphs.

Feedback characteristics of control systems:

Feedback and Non-feedback systems, Reduction of parameter variations by use of feedback, control over system Dynamics by use of feedback, control of the effects of Disturbance signals by use of feedback.

SECTION – B

Time Response Analysis:

Transient and steady state response, Input Test Signals, Time response of a first order and second order control systems, Steady State Error, Control Actions.

Stability:

The concept of stability, Necessary conditions for stability, Routh – Hurtwitz stability criterion.

Root Locus Technique:

The Root Locus concept, construction of root loci.

SECTION – C

Frequency Response Analysis:

Correlation between Time and Frequency Response, Polar plots, Bode plots,

Stability in Frequency Domain:

Nyquist stability Criterion, Assessment of Relative Stability using Nyquist Criterion,

SECTION – D

Compensation of Control Systems:

Phase lead compensation, phase lag compensation, phase lag – lead compensation,

Feedback compensation.

State Variable Analysis:

State space Representation, the concept of state, State space Representation of Systems,

Block diagram for state equation, controllability, observability.

Books Recommended:

1. "Control Systems Engineering" Nagrath & Gopal, New Age International Publishers.

2. "Linear Control Systems", B.S.Manke, Khanna Publishers.

3. "Automatic control system", KUO, PHI.

OPERATING SYSTEM (BTEC-605)

Section A

What is an Operation System? Simple Batch Systems; Multiprogrammed Batched Systems;
Time-Sharing System; Personal-Computer System; Parallel System; Distributed System;
Real-Time Operating Systems. System Components System Calls, System Programs; System
Structure; Virtual Machines. Process concept; Process Scheduling; Operation on processes,
Cooperating Processes, Threads, Interprocess Communication CPU Scheduling fundamental
concepts, Scheduling criteria; Scheduling Algorithms; Multiprocessor Scheduling; Real Time
Scheduling. Threads: Overview; Multithreading

Section B

Deadlock: System Model; Deadlock Characterization, Methods of Handling Deadlock,

deadlock Prevention; Deadlock Avoidance; Deadlock Detection, Recovery from deadlock;

Protection : Goals of protection; Domain of protection; Security : The Security Problem;

Authentication; One Time passwords program Threats, System Threats;

Section C

Memory Management Logical Versus Physical Address Spacel Swapping Contiguous

Allocation; Paging; Segmentation; Segmentation with paging. Virtual Memory; Demand Paging

Performance of Demand Paging page Replacement Page Replacement Algorithms; Allocation of

Frames Thrashing; Demand Segmentation; Cache memory and implementation. Secondary

Storage Structure : Disk Structure; Disk Scheduling; Disk Management; Swapspace

management;

Section D

File System Interface ; File Concept; Access Methods; Directory Structure; Protection;

Consistency Semantics; File-System Interface : File Concept; Access Methods; Directory

Structure; Protection; Consistency Semantics; File System Implementation ; File System

Structure ; Allocation Methods, Free Space Management Directory Implementation ; Efficiency

and Performance; Recovery.

Books :

1. Abrahanm Silberschatz, Peter Baer Galvin, " Operating System Concepts " John

Wiley & Sons, Inc., Vth Edition, 2000.

2. Detail H. M. "An Introduction to Operating System" Addison Wesley Publishing Co.,

1984

MULTIMEDIA SYSTEMS (BTEC – 606)

SECTION-A:

Multimedia Communications: Introduction, multimedia information representation,

multimedia networks, multimedia applications, application and networking terminology.

Multimedia information representation: Introduction, digitization principles, text, and images,

audio, video.

SECTION-B*:*

Text and image compression: Introduction, compression principles, text compression, image compression. Various methods of text and image compression.

SECTION-C:

Audio and video compression: Text compression, image compression, Various methods of audio compressions and video compressions

SECTION-D:

Enterprise networks: Introduction, LAN's, Ethernet/IEEE 802.3, token ring, bridges, FDDI, high speed LAN's, LAN protocols, multisites LAN interconnection technologies.

Text Books:

1. Multimedia Communications- Applications, Networks, Protocols & Standards by Fred Halsall., Pearson Education
2. Multimedia Communications by RALF, CLARA, Pearson Education

ADVANCED MICROPROCESSORS LAB (BTEC- 607)

List of Experiments

1. Study of 8086 Microprocessor kit.

2. Write a program using 8086 for division.

3. Write a program using 8086 for:

a) Finding largest number from an array

b) Finding smallest number from an array

4. Write a program using 8086 for arranging an array of numbers in ascending & descending order.

5. Write a program to control the operation of stepper motor using 8086 & 8255 PPI

6. Write a program to calculate the number of bits in a string.

7. Write a program to convert data string into its 2's complement form.

8. Simple Programming on 8051 Micro controller.

9. Interfacing of 8051 with PC & downloading of program.

10. Application of 8051 as a stand alone (dedicated) controller.

CONTROL SYSTEMS LAB (BTEC-608)

List of Experiments

1. To illustrate a simple motor driven open loop position control system.

2. To demonstrate simple motor driven closed loop position control system.

3. To study and demonstrate simple closed loop speed control system.

4. To study the lag compensator and to draw magnitude and phase plots for these.

5. To draw the magnitude and phase plots for lead and lag-lead compensators.

6. To study a stepper motor and to execute microprocessor or computer based

control of the same by changing number of steps, direction of rotation and speed.

7. To plot torque – speed characteristics of ac servomotor.

8. To plot torque – speed characteristics of dc servomotor.

9. To study magnetic amplifier.

10. To study synchro transmitter rotor position vs. stator voltages and the working of synchro reciever position.

11. To study second order system and obtain its time response for different damping factors.

OPERATING SYSTEMS LAB(BTEC-609)

List of Experiments

1. Study of DOS internal commands.

2. Study of DOS external commands.

3. Writing of Batch files in DOS.

4. Study of GUI features of Windows Operating Systems.

5. Study various settings in Windows Operating Systems (Desktop settings, control panel etc.).

6. Study of LINUX Operating systems (LINUX basic commands).

7. Study of LINUX kernel.

8. Writing of Shell Scripts in LINUX.

MULTIMEDIA SYSTEMS LAB (BTEC-610)

List of Experiments

1.Using available multimedia software like Photoshop, macro media, generator, flash to create

a) Backgrounds

b) Titling

c) Icons

d) Pulls

e) Buttons & Bullets

f) Menu Bars

g) Animation (Rotate, Fade, Marquee, Twirl, Morphing etc & submit a project in concentration with instruction tutor incharge.

2.Overview of Flash 5

a) Menu b) Lasso Tool c) Arrow Tool d) Pen Tool

3.Working with Drawing & Painting tool.

4.Working with Bitmap & Raster Graphics.

5.Sound & Movie

6.Understand of Action scripts.

7.3-D Graphics.

8.Animation]

9. Write a program to read a paragraph & store it in suggested format.

10. Study the Pions Notes & stimulate them using keyboard & store them in file

11. Write a program to Play Wave, Midfile.

Project:

1. Create an Animated movie In Flash

2. Create a Full Motion Video Movie in Flash.

3. Create A Post Table Game on Flash.

SEMESTER – VII

T.V. ENGINEERING (BTEC – 701)

Section A

PRINCIPLES OF TV:

Picture elements, Theory of line, frame and field frequencies Blanking, Synchronization, interfacing, resolution, vertical resolution, horizontal resolution and video bandwidth. Use of AM in video and FM in audio.

Block Diagram of TV Transmitter and Receiver.

Construction of composite video signal.

Section B

TELEVISION CAMERAS AND PICTURE TUBES:

Spectrum of light and eye response.

Image orthicon, plumbicon, vidicon (Principles of operation, Construction and working).

TV picture tube details.

Modulation system used for sound and picture.

VSB working.

TV transmitter.

Section C

TV RECEIVER:

Block Diagram of TV Receiver, Tuner Circuits, Choice of IF amplifier, A.M. & F.M. detectors, Receiver sweep circuits, Video Frequency amplifier, synch. Pulse representation, deflection circuits.

Section D

COLOUR TV:

Hue, Saturation and luminance, Luminance and colour signal generation, colour picture tubes (Basic principles and construction), colour subcarrier and colour triangle.

NTPC, PAL, SECAM systems.

Colour TV transmission & reception.

◻Block Diagram of digital TV with merits.

Books Recommended:-

1. Gulati R.R. – Monochrome & Colour TV.

2. Grob G.M. – 'BASIC Television' McGraw Hills'.

3. Dhake TV Engg. – Tata McGraw Hills.

OPTICAL FIBRE COMMUNICATION (BTEC – 702)

SECTION – A

Need for Fiber Optic Communications System, Role of Fiber Optic communication technology, Basic Block Diagram, Advantages & Disadvantages of Optical Fiber Communication, Ray Theory, Electromagnetic Mode Theory, Step Index Fiber, Graded Index Fiber, Attenuation- Bending Loses, Scattering, Absorption, Dispersion – Intermodal, Chromatic, limitations & remedies.

SECTION – B

Light sources & Transmitters – Light Emitting Diodes, laser diodes, Principle of action, characteristics, efficiency, Block Diagram and typical circuits of Transmitter.

SECTION – C

Receivers, Photodiodes - Working, Power relationship, PIN photodiodes, Avalanche photodiode, Block Diagram & typical circuits of receiver.

SECTION – D

Fiber Cable Connecterization– Splicing, Connectors, components of Fiber Optic Networks, Transceivers, Semiconductor, optical amplifiers - Principle of operation, Gain, Bandwidth, Cross talk, Noise, Applications, Advantages& Disadvantages. Erbium Doped Fiber Amplifiers (EDFAs) - Operation, gain, noise, Components of EDFA module

Books Recommended:

1. Fiber Optic Comm. Systems – D.K.Mynbaev Pearson Education.

2. Optical Fiber Comm. Principle – John M.Senior PHI Pub.

3. Optical Fiber Comm. Principle – G.Keiser.

COMPUTER NETWORK & DATA COMMUNICATION (BTEC–703)

Section A

Introduction

User of computer Networks LAN, MAN, WAN, Wireless Networks, Networks software; Protocol hierarchies, design issues of layers interfaces and services. The OSI reference model, the TCP/IP reference model The Physical Layer : Fourier analysis, maximum data rate of a channel, transmission media, wireless transmission, narrow band ISDN, Broadband ISDN and ATM; Virtual circuits versus circuits switching.

Section B

Data link layer Data link layer design issues; services provided to network layers, framing, error control, flow control, error detection and correction. Elementary data link protocol; an unrestricted simplex protocol. A simplex stop and wait protocol, simplex protocol for noisy channel, sliding window protocol; a one bit sliding window protocol, a protocol using go back-N, a protocol using selective repeat ,Protocol specification and verification, example data link protocols;HLDC- high level data link control.

SECTION C

The Medium Access Sub layer: Channel allocation problem; static and dynamic channel allocation in LAN's and MAN's multiple access protocols- ALOHA carrier Multiple access protocol, WDMA protocol, wireless LAN protocol collision free protocols, limited contention protocols, IEEE standards 802.3 and Ethernet, IEEE standard 802.4 token bus, IEEE standard 802.5 token, ring. Distributed queue dual bus, logical link control bridges, high speed LANs, Satellite network.

SECTION D

Networks, layer design issues, routing algorithms, congestion control algorithm, internetworking. TRANSPORT LAYER: Transport services, elements of transport protocols, simple transport protocol, overview of application layer (TCP, UDP).

Reference Books:

1. Computer Networks by Tenanbaum (3rd edition)

2. Data & Computer Communication by Black.

3. Data Communication and Networking by FORAUZAN.

RADAR AND NAVIGATION (BTEC – 704)

SECTION A:

Basic RADAR system, Frequencies and Powers used in Radar, Radar equation, prediction of range, detection of signals in Noise, receiver noise and S/N ratio, integration of radar pulses, prf (pulse repetition frequency) and range ambiguity, Antenna parameters, system losses.

SECTION B:

Doppler effect, Moving Target Indicator RADAR, Continuous Wave Doppler RADAR, FM-CW RADAR, Pulsed Doppler RADAR, RADAR beacons, Tracking RADAR -Monopulse Tracking, Conical scan and frequency lobing, clutters, applications of radar, delay lines.

SECTION C:

RADAR Transmitters: brief idea of Radar RF sources, transmitter noise and spectrum. Radar Receivers: Noise Figure, Superhetrodyne Receiver, Mixer, Dynamic Range, Oscillator, Amplifiers, detector, Duplexer, Radar Displays, Radar Antennas.

SECTION D:

Introduction to navigation, Four methods of Navigation, VHF Phase comparison Direction Finder, Radio Ranges; LF/MF four course radio ranges, VOR, Instrument Landing System, Ground Controlled Approach-Surveillance RADAR and Precision approach RADAR, Synthetic aperture Radar

Reference Books:

1.N.S. Nagaraja, Elements of Electronic Navigation.

2.Skolnik, Introduction to Radar systems, 2nd Edition.

3.George F Kennedy, Principles of Communication Systems.

DIGITAL SYSTEM DESIGN (BTEC – 705)

SECTION – A
INTRODUCTION

Introduction to Computer aided design tools for digital systems. Hardware description languages; introduction to VHDL, data objects, classes and data types, Operators, Overloading, Logical operators. Types of delays Entity and Architecture declaration. Introduction to behavioral, data flow and structural models.

SECTION – B
VHDL STATEMENTS:

Assignment statements, sequential statements and process, conditional statements, case statement Array and loops, resolution functions, Packages and Libraries, concurrent statements.

Subprograms: Application of Functions and Procedures, Structural Modeling, component declaration, structural layout and generies.

SECTION – C
COMBINATIONAL CIRCUIT DESIGN:

VHDL Models and Simulation of combinational circuits such as Multiplexers, Demultiplexers, encoders, decoders, code converters, comparators, implementation of Boolean functions etc.

SEQUENTIAL CIRCUITS DESIGN:

VHDL Models and Simulation of Sequential circuits. Shift Registers, Counters etc.

SECTION – D
DESIGN OF MICROCOMPUTER:

Basic components of a computer, specifications, architecture of a simple microcomputer system, implementation of a simple microcomputer system using VHDL. DESIGN WITH CPLDs AND FPGAs: Programmable logic devices: ROM, PLAs, PALs, GAL, PEEL, CPLDs and FPGA. Design implementation using CPLDs and FPGAs.

REFERENCE BOOKS:

1. IEEE Standard VHDL Language Reference Manual (1993).

2. Digital Design and Modelling with VHDLand Synthesis: KC Chang; IEEE Computer Society Press.

3. "A VHDL Primmer": Bhasker; Prentice Hall 1995.

4. "Digital System Design using VHDL": Charles.H.Roth; PWS (1998)

5. "VHDL-Analysis & Modelling of Digital Systems" : Navabi Z; McGraw Hill.

6. VHDL – IV Edition: Perry TMH (2002)

7. "Introduction to Digital Systems": Ercegovac. Lang & Moreno; John Wiley (1999).

8. Fundamentals of Digital Logic with VHDL Design: Brown and Vranesic; TMH (2000).

9. Modern Digital Electronics – III Edition: R.P.Jain; TMH (2003)

BIOMEDICAL ELECTRONICS (BTEC – 706)

Section A

BIOELECTRIC SIGNALS: Origin and Electrodes for ECG, EEG and EMG signals.

PSYCHOLOGICAL TRANSDUCERS:- Pressure and temperature Transducers, Pulse sensors, Respiration Sensors.

PATIENT SAFETY: - Electric sock Hazards, Leakage currents instrument for checking safety parameters.

Section B

RECORDING SYSTEM; basic recording system, sources of noise in low level recording circuits, pre amplifiers, drivers, various types of records-Inkjet, Potentiometer, UV, thermal array, electrostatic, light gate array.

BIOMEDICAL RECORDS:- Electrocardiograph, phonocardiograph, Electroencephalograph , Electromyograph.

Section C

MEDICAL DISPLAY SYSTEM :- Oscilloscopes, cardio scope, multichannel Display, Nonfade display system.

IMAGE SYSTEMS:- Introduction Basic Principle & Block Diagram of X-ray Machine, Computer Tomography and Nuclear Magnetic Resonance (NMR) Tomography, Ultrasonic Imaging Systems, Ultrasound.

Section D

CARDIAC PACEMAKERS:- Externals, implantable & Programmable pacemakers, power sources for implantable pacemakers, Leads and electrodes.

CARDIAC DEFIBRILLATOR:- DC- Defibrillators, Defibrillator Electronic, Implantable defibrillators. BIO-TELEMETRY:- wireless telemetry system, multichannel wireless telemetry. PATIENT MONITORING SYSTEM.

Reference Books: -

1. Hand Book of Biomedical instrumentation - R.S. Khandpur (TMH)

2. Biomedical Electronics - Cromwell.,PHI

3. Biomedical Instruments Theory and design by Walter Welko Witiz.

T.V. ENGINEERING LAB (BTEC – 707)

LIST OF EXPERIMENTS:

1. To identify Receiver components and locate different stages on the chasis of Black & White Receiver.

2. To identify Receiver components and locate different stages on the chasis of PAL colour TV Receiver.

3. To operate various controls of TV Receiver and observe their effect on Black & White Receiver.

4. To operate various controls of different stages on PAL colour TV Receiver.

5. To know dc voltages and waveforms at various points in a Black & White TV Receiver.

6. To know dc voltages and waveforms at various points in a colour TV receiver.

7. To observe the effect of brightness control on grid to cathode bias of CRT and note cut off bias for CRT.

8. To observe the effect of contrast control on luminance signal at cathode of CRT.

9. To use a colour pattern generator and subjectively evaluate Raster reproduction.

10. To install and study satellite TV Receiver system including Dish Antenna and receiver.

11. To study typical faults in different sections of Black & White TV Receiver.

12. To study typical faults in different sections of PAL colour TV Receiver.

OPTICAL FIBER COMMUNICATION LAB (BTEC – 708)

List of Experiments

1. Study Of Fiber Optic Transmitters

2. Study Of Fiber Optic Detectors

3. Study Of Simplex Fiber Optic Link

4. Study Of Duplex Fiber Optic Link

5. Study Of Digital Transceiver

6. Study of Fiber Optic LED

7. Study of Losses in Optical Fiber

8. Determination of numerical aperture of optical fibers

9. Transmission of an audio signal through an optical fiber

10. Fiber optics hybrid modules for analogue transmission models Tx & Rx

COMPUTER NETWORK AND DATA COMMUNICATION LAB (BTEC–709)

LIST OF EXPERIMENTS:

1. To study different types of transmission media.

2. To study 16 Quadrature Amplitude Multiplexing.

3. To study Serial Interface and its applications.

4. To configure the modem of a computer.

5. To make inter-connections in cables for data communication in LAN.

6. To install LAN using Tree topology.

7. To install LAN using STAR topology.

8. To install LAN using Bus topology.

9. To configure a HUB/Switch.

DIGITAL SYSTEM DESIGN LAB (BTEC–710)

LIST OF EXPERIMENTS:

1. Design all gates using VHDL.

2. Write VHDL programs for the following circuits, check the waveforms and the hardware generated

a) Half adder.

b) Full adder.

3. Write VHDL programs for the following circuits, check the waveforms and the hardware generated

a) Multiplexer.

b) Demultiplexer.

4. Write VHDL programs for the following circuits, check the waveforms and the hardware generated

a) Decoder.

b) Encoder.

5. Write a VHDL programs for a comparator and check the waveforms and the hardware generated

6. Write a VHDL programs for a flip-flop and check the waveforms and the hardware generated.

7. Write a VHDL programs for a counter and check the waveforms and the hardware generated.

8. Write a VHDL programs for a code converter and check the waveforms and the hardware generated.

9. Write a VHDL programs for a following circuits and check the waveforms and the

hardware generated.

a. Register

b.shift register

10. Implement any three (given above) on FPGA/CPLD kit.

SEMESTER – VIII

DIGITAL SIGNAL PROCESSING (BTEC–801)

SECTION – A

Discrete – time signal analysis and linear systems: Signal analysis – signal characteristics – typical discrete – time signals – operation on signals – properties of linear time – invariant digital systems – Fourier transform relationship – sampling analog signals and sampling rate conversion. Z-transform; Properties of Z-transform-inverse, Z-transform – analysis of discrete time systems, convolution

SECTION – B

System function, difference equation IIR filter design: analog filter approximation, Butter worth, Chebyshev and elliptic filters, bilinear transformations, impulse invariance technique, digital frequency band transformations. FIR filter design: window technique, equiripple approximation technique, frequency sampling technique.

SECTION – C

Discrete Fourier transform (DFT) and inverse Discrete time Fourier Transform: properties – circular convolution. Fast Fourier Transform (FFT): Decimation-in-time (DIT) algorithmdecimation- in-frequency algorithm-FFT, Radix-2 DIT and DIF implementation.

SECTION – D

Finite Register Length Effects: Quantization noise introduced by analog-to-digital conversionfinite register length effects in the realization of IIR and FIR digital filters and in DFT computation. IIR and FIR filter realization scheme

Text Books:

1. David.K.Defatta, Joseph G, Lucas and William S.Hodgkiss, Digital Signal

Processing, John Wiley & sons, 1988.

2. Sanjit K and Mitra, Digital Signal Processing, Tata McGraw Hill, 1998.

Reference Books:

1. A.V.Oppeheim and R.W.Schaffer, Digital Signal and Processing, Prentice Hall.

2. Farooq Hussain, Digital Signal and Processing, Prentice Hall.

MICROWAVE ENGINEERING (BTEC–802)

SECTION – A

Wave guides: Introduction, comparison with transmission lines, propagation in TE and TM mode, rectangular wave guide, TEM mode in rectangular wave guide, introduction to circular wave guide, characteristic impedance.

Microwave Components: Directional couplers, tees**,** hybrid ring, s-parameters, attenuators, cavity resonators, mixers and detectors, matched load, phase shifter, wave meter, Ferrite devices: Isolators, circulators, gyrators.

SECTION – B

Microwave tubes: Limitation of conventional tubes, construction, operation and properties of Klystron amplifier, reflex Klystron, magnetron, Traveling wave tube, cross-field amplifier, backward wave oscillator.

SECTION – C

Microwave Solid State Devices: Varactor and step recovery, diodes, Multipliers, Parametric amplifiers, Tunnel diodes, Gunn effect and diodes, MASER, LASER, IMPATT, TRAPATT, PIN, Schottky barrier and Backward diodes, Read diode.

Microwave Antennas.

SECTION – D

Microwave Measurements: Power measurement using calorimeter and bolometers, Measurements of SWR, frequency and wave length, Impedance measurement, Measurement of Noise factor, Microwave bridges.

Propagation of Microwave: Space wave propagation Effect of curvature of Ideal Earth, Various other considerations.

Text Books:-

1. Microwave devices and circuits: Samuel Liao, PHl.
2. Microwave devices and Radar Engg: M.Kulkarni, Umesh**.**

DIGITAL SIGNAL PROCESSING LAB (BTEC–803)

LIST OF EXPERIMENTS: -

Perform the experiments lab using DSP:

1. To represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine)

2. To develop program for discrete convolution.

3. To develop program for discrete correlation.

4. To understand stability test.

5. To understand sampling theorem.

6. To design analog filter (low-pass, band-pass, band-stop).

7. To design digital IIR filters (low-pass, high pass, band-pass, band-stop)

8. To design FIR filter using windows technique.

9. To design a program to compare direct realization values of IIR digital filter.

10. To develop a program for computing parallel realization values of IIR digital filter.

11. To develop a program for computing cascade realization values of IIR digital filter.

12.To develop a program for computing inverse Z-transform of a rational transfer function.

MICROWAVE ENGINEERING LAB (BTEC – 804)

LIST OF EXPERIMENTS: -

1. Study of wave-guide components.

2. To study the characteristics of reflex Klystron and determine it's timing range.

3. To measure frequency of microwave source and demonstrate relationship

among guide dimensions, free space wavelength and guide wavelength.

4. To measure VSWR of unknown lad and determine its impedance using a smith chart.

5. To match impendence for maximum power transfer using slide screw tuner.

6. To measure VSWR, insertion losses and attenuation of a fixed and variable attenuator.

7. To measure coupling and directivity of direction couplers.

8. To measure insertion loss, isolation of a three port circulator.

9. To measure the Q of a resonant cavity.

10. To study the V-I characteristics of GUNN diode.

CELLULAR AND SATELLITE COMMUNICATION (BTEC – 805)

SECTION – A
Mobile Telephone Service, Evolution of cellular Telephone, Fundamental Concepts of Cellular Telephone, Fundamental Concepts of Cellular Telephone, Frequency Reuse, Interference, segmentation & Dualization, Cellular System Topology, Roaming & Handoffs, Cellular Telephone network Components, Cellular Cell processing.

SECTION- B
First Generation Analog Cellular Telephone, Second Generation Analog Cellular telephone, Personal Comm. Systems, digital Cellular telephone, CDMA Cellular Radio network, Globle Systems for Mobile communication.

SECTION – C
Principle of Satellite Comm., Kepler's law, Geosynchronous Satellite, Antenna look angles, Satellite classifications spacing and Frequency allocation, Satellite antenna Radiation patterns, Footprints, Satellite link models, Parameter & Equations.

SECTION – D
FDM/FM Satellite Systems, Multiple accessing – FDMA, TDMA, CDMA, Channel Capacity Special purpose Comm. Satellites, INTELSAT, VSAT (data broad – band Satellite), MSAT. LEOs (lower Earth Orbit Satellite), Defence Satellites.

Reference books:

1. Advanced Electronic Communications Systems: Wayne Tomasi.

2. Electronic Communications: Dennis Roddy & John Coolen.

AI & EXPERT SYSTEM (BTEC – 806)

Section-A

Introduction to AI: Problems, Techniques and programming Languages. Introduction to LISP : List manipulations, functions, predicates, and conditionals , input , output and logical variables, iteration and recursion. Lists and arrays. Introduction to PROLOG .

Problems, Problems Spaces & Search: Defining a problem as a space, search, production

systems, problem characteristics, production system characteristics, issues in the design of search

programs.

Section-B

Heuristic Search Techniques:

Generate – and – test, Hill Climbing, best – first search (A*), Problem Reduction (AO*), constraint

satisfaction, Means End Analysis.

Knowledge Representation Issues: Representations and Mappings, approaches to knowledge

representations, issues of knowledge representations, the frame problem

Section-C

USING PREDICATE LOGIC: Representing simple facts in logic representing instance & its

relationships, computable functions and predicates, resolution natural deduction.

REPRENTING KNOWLEDGE USING RULES: Procedural vs. declarative knowledge, logic

programming, forward and backward searching, matching, control knowledge,

Section-D

GAME PLAYING AND SEARCH: Introduction Min-Max Algorithm, alpha-beta cut off. Examples of games.

EXPERT SYSTEM: Component of an expert system, categories of an Expert System, stages in

development of Expert System, Expert System Development Tools. Expert System Architecture,

Frames.

TEXT BOOKS:

Patterson, D.W.: INTRODUCTION TO ARTIFICIAL INTELLIGENCE & EXPERT SYSTEM,

Prentice hall of India, New Delhi

Rich, E & Knight, K: ARTIFICIAL INTELLIGENCE, Tata McGraw Hill Pub Co, New Delhi

Nilson, N.J.: PRINCIPLES OF ARTIFICIAL INTELLIGENCE, Narosa Pub, House

References:

Schmildt, H: ARTIFICIAL INTELLIGENCE, USING c, McGraw Hill

Winston, P.H.: ARTIFICIAL INTELLIGENCE, Addition - Wesley

NEURAL NETWORKS AND FUZZY LOGIC (BTEC – 807)

SECTION – A

Neural Network characteristics, History of development in Neural Networks Principles, Artificial Neural Net terminology, Model of a neuron, topology, learning types of learning, supervised, unsupervised, re-enforcement learning.

SECTION- B

Basic Hopfield Model, the perceptron, linear separability, Basic learning laws: Hebb's rule, Delta rule, Widrow & Hoff LMS, learning rule, correlation learning rule, instar and outstar learning rules.

Unsupervised learning, competitive learning, K-means clustering algorithm, Kohonen's feature maps.

SECTION – C

Radial Basis Function neural networks, basic learning laws in RBF nets, Recurrent networks, recurrent back propagation, Real Time Recurrent learning algorithm.

Introduction to counter propagation network, CMAC network, ART networks.

SECTION – D

Fuzzy logic: Basic concepts of Fuzzy logic, Fuzzy Vs Crisp set, Linguistic variables, membership functions, operations of fuzzy sets, fuzzy IF-THEN rules, variable inference techniques, de-fuzzification techniques, basic fuzzy inference algorithm, Applications of fuzzy system, useful tools supporting design.

Reference books:

1. Fuzzy Systems Design Principles, Building Fuzzy IF-THEN Rule Bases By Riza

C.Berkin & Trubatch. IEEE Press ISBN 0-7803-1151-5.

2. Yegna narayanam – Artificial Neutral Networks.

3. Bart Kosko – Neural Networks & fuzzy logic.

4. Simon Haykin – Neutral Networks.

5. Ross.T. – Fuzzy Logic.

COMMUNICATION SYSTEMS (BTEC – 808)

SECTION – A

PULSE COMMUNICATION: Information In a communication system, coding, noise in an information carrying channel, Types of pulse modulation, Pulse Amplitude modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), Pulse code Modulation (PCM), Telegraphy (& Telex), Telemetry.

SECTION – B

BROADBAND COMMUNICATION SYSTEMS: Frequency division multiplexing, Time division

multiplexing, Short & Medium Haul systems – Coaxial Cables, Fiber Optic Links, Microwave Links, Tropospheric scatter links, Long Haul Systems – Submarine cables, Satellite communications.

SECTION – C

SATELLITE COMMUNICATION: Introduction, Orbits, Station keeping, Orientation of Satellite,

Transmission Path, It's losses & noise consideration, Satellite Systems, Saturation flux

Density, effective Isotropic radiated Power, SPADE, TDMA.

SECTION – D

FIBER OPTIC COMMUNICATION: Introduction, Principle of light transmission in a fiber,

Effect of Index profile on Propagation, Modes Of propagation, Number of modes via fiber,

Single mode propagation, Raleigh scattering losses, Absorption losses, mode coupling losses,

bending losses, combined losses. Effects of Dispersion on Pulse Transmission, intermodal

dispersion, material dispersion, wave guide dispersion, total dispersion, fiber optic

communication system.

BOOKS:

1. Electronics communication systems by Kennedy & Davis, TMH.
2. Electronics Communication by Dennis Roddy & John Coolen.

RELIABILITY OF ELECTRONICS COMMUNICATION SYSTEM (BTEC-809)

Section A

Basic Definitions, concept and need for reliability, inherent value of reliability in modern

system, hazard rate, and failure density function, mean time to failure & repair.

Relationship between basic variables, analytical form of reliability function. Derivation

for the exponential distribution function and Webiull distribution.

Section B

Different type and modes of failures, causes of failure in different systems, systems

structures, series, parallel, stand by, K-out-of-n configuration their reliability analysis.

Reliability evaluation techniques applicable to general non-series parallel system.

Markov processes for repairable & nonrepairable system & their applications in reliability analysis..

Section C

Maintainability, analysis of down time, Repair Time Distribution, Stochastic Point Processes, System Repair Time, Reliability under Preventive Maintenance, State Dependent Systems With Repair Maintenance Requirements.

Availability, concepts & definitions, Exponential Availability model, System availability, Inspection & Repair availability model, design trade-off Analysis.

Section D

Data collection & Empirical Methods- Data collection, Empirical methods, static life estimation.

Reliability Testing- Product testing, Reliability Life testing, Test time calculations, Burn in testing, Acceptance testing, accelerated life testing, experimental design, Competing failure models.

Books:

1. Concepts in Reliability by L.S. Sri Nath.

2. Reliability Engineering by Balaguruswamy:

3. Reliability and Maintainability Engineering by Charles E. Ebeling.

OPEN ELECTIVE

SEMESTER-VIII
COMPUTER SOFTWARE TESTING (BTEC-810)

SECTION-A

Fundamentals of Testing types: First, second and later cycles of testing. Objectives and limits of testing. Overview of S/W development stages, Planning and Design stages and testing during these stages. Glass box code, Regression and Black box testing Software errors, Categories of software error.

Reporting and analyzing bugs: Problem reports, Content and characteristics of Problem Report,
analysis and tactics for analyzing a reproducible bug. Making a bug reproducible.

SECTION-B

Problem Tracking System: Objective of Problem Tracking system, tasks of the system, problem
tracking overview, users of the tracking system, mechanics of the database.

Test Case Design: Characteristics of a good test, equivalence classes and boundary values, visible
state transitions, Race condition and other time dependencies, load testing, Error guessing, Function
equivalence testing, Regression testing, General issues in configuring testing, printer testing.

SECTION-C

Localization and User Manual testing: Translated test expands, Character sets, keyboards, Text filters, Loading, saving, importing and exporting high and low ASCII, Operating system language, Hot keys, Error message identifiers, Hyphenation rules, Spelling rules, Sorting rules, Upper case and lower case conversion, Printers, Sizes of paper, CPU's and video, Rodents Data formats and setup options, Rulers and measurements, Culture-bound Graphics and output, European product

compatibility, Memory availability, automated testing, Testing user manuals, Effective documentation , documentation tester's objective, How testing documentation contributes to software reliability.

SECTION-D

Testing Tools and Test Planning: Fundamental tools, Automated acceptance and regression standards, Translucent box testing, Overall objective of the test plan: Product or tool? Detailed objective, type of test, strategy for developing components of test planning documents, components

of test planning documents, documenting test materials.

Text Book:

1. Testing Computer Software, by Cem Kanern , Jack Falk, Hunk Quoe Nguyen,1999, Pub:Wiley,(Second edition).

COMPUTER NETWORKS AND SECURITY (BTEC-811)

SECTION-A

Introduction to computer networks: Uses of computer networks, Types, LAN, MAN, WAN, wireless networks, Network

Topologies, Networks software, Protocol hierarchies, design issues of layers interfaces and services, The OSI reference model,

The TCP/IP reference model. Transmission media, Wireless transmission.

SECTION-B

Narrow band ISDN, Broadband ISDN and ATM, Virtual circuit switching, Types of switching. Elementary data link protocolan

Unrestricted simplex protocol, a simplex stop and wait protocol, sliding window protocol, a protocol using Go back-N, a

protocol using selective repeat.

IEEE standards 802.3 and Ethernet, IEEE standard 802.4 token bus, IEEE standard 802.5 token ring.

SECTION-C

Network security: Basic encryption and decryption- Ecryption, decryption and cryptosystems, Plain text and Cipher text,

Encryption Algorithms, Cryptanalysis.

Introduction to Ciphers: Monoalphabatic substitutions such as Caesar Cipher, Cryptanalysis of Monoalphabatic Ciphers,

Polyalphabatic Ciphers such as Vigenere Tableaux, Cryptanalysis of Polyalphabatic Ciphers, Perfect substitution Cipher such as Cryptanalysis of Monoalphabatic Ciphers, Verman Cipher, Stream and Block Cipher.

SECTION-D

Operating System, Database and Program Security: Operating system security-Security policies, Models of security,

Security features of ordinary operating system, Security features of trusted Operating system.

Database Security: Security requirements of database, Reliability and Integrity, Protection of sensitive data, Inference problem: Direct and Indirect attacks.

Program security: Kinds of malacious code, How viruses attach and gain control, Homes for viruses, Virus signatures,

Preventing virus infection.

TEXT BOOKS:

⬜Computer Networks by Tenanbaum(3rd Edition)

⬜Data ans computer communication by Black

⬜Data communication and Networking by FORAUZAN

⬜"Security in Computing(Second edition)", Charles P. Pfleeger, 1996, Prentic-Hall International, Inc.,

⬜"Appliec Cryptography protocols, Algorithms, and Source code in C(Second Edition)", Bruce Schneier, 19975, John

Wiley and Sons, inc.,

REFERENCE BOOKS:

☐"Security Technologies for the World Wide Web", Rolf Oppliger, Artech House, Inc,

☐"Digital Certificates Applied Internet Security", Jalal Feghhi and Peter Williams, Addison Welsley Longman, Inc,

☐"The World Wide Web Security FAQ", World Wide Web Consortism, [online] Available at http://www.w3.org/

Security/Faq/www-securityfaq.html

☐Cryptographic Message Syntax Standards, RSA Laboratories,[online] Available at http://www.rsasecurity.com/rsalabs/

pkcs/pkcs-7/index.html

NON CONVENTIONAL ELECTRICAL POWER GENERATION (BTEC-812)

SECTION - A

Energy situation and renewable energy sources: Global Energy scenario, World Energy consumption, Energy in developing countries, fire wood crisis, Indian energy scene, Non conventional renewable energy sources, potential of renewable energy sources.

SECTION - B

Wind Energy: Origin of wind, Basic principle of wind energy, conversion, component of wind energy conversion system, type of windmills, Wind electrical Generations in India.

Solar Energy: Introduction, solar radiation, solar energy collector, solar thermal power generation, low temperature application of solar energy.

SECTION - C

Geo-thermal Power Plants: Introduction, Geothermal sources, comparison of Geo thermal energy with other energy forms, development of Geothermal power in India.

Physical and thermochemical methods of bioconversion: Introduction, biomass definition and potential, physical method of bio conversion, thermo chemical methods.

SECTION - D

Wave, Tidal and OTEC: Introduction, Basic principle of tidal power, Wave energy, component of Tidal power plant, Ocean Thermal Energy Conversions, advantages and disadvantages of tidal power generation.

Small and Mini Hydro power System: Introduction, site development, generation and electrical equipment, system of regulation of Hydroelectric Power in India.

BOOKS

1. Renewable Energy Sources – Maheshwar Dyal.
2. Small and mini Hydropower system by Tata Mc Graw Hill.
3. An Introduction to power plant technology – G.D.Rai.
4. Solar Energy – Suhas.P.Sukhatma, Tata Mc Graw Hill.
5. Modern Power Plant Engg. – Joel

ENERGY ASSESSMENT AND AUDITING (BTEC-813)

SECTION - A

ENERGY MANAGEMENT PRINCIPLES: Systems of Energy flow, principles of Energy flow and Energy conservation, Energy and money, Energy and growth, flow of energy in ecological system, Energy efficiency and demand side management (DSM), Economic evaluation.

SECTION - B

ENERGY AUDIT: Concepts and benefits of Energy Audit, Types of Energy Audits, National Energy Plan and its impact on energy conservation, Energy accounting and analysis, Energy audits of building systems, electrical systems, maintenance and energy audits.

SECTION - C

MEASURING INSTRUMENTS: Temperature measuring instruments, combustion system measuring instruments, measurement of heating, ventilation and air conditioning system performance.

SECTION - D

ENERGY CONSERVATION IN INDIAN SCENARIO: Energy demand and consumption in Indian industries, potential for energy efficiency in Indian industry, government's role in energy conservation and energy efficiency, Energy conservation techniques – conservation in energy intensive industries, economic evaluation of conservation techniques.

BOOKS

1. Handbook of Energy Audits by Albert Thuman – Fairman Press Inc.
2. Energy basis for man and nature by Howard T.Odum & Elisbeth.C.Odum.

Professional Issues in IT (BTEC-814)

Section A

Legal Issues: Introduction to legal concepts, Basic outline of Criminal and Civil Laws, Concepts relating to laws of Contract and Commercial Law, substantive Legal Issues, intellectual property issues, Cyber crime, Data protection principles and implications of the European Union Data protection Directive, Confidentially and privacy, Intellectual property rights, copyrights and Industrial Property, patents, trade Marks and laws relating to designs.

Software protection and privacy, Dealing with copyright, Originality, Exception to Copyright infringement, Employees and freelance programs, devices to overcome protection Software Licensing, Methods of Licensing, Copyright and electronic publishing, copyright problems posed by electronic publishing.

Section B

Multimedia, Licensing and related issues: protection of Databases, Trade Marks and passing off, Internet related issues, Contract issues and Law, Basic understanding of the Types of Agreements in large Computerization projects – Implementation Agreements, License Agreements,

Maintenance Agreements etc., Enforcements issues, dispute resolution, arbitration, legislation

action.

Section C

Other Professional Issues: Duties of a Professional, Duties to Client, Duties to employer, Duties to profession, Duties to society, Accountability for quality, timeliness and use of resources, human relationships and change management

Avoiding computer misuse, Hacking unauthorized access and types of Computer Crime, Introduction of Viruses, Fraud and types of Computer Fraud, Implications arising from the Draft computers crimes Act (Sri lanka).

Section D

Public interest and social implications, Environmental protection, health and safety issues, Privacy, Ethics and Codes of Professional conduct, the need for professional ethics, characteristics of professions, Integrity & Honesty, competence, professional development, judgment, knowledge of law, relations, standards, independence.

Acting with responsibility, professional skill, comply with law, confidently, due care, contribute towards advancements of human welfare.

Public Interest, Public awareness, Basic human rights, Ethics and the Internet, Netiquette and Policy approaches, Professional relationships, Are computer professionals "professionals", Conflicting responsibilities and misconduct, codes of Ethics.

Books: -

1. Professional Issues in Software Engineering (2nd Edition.) Bott. F et al., 1995, UCL Press.

2. (Eds), The Responsible Software Engineer: Selected Readings in IT Professionalism, Myers C.,

Hall t. and Pitt D., 1997, springer

3. BCS Code of conduct: http://www.bcs.org/docs/01100/1194/pdg/codeofc.pdf

4. BCS Code of Practice: http://www.bcs.org/docs/01100/1194/Cop.htm

5. ACS Code of Ethics: http://203.58.197.209/acs/events admin/static/national/pospaper/acs131.htm

6. ACS Professional Conduct and Professional Practices:

http://203.58.197.209/acs/events admin/static/national/pospaper/code2.htm

Computer Aided Fine Arts (BTEC-815)

Section A

Painting and Drawing Software applications: Drawing Software: Illustration applications (vector graphics), painting applications (bitmapped graphics) Drawing devices: Digitizing tablet, pressure sensitive stylus, mouse, touch screen.

Collect and present examples of the use of digital panting and drawing in contemporary sources. Use drawing and painting software applications creatively to present a range of work.

Section B

Image Manipulation: Software Applications: Any software which will have features like distortion, adjust colour range, contrast, palettes and an range of tools with which to paint and adjust images files.

Digities: Digital photography, scan, digitize.

Object: found objects, natural objects, domestic tools.

Image: Photographs, found images, own visual work, hand written text, word-processed text.

Digitize a range of objects and images in an appropriate file format for further development

Manipulate and present scanned images in a range of way

Section C

Typographic design: Font design software: any software that will enable experimentation with Bitmapped fonts, postscript fonts, and True type fonts.

Typographic Design Software: any software that will enable students to experiment with fonts and font design using a range of tools. Investigate the potential of digital typography Produce a range of work showing the creative use of typography, Combine typography with image in innovative ways.

Section D

Desk Top publishing and Text Editors: Text Editing Software: Proprietary word processing applications with automated routines e.g. word count, spell checker, formatting styles, font

styles, header and footers. Design a range of page layouts using traditional methods, Prepare digital layot grid with common page elements, Prepare image, graphic and text files for the use in page layout, Format document and check for accuracy, and present in an appropriate format for print.

Books: -

1. B. Saraswati, Computerizing Cultures, New Age International Publishers, New Delhi.

ENTREPRENEURIAL DEVELOPMENT & ENTERPRISE MANAGEMENT(BTEC-816)

SECTION –A

☐Developing Entrepreneurship: Element for a program.

☐Developing Entrepreneurship competencies : Need & process of development, social determinants of Entrepreneurship growth.

☐Entrepreneurship development programs.

☐Entrepreneurship orientation & awareness programme.

☐New enterprise creation programme.

SECTION- B

☐Existing Entrepreneurship programmes for existing enterprising for survival & growth. Evolution of various EDP programme in India.

☐Managing growth & transition, the organization life cycle, chasing Entrepreneurship roles.

SECTION- C

☐Entrepreneurship & new venture opportunities.

☐Planning for new ventures.

☐Concept of planning paradigm – pre-startup, early growth & later growth stage.

SECTION- D

☐Incentive & subsidies available for Entrepreneurship growth.

☐Guidance for project report preparation.

☐Location, Environmental and managerial problems of new enterprise management .

☐Managing family business. Some case studies of family run business in India.

BOOKS:

1. Deshpande, (1980)," Entrepreneurship of small scale industries," Deep & Deep, New delhi.

2. Peter Kibly," Entrepreneurship & Economic development ," The free press ,New York,(1971).

3. Rehman, A.H.M..,Habibur,(1979)," Entrepreneurship & small enterprise development in Bangladesh University of Dacca.

4. Sharma, K.L., (1981), Entrepreneurship & Industrial development in Punjab",PSE economic analyst , Vol.II, No.2.

5. David H. Holt ,(1998)," Entrepreneurship-New ventura creation," Prentice Hall , New Delhi.

Accounts And Financial Management (BTEC-817)

Section A

Accounting: Principle, Concepts and conventions, double entry system of accounting, introduction of basic books of accounts of sole proprietary concern, control accounts for debtors and creditors, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading, Profit and Loss Accounts and balance sheet of sole proprietary concern with normal closing entries. Introduction to manufacturing account, Final accounts of Partnership firms, Limited company.

Section B

Financial Management: Meaning and role.

Ration Analysis: Meaning, advantages, limitations, types of rations and their usefulness.

Fund Flow Statement: Meaning of the terms – fund flow and fund working capital cycle, preparation and interpretation of the fund flow statement.

Section C

Costing: Nature, Importance and basic principles, Budget and budgetary control: Nature and scope, importance,

method of finalization of master budget and functional budgets.

Marginal Costing: Nature, Scope and importance, break – even analysis, its uses and

limitations, construction of break-even chart, practical application of marginal costing.

Section D

Standard Costing: Nature and Scope, Computational and analysis of variances with reference to material cost,

labour cost and overhead cost, interpretation of the variances.

Introduction to computerized accounting system: coding logic and codes required, master files transaction files;

introduction to documents used for data collection, processing of different file sand output obtained.

Books:

1. Kellock, J.: Elements of Accounting, Heinemann, 1978.
2. Rockely, L.E.: Finance for the Non-Accountant, 2nd Edition, and basic books, 1976.
3. Levy, and Sarnet: Principle of Financial Management, Prentice – Hall International.

Total Quality Management(BTEC-818)

Section-A

Introduction to TQM & ISO 9000, Total Quality Control, Customer Focus & Total waste

Elimination (TWE), Quality Assurance

Quality of Design & Development, Inspection & Measurement workforce Teams,

Benchmarking, TQM for Sales Marketing Management.

Section-B

Business Process Re-engineering & Information Technology, Quality control SQC/ SPC,

Technology & Product Quality, Quality for After Sales Services Technology & Product

Quality.

Section-C

Organization for Quality, Reliability as quality characteristics, Quality leadership, Quality linked productivity, Total Quality, Culture, Quality and environment, Cost of Quality.

Section-D

Cost of Quality, Quality Control for Export Units, Quality Maturity and Discipline, Total commitment for Quality, TQM Implementation, ISOm 9000 series of standards, ISO 9000-1, ISO 9000-2, ISO 9000-3.

References:-

1. TQM & ISO 14000: K.C.Arora.

2. Total Quality Control: Armand V. Feigenbaum.

3. Total Quality Management: Joseph.A.Patrick, Diana.S.Furr.

4. Total Quality Management – Text: Joel E. Ross Cases & Readin

5. Total Quality Control Essentials: Sarv Singh Soin

ADVANCED OPERATIONS RESEARCH (BTEC – 819)

SECTION – A

Introduction to Operations Research

Formulation of problems, simplex method problem of degenerals, dual simplex method revised simplex method,

bounded variable problems.

Integer Programming

Graphical method, the branch and bound technicque, Gomary's ALL-IPP method, transportation model, unbalance

in transportation, transshipment problem, sensitivity analysis in transportation problems.

SECTION – B

Dynamic Programming

Bellman's principle of optimality, examples on the application on routing problem, inventory problem, simplex problem, marketing problem.

Network Analysis

PERT and CPM, probability of achieving completion data, cost analysis, graph reduction theory, updating, resource allocation, resource smoothing.

SECTION – C

Inventory Method:

Variables in an inventory problem, inventory problem, inventory models with penalty, storage and quantity discount, safety stock, inventory models with probability, demand,

multi item deterministic model.

Queuing Theory

Poison arrivals and exponential service times, waitng time and idle time cost, single channel multi channel problem. Monte technique applied to queuing problems, Poisson

arrivals and service time.

SECTION – D

Decision Theory Game

Examples on the application of theory of games 2 XM and MX2 Problems, graphic dominance and linear programming method for different problems, decision trees.

Replacement Models

Replacement of items that deteriorate, gradually, fail suddenly, group placement policy, concept of system reliability.

Text Books:

☐Kumar Gupta, Prem and Hira, D.S., "Operations Research", S Chand & Company Limited, 1986.

☐Swarup, Kanti, Gupta, P.K. and Manmohan, "Operations Research", Sultan Chand & Sons, New Delhi 1988.

☐Srinath L.S., "PERT & CPM Principles and Applications", Affiliate East West Press (P) Limited, New Delhi, 1975.

INDUSTRIAL MANAGEMENT (BTEC-820)

Section – A

Management Concept

Management, administration, organization, Difference and relationship between management, administration and organization. Types of organization. Characteristics of management. Origin of principles of management. Beginning of scientific management. Scientific management, principles of management, functions of management, management development.

Personnel Management, Union and industrial relations

Definition and concept. Aims, objectives or functions or personnel management. Principles of good personnel policy.

Recruitment and selection of employees. Safety engineering, labour welfare, Promotion, transfer, lay-off and discharge.

Trade unions, industrial disputes, settlement of industrial disputes, collective bargaining, union-management relations.

Section – B

Material, purchase and stores management.

Material management, purchase and procurement, Purchase organization, purchasing procedure. Stores and material control. Receipts and issue of materials. Store records.

Inventory control and management

Inventory, inventory – control, classification, management. Objectives of inventory control, functions of inventories,

Economic order quantity, ABC analysis, material requirement planning.

Section – C

Financial Management

Concept and definition. Purpose of investment. Types of capital. Sources of finance. Book – keeping, terms used in book – keeping. Assets and liabilities. The journal and the ledger. Trading account, capitalization, capital structure, difference between capital, capitalization and capital structure.

Sales and marketing management

Sales management, sales organization, function of sales department, Selling concept v/s marketing concept. Marketing – definition, principles and functions. Marketing research, sales forecasting. Sales promotion. Advertising, international Advertising.

Section – D

Management by objectives

Definition and concept, objectives. Steps in setting up MBO, advantages of MBO, limitations of MBO.

Management information system

Definition, evolution of MIS, Need/objectives/functions of MIS. Difference between data and information. Need for information, information as an organizational resource. Management information categories. Designing information system. Computer system, components of computer system, integerated information system. Applications of MIS, future of MIS.

OPTIMIZATION METHODS FOR ENGINEERING SYSTEM (BTEC-821)

SECTION A

Introduction: Engineering Application; Statement of the Optimal Problem;

Classification; Optimization Techniques;

Classical Method : Single Variable Optimization; Multivariable Optimization

Without any Constraints with Equality and Inequality Constraints.

SECTION B

One-Dimensional Minimization Method: Unimodal Function; Elimination

Method – Dichotomous Search, Fibonocci and Golden Method; Interpolation

Method – Quadratic and Cubic Interpolation Method.

Unconstrained Minimization Method: Univariate, Conjugate Directions, Gradient

And Variable Metric Method.

SECTION C

Constrained Minimization Method: Characteristics of a constrained problem;

Direct Method of feasible directions; Indirect Method of interior and exterior penalty functions.

Geometric Programming : Formulation and Solutions of Unconstrained and Constrained geometric programming problem.

SECTION D

Dynamic Programming: Concept of Sub-optimization and the principal of optimality:

Calculus, Tabular and Computational Method in Dynamic Programming: An

Introduction to Continuous Dynamic Programming.

Integer Programming : Gomory's Cutting Plane Method for Integer Linear

Programming; Formulation & Solution of Integer Polynomial and Non- Linear problems.

Text Books:

1. Optimization (Theory & Application)- S.S. Rao, Wiley Eastern Ltd, New Delhi.

2. Optimization Concepts and Applications in Engineering – Ashok D.Belegundu and

Tirupathi R Chandrupatla – Pearson Education 1999, First India Reprint 2002.

Reference Books:

1. Optimization: Theory and Practice, C.S.G. Beveridge and R.S. Schechter, McGraw Hill, New York.

Note :-

1. In campus 4 week vocational training for all branches will be held after the second semester and credit for the same will be given in the IIIrd Semester.

. Vocational Training consists of extended workshop training in shops of Carpentry, fitting, foundry, Welding and Electrical Workshop.