Scheme & Syllabus of
B. Tech. Electronics & Communication Engineering [ECE]
Batch 2011

By
Board of Studies Electronics & Communication Engineering
### Third Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Load Allocation</th>
<th>Marks Distribution</th>
<th>Total Marks</th>
<th>Credits</th>
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<td>BTAM-301</td>
<td>Engineering Mathematics-III</td>
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<tr>
<td>BTCS-305</td>
<td>Object Oriented Programming using C++</td>
<td>3</td>
<td>1</td>
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<tr>
<td>BTEC-301</td>
<td>Analog Devices &amp; Circuits</td>
<td>3</td>
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<tr>
<td>BTEC-302</td>
<td>Digital Circuit and Logic Design</td>
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<tr>
<td>BTEC-303</td>
<td>Network Analysis and Synthesis</td>
<td>3</td>
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<tr>
<td>BTEC-304</td>
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<td>BTCS-309</td>
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Workshop Training *

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*The marks will be awarded on the basis of 4 weeks workshop training conducted after 2nd Semester*

### Fourth Semester

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<td>BTEE-402</td>
<td>Linear Control Systems</td>
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<td>Analog Communication Systems</td>
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<td>BTEC-402</td>
<td>Signal &amp; Systems</td>
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<td>BTEC-403</td>
<td>Electromagnetics &amp; Antennas</td>
<td>4</td>
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General Fitness

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TOTAL 20 6 6 430 420 850 29
### Fifth Semester

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<td>Data Structures</td>
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*The marks will be awarded on the basis of 06 weeks workshop training conducted after 4th Semester*

### Sixth Semester

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<td>BTEC-601</td>
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Contact Hours: 30 Hrs
Seventh / Eighth Semester

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<th>Course Code</th>
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Seventh / Eighth Semester

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<tr>
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<td>For Industry Oriented Project Training</td>
<td>300 Marks</td>
<td>200 Marks</td>
<td>500 Marks</td>
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Note:
*The institution may provide training on any of the softwares from amongst

- ORCAD,
- MATLAB,
- Mentor DSP,
- MULTISIM,
- OPTSIM,
- OPTISYSTEM
- NS2
- OPNET etc.
- QUALNET
- ULTIBOARD
- XILINX
- MODELSIM/ QUESTA SIM
- KIEL etc.
Departmental Elective – I (Common Code XXX)

BTEC 901 Relational Data Base Management System
BTEC 902 Micro Electronics
BTEC 903 Industrial Electronics
BTEC 904 Digital System Design
BTEC 905 Intellectual property rights & patent systems
BTEC 906 Intelligent Instrumentation
BTEC 907 Information Theory & Coding
BTIT 702 Software Project Management

Departmental Elective –II (Common Code YYY)

BTEC 908 CMOS based design
BTEC 909 Biomedical signal processing
BTEC 910 Satellite Communication
BTEC 911 Artificial Intelligence Techniques & Applications
BTEC 912 Speech & image Processing
BTEC 913 Human Resource Management
BTEC 914 Computer organization and Architecture
BTIT 501 Cyber Law & IPR

Departmental Elective – III (Common Code ZZZ)

BTEC 915 Electromagnetic interference & compatibility
BTEC 916 Neural Networks & Fuzzy logic
BTEC 917 Robotics
BTEC 918 Operation Research
BTEC 919 Mobile Computing
BTEC 920 Wireless Sensor network
BTEC 921 Numerical Methods
Third Semester
BTAM301 Engineering Mathematics-III

Unit I Fourier Series: Periodic functions, Euler's formula. Even and odd functions, half range expansions, Fourier series of different wave forms.

Unit II Laplace Transforms: Laplace transforms of various standard functions, properties of Laplace transforms, inverse Laplace transforms, transform of derivatives and integrals, Laplace transform of unit step function, impulse function, periodic functions, applications to solution of ordinary linear differential equations with constant coefficients, and simultaneous differential equations.

Unit III Special Functions: Power series solution of differential equations, Frobenius method, Legendre's equation, Legendre polynomial, Bessel's equation, Bessel functions of the first and second kind. Recurrence relations, equations reducible to Bessel's equation.


Unit V Applications of PDEs: Wave equation and Heat conduction equation in one dimension. Two dimensional Laplace equation in Cartesian Coordinates, solution by the method of separation of variables.


Suggested Readings/ Books:
- Babu Ram, Advance Engineering Mathematics, Pearson Education.

BTCS 305 Object Oriented Programming Using C++

Unit I Object-Oriented Programming Concepts: Introduction, comparision between procedural programming paradigm and object-oriented proramm Paradigm, basic concepts of object-oriented programming — concepts of an object and a class, interface and implementation of a class, operations on objects, relationship among objects, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging.
Unit II Standard Input/Output: Concept of streams, hierarchy of console stream classes, input/output using overloaded operators >> and << and memberv functions of i/o stream classes, formatting output, formatting using ios class functions and flags, formatting using manipulators.

Unit III Classes and Objects: Specifying a class, creating class objects, accessing class members, access specifiers, static members, use of const keyword, friends of a class, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes.

Unit IV Pointers and Dynamic Memory Management: Declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using new and delete operators, pointer to an object, this pointer, pointer related problems - dangling/wild pointers, null pointer assignment, memory leak and allocation failures.

Unit V Constructors and Destructors: Need for constructors and destructors, copy constructor, dynamic constructors, explicit constructors, destructors, constructors and destructors with static members, initializer lists.

Unit VI Operator Overloading and Type Conversion: Overloading operators, rules for overloading operators, overloading of various operators, type conversion - basic type to class type, class type to basic type, class type to another class type.

Unit VII Inheritance: Introduction, defining derived classes, forms of inheritance, ambiguity in multiple and multipath inheritance, virtual base class, object slicing, overriding member functions, object composition and delegation, order of execution of constructors and destructors.

Unit VIII Virtual functions & Polymorphism: Concept of binding - early binding and late binding, virtual functions, pure virtual functions, abstract classes, virtual destructors.

Unit IX Exception Handling: Review of traditional error handling, basics of exception handling, exception handling mechanism, throwing mechanism, catching mechanism, rethrowing an exception, specifying exceptions.

Unit X Templates and Generic Programming: Template concepts, Function templates, class templates, illustrative examples.

Unit XI Files: File streams, hierarchy of file stream classes, error handling during file operations, reading/writing of files, accessing records randomly, updating files.

Suggested Readings/ Books:

- Lippman F. B, C++ Primer, Addison Wesley.
BTEC301  Analog Devices & Circuits

Unit I Semiconductor diode: Theory of PN junction diode, Band structure of open circuited PN junction, Volt Ampere Characteristics, Temperature Dependence of PN diode, LED, LCD and Photo- diodes, Tunnel diode, Zener diode as Voltage Regulator.

Unit II Transistors, Characteristics and Biasing: Transistor, Types of Transistor, Transistor current components, Transistor as an Amplifier, Transistor characteristics in CB, CE and CC modes. Operating point, bias stability, various biasing circuits, stabilization against Ico, VBE and beta, Construction, Characteristics & applications of Junction Field Effect Transistor (JFET), UJT and MOSFET.

Unit III Large Signal Amplifiers: Class A direct coupled with resistive load, Transformer coupled with resistive load, harmonic distortion, variation of output power with load, Push-Pull Amplifiers, operation of class- B push-pull amplifier, crossover distortion, transistor phase inverter, complementary- symmetry amplifier.

Unit IV Feedback Amplifiers and Oscillator: Feedback Concept, Effect of negative feedback on gain, bandwidth, stability, distortion and frequency Response, Sinusoidal Oscillators, Sinusoidal oscillators; criterion for oscillation, Different types of oscillators: RC Phase Shift, Wein Bridge, Hartley, Colpitts and Crystal Oscillators. Derivation of expression for frequency and amplitude of these oscillators.

Unit V Low & High Frequency Transistor Model: Transistor Hybrid Model, h parameter equivalent circuit of transistor, Analysis of transistor amplifier using h-parameters in CB, CE and CC configuration, The high frequency T model, hybrid pi CE transistor model, hybrid pi conductance in terms of low frequency h parameters.

Suggested Readings/ Books:
- Electronic Devices & Circuits by Millman- Halkias, Tata Mcgraw Hill
- Electronic Devices & Circuits Theory by Boylested, Pearson Education.
- Electronic Fundamentals & Application, by J.D. Ryder, PHI.
- Electronic Devices, by Floyd, Pearson Education.
- Electronics Devices & Circuits by J.B.Gupta, Katson.

BTEC302  Digital Circuit and Logic Design

Unit I Number System and Binary Code: Introduction, Binary, Octal and Hexadecimal Number System (Conversion, Addition & Subtractions). Signed and unsigned numbers, Binary Subtractions using 1’s and 2’s compliment, ASCII code, Excess 3 code, Grey code, BCD code and BCD additions.

Unit II Minimization of logic function: OR, AND,NOT,NOR,NAND,EX-OR, EX-NOR, Basic theorem of Boolean Algebra, Sum of Products and Product of Sums, canonical form, Minimization using K-map and Q-M method.

Unit IV Sequential Circuits: Introduction, flip flops, Clocked flip flops, SR, JK, D, T and edge triggered flip-flops. Excitation tables of Flip flops. Shift Registers, Type of Shift Registers, Counter, Counter types, counter design with state equation and state diagrams.


Unit VI Semiconductor Memories: Introduction, Memory organisation, Classification and characteristics of memories, Sequential memories, ROMs, R/W memories. Content addressable memories. PLA and PAL.

Unit VII Logic Families: RTL, DCTL, DTL, TTL, ECL, CMOS and its various types, Comparison of logic families.

Suggested Readings / Books:
- Roth, Fundamentals of Logic Design, Cengage Learning

BTEC303 Network Analysis and Synthesis

Unit I Circuit Concepts: Independent and dependent sources, Signals and wave forms: Periodic and singularity voltages, step, ramp, impulse, doublet, loop currents and loop equations, node voltage and node equations, Network Theorems: Superposition, Thevenin's, Norton's, Maximum Power Transfer, and Reciprocity.

Unit II Time and Frequency Domain Analysis: Representation of basic circuits in terms of generalized frequency and their response, Laplace transform of shifted functions, transient and steady response, Time domain behaviors from poles and zeros, Convolution Theorem.

Unit III Network Synthesis: Network functions, Impedance and admittance function, Transfer functions, Relationship between transfer and impulse response, poles and zeros and restrictions, Network function for two terminal pair network, Sinusoidal network in terms of poles and zeros, Real liability condition for impedance synthesis of RL and RC circuits, Network synthesis techniques for 2-terminal network, Foster and Cauer forms.
Unit IV: Classification of filters, characteristics impedance and propagation constant of pure reactive network, Ladder network, T-section, π-section, terminating half section, Pass bands and stop bands, Design of constant-K, m-derived filters, Composite filters.

Suggested Readings/ Books:

**BTEC304 Lab Analog Devices & Circuits**

1. Study of Zener regulator as voltage regulator
2. Study of Half wave, full wave & Bridge rectifiers.
3. To plot the input and output characteristics of CE configuration.
4. To study the characteristics of a Class- A amplifier.
5. To study the characteristics of Class- B amplifier.
6. To study the characteristics of Class- B push-pull amplifier.
7. To study the characteristics of complementary symmetry amplifier.
8. To study the response of RC phase shift oscillator and determine frequency of oscillation.
9. To study the response of Hartley oscillator and determine frequency of oscillation.
10. To study the response of Colpitt’s oscillator and determine frequency of oscillation.
11. To study the response of Wien Bridge oscillator and determine frequency of oscillation

**BTEC-305 Lab Digital Circuit and Logic Design**

1. Study of Logic Gates: Truth-table verification of OR, AND, NOT, XOR, NAND and NOR gates; Realization of OR, AND, NOT and XOR functions using universal gates.
2. Realization Half Adder / Full Adder using Logic gates.
3. Realization Half Subtractor / Full Subtractor using Logic gates
4. Design 4-Bit Binary-to-Gray & Gray-to-Binary Code Converter.
5. Design 4-Bit magnitude comparator using logic gates. Multiplexer: Truth-table verification and realization of Half adder and Full adder using MUX.
6. Demultiplexer: Truth-table verification and realization of Half subtractor and Full subtractor using DEMUX.

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**BTCS 309 Object Oriented Programming Using C++ Lab**

1. **[Classes and Objects]** Write a program that uses a class where the member functions are defined inside a class.
2. **[Classes and Objects]** Write a program that uses a class where the member functions are defined outside a class.
3. **[Classes and Objects]** Write a program to demonstrate the use of static data members.
4. **[Classes and Objects]** Write a program to demonstrate the use of const data members.
5. **[Constructors and Destructors]** Write a program to demonstrate the use of zero argument and parameterized constructors.
6. **[Constructors and Destructors]** Write a program to demonstrate the use of dynamic constructor.
7. **[Constructors and Destructors]** Write a program to demonstrate the use of explicit constructor.
8. **[Initializer Lists]** Write a program to demonstrate the use of initializer list.
9. **[Operator Overloading]** Write a program to demonstrate the overloading of increment and decrement operators.
10. **[Operator Overloading]** Write a program to demonstrate the overloading of binary arithmetic operators.
11. **[Operator Overloading]** Write a program to demonstrate the overloading of memory management operators.
12. **[Typecasting]** Write a program to demonstrate the typecasting of basic type to class type.
13. **[Typecasting]** Write a program to demonstrate the typecasting of class type to basic type.
14. **[Typecasting]** Write a program to demonstrate the typecasting of class type to class type.
15. **[Inheritance]** Write a program to demonstrate the multilevel inheritance.
16. **[Inheritance]** Write a program to demonstrate the multiple inheritance.
17. **[Inheritance]** Write a program to demonstrate the virtual derivation of a class.
18. **[Polymorphism]** Write a program to demonstrate the runtime polymorphism.
19. **[Exception Handling]** Write a program to demonstrate the exception handling.
20. **[Templates and Generic Programming]** Write a program to demonstrate the use of function template.
21. **[Templates and Generic Programming]** Write a program to demonstrate the use of class template.
22. [File Handling] Write a program to copy the contents of a file to another file byte by byte. The name of the source file and destination file should be taken as command-line arguments,

23. [File Handling] Write a program to demonstrate the reading and writing of mixed type of data.
Fourth Semester
BTEE 402 Linear Control Systems

Unit I Introductory Concepts: Plant, Systems, Servomechanism, regulating systems, disturbances, Open loop control system, closed loop control systems, linear and non-linear systems, time variant and invariant, continuous and sampled-data control systems, Block diagrams, some illustrative examples.

Unit II Modeling: Formulation of equation of linear electrical, mechanical, thermal, pneumatic and hydraulic system, electrical, mechanical analogies. Transfer function, Block diagram representation, signal flow graphs and associated algebra, characteristics equation.

Unit III Time Domain Analysis: Typical test – input signals, Transient response of the first and second order systems. Time domain specifications, Dominant closed loop poles of higher order systems. Steady state error and coefficients, pole-zero location and stability, Routh-Hurwitz Criterion.

Unit IV Root Locus Technique: The extreme points of the root loci for positive gain. Asymptotes to the loci, Breakaway points, intersection with imaginary axis, location of roots with given gain and sketch of the root locus plot.


Unit VI Compensation: Necessity of compensation, series and parallel compensation, compensating networks, applications of lag and lead-compensation.

Unit VII Control Components: Error detectors – potentiometers and synchros, servo motors, a.c. and d.c. techno generators, Magnetic amplifiers.

Suggested Readings / Books

- Dorf Richard C. and Bishop Robert H., Modern Control System, Addison –Wesley, Pearson New Delhi
- Ogata K., Modern Control Engineering”, Prentice Hall,
- Kuo B. C., Automatic Control System”, Prentice Hall
- Nagrath I.J. and Gopal M., Control System Engineering, Wiley Eastern Ltd.
- Singh / Janardhanan, Modern Control Engineering, Cengage Learning
- Kilian, Modern Control Technology: Components and Systems, Cengage Learning

BTEC 401 Analog Communication Systems

Unit I Base Band Signals and Systems: Introduction, Elements of communication system, Noise & its types; Noise Figure & noise factor, Noise equivalent temperature. Modulation & Demodulation, Mixing; Linear & Nonlinear, need of modulation, types of modulation systems, basic transmission signals, Frequency multiplexing technique.

Unit II Analog Modulation Techniques: Introduction, theory of amplitude modulation; AM power calculations, AM current calculations, AM modulation with a complex wave, theory of frequency modulation;
mathematical analysis of FM, spectra of FM signals, narrow band of FM, Wide band FM, Theory of
phasemodulation, phase modulation obtained from frequency modulation, comparison of AM & FM,
Comparison of PM & FM.

**Unit III AM Transmission:** Introduction, generation of Amplitude Modulation, Low level and high level
modulation, basic principle of AM generation; square law modulation, Amplitude modulation in amplifier
circuits, suppressed carrier AM generation (Balanced Modulator) ring Modulator, Product Modulator/balanced
Modulator.

**Unit IV AM Reception:** Receiver Parameters; Selectivity, Sensitivity, Fidelity, Tuned Ratio Frequency (TRF)
Receiver, Super heterodyne Receiver; Basic elements of AM super heterodyne Receiver; RF Amplifier,
Neutralization of RF Amplifiers, Class of operation of RF Amplifiers, High power RF Amplifiers, Image
Frequency Rejection, Cascade RF Amplifier, 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 & 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 hetero-dyne receiver, AM receiver using a phase locked loop (PLL),
AM receiver characteristics.

**Unit V FM Transmission:** FM allocation standards, generation of FM by direct method, varactor diode
Modulator, Cross by Direct FM Transmitter, Phase-Locked-Loop Direct FM Transmitter, Indirect generation of
FM; Armstrong method, RC phase shift method, Frequency stabilised reactance FM transmitter.

**Unit VI FM Reception:** Frequency demodulators, Tuned circuit frequency discriminators; Slope Detector,
Balance Slope Detector, Foster Seeley discriminator, Ratio Detector, FM detection using PLL, Zero crossing
detector as a Frequency Demodulator, quadrature FM demodulator, pre emphasis and de emphasis, limiter
circuits, FM Capture effect, FM receiver, FM stereo transmission and reception, Two way FM Radio
Transmitter and Receiver.

**Unit VII SSB Transmission:** Introduction, Single Side band systems, AM-SSB; Full carrier, Suppressed
carrier , reduced carrier, Independent side band, and Vestigial side band, Comparison of SSB Transmission to
conventional AM, Generation of SSB; Filter method, Phase Shift Method, Third Method.

**Unit VIII SSB Reception:** SSB Product Demodulator, Balanced Modulator as SSB Demodulator, Single Side
band receivers; Single side band BFO Receivers, Coherent Single side band BFO Receivers, Single Side band
Envelop detection receiver, Multi Channel Pilot Carrier SSB Receiver.

**Unit IX Pulse Modulation Transmissions and Reception:** Introduction, Sampling Theorem Pulse Amplitude
Modulation (PAM), Natural PAM Frequency Spectra for PAM , Flat-top PAM, Sample and hold circuits, Time
division Multiplexing, PAM Modulator Circuit, Demodulation of PAM Signals, Pulse Time Modulation
(PTM); Pulse Width Modulation(PWM), Pulse Position Modulation (PPM), PPM Demodulator.
Suggested / Recommended Books:

- Electronic communication Systems by Kennedy & Davis, Tata Mcgraw Hill.
- Electronic Communication System, Tomasi, Pearson Education.
- Electronic Communication, Roddy, Pearson Education.

BTEC402 Signals & Systems

Unit I Classification of Signals and Systems: Continuous time signals (CT signals), discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Exponential, Classification of CT and DT signals - periodic & aperiodic, random &deterministic signals, Even& Odd Signals, Energy & Power Signals, Description of continuous time and discrete time systems.


Unit IV Analysis of Discrete Time Signals: Sampling of CT signals and aliasing, DTFT and its properties, Z-transform and properties of Z-transform.

Unit V Linear Time Invariant - Discrete Time System: Difference equations, Block diagram representation, Impulse response, Convolution sum, LTI systems analysis using DTFT and Z-transforms.

Unit VI Random Signal Theory: Introduction to probabilities, Definition, probability of Random events, Joint and conditional probability, probability Mass function statistical averages. Probability density functions and statistical averages. Examples of P.D. function, transformation of random variables random processes, stationary, True averages and Ergodic.

Suggested Readings / Books:

- Signals and Systems by Allan V.Oppenheim, S.Wilsky and S.H.Nawab, Pearson Education.
- Signals and Systems by H P Hsu, Rakesh Ranjan, Schaum’s Outlines, Tata McGraw Hill.
- Signals and Systems by Simon Haykins and Barry Van Veen, John Wiley & sons, Inc.
- Signal, System & Transforms, Phillips, Pearson Education.

BTEC403 Electromagnetics & Antennas


Unit III Antennas: introduction, concept of radiation in single wire, two wire, and dipole, Antenna parameters, Retarded potential, infinitesimal dipole. Current distribution of short dipole and half wave dipole, Far-field, Radiating near-field and reactive near-field region, Monopole and Half wave dipole.

Unit IV Antenna Arrays: Array of two point sources, Array factor, Array configurations, Hansen-woodyard end fire array, n-element linear array with uniform amplitude and spacing, n-element linear array with non-uniform spacing, Analysis of Binomial and Dolph-Tschebysceff array, Scanning Array, Super directive array. 

Unit V Aperture Antennas: Field Equivalence principle, Rectangular and circular aperture antennas, Horn antenna, Babinet’s Principle, Slot Antenna, Reflector antenna.

Unit VI Wave Propagation: Free space equation, Reflection from earth’s surface, Surface and Space wave propagation, Range of space wave propagation, Effective earth’s radius, Duct propagation, Troposphere propagation. Structure of ionosphere, propagation of radio waves through ionosphere, Critical frequency, Maximum usable frequency, Optimum working frequency, lowest usable high frequency, virtual height, Skip Distance, Effect of earth’s magnetic field.

Suggested Readings/Books:
- Electromagnetics and radiating systems, Jordan E.C., PHI.
- Antenna Theory, Balanis C.A, John Wiley & sons.
- Antenna and wave propagation, R.L.Yadava, PHI
- Problem and solutions in electromagnetics, W H Hayt and J A buck, Tata McGraw Hill
- Antenna Theory, Krauss J.D., McGraw Hill.
- Shen/Kong/Patnaik, Engineering Electromagnetics, Cengage Learning.

BTEC-404  Electronics Measurements and Instrumentation

Unit I Fundamentals: Generalized instrumentation system – Units and Standards, Calibration Methods, Standards of measurements, Classification of errors, error analysis. Static Characteristics- Accuracy, Precision, sensitivity, linearity, resolution, hysteresis, threshold, input impedance, loading effects etc. Dynamic Characteristics.

study of various stages in brief, measurement of voltage, current phase and frequency, special purpose oscilloscope.

**Unit III Measuring Instruments:** Principle of operation of galvanometer, PMMC, Moving Iron instruments, Resistance measurements using Wheatstone bridge, Kelvin Double Bridge, Ohm meter, AC bridges: Maxwell bridge, Maxwell wein bridge, Hey’s Bridge, Schering Bridge, Anderson Bridge, Campbell Bridge.

**Unit IV Instrumentation for Generation and Analysis of Waveforms:** Signal generators: Fixed and variable AF oscillators, AF sine and square wave generator, Function generator: Square and pulse generator, Sweep generator, wave analyzer, harmonic distortion analyzer, spectrum analyzer, spectrum analysis.

**Unit V Storage and Display Devices:** Necessity of recorders, recording requirements, graphic recorders, strip chart recorders, magnetic tape recorders, digital tape recorders. Electronic indicating instruments, seven segment display, fourteen segmental display Nixie tube.

**Unit VI Transducers and DATA Acquisition Systems:** Strain gauge, LVDT, thermocouple, piezoelectric, crystal and photoelectric transducers and their applications. Data acquisition systems.

**Unit VII Telemetry:** Introduction, method of data transmission, types of telemetry systems and applications.

**Suggested Readings / Books:**

- Electrical and Electronic Measurements and Instrumentation, by K. SAWHNEY.
- Electronic Instrumentation and Measurement Techniques, by D Cooper.
- Electronic Instrumentation, by H.S. Kalsi, Tata McGraw Hill
- Applied Electronics Instrumentation and measurement, David Buchla, Wayne Melachlan:
- Electronics Measurement and Instrumentation, Oliver by B.H and Cag J.M. McGrawHill.
- Element of Electronic Instrumentation & Measurement, by Carr, Pearson Education.
- Electronic Measurements & Instrumentation, by Kishore, Pearson Education.
- Process Control Systems and Instrumentation, Bartelt, Cengage Learning

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**BTEC405 Pulse Wave Shaping and Switching**

**Unit I Introduction to Basic Elements and Waveforms:** Passive and Active circuit elements, AC through inductor and capacitor, AC through Resistor-inductor and resistor-capacitor in series, Series and parallel resonance circuit, Different input signals, Average and RMS value.

**Unit II Bistable Multivibrators:** Role of feedback in electronic circuits, Fixed bias and self-bias bistable multivibrator, Speed-up Capacitors, unsymmetrical and symmetrical triggering, Application of Trigger input at the base of OFF Transistor, Application of Trigger input at the base of ON Transistor, Bistable multivibrator as T Flip-Flop, Schmitt trigger circuit, Calculation of Upper Tripping Point and Lower Tripping Point.

**Unit III Monostable and Astable Multivibrators:** Collector Couple and Emitter Coupled Monostable multivibrator, Expression for Gate width, Astable Collector coupled and emitter coupled multivibrator, complementary Transistor Astable multivibrator.
Unit IV Switching Characteristics of Devices: Diode and transistor as electronic switch, Breakdown mechanism in diode, Effect of temperature on diode, Charge storage phenomena, Switching times in diode and transistor, Delay time, Rise time, Storage time and fall time, Use of Schotkey diode for reducing storage time.

Unit V Linear Wave Shaping: Low pass RC Network, Response to standard waveforms circuits, Integrator High Pass RC circuits, Response to standard waveforms, Differentiator, Double differentiation, Attenuator.

Unit VI NON- Linear Wave Shaping: Clipping circuits (diode & transistor), Diode comparators, Transistor differential comparator, Operational amplifier comparator, clamping circuits, Practical clamping circuit, clamping circuit theorem.

Suggested Readings / Books:
- Pulse and Digital Switching Circuits by Milliman, Taub; Tata Mcgraw Hill
- Pulse and Digital Circuits by Mthiki S. Prakash Rao; Tata Mcgraw Hill
- Pulse & Digital Circuits, by Rao K, Pearson Education.
- Switching Theory & Logic Design, by Rao ; Pearson Education.
- Wave Generation and Shaping by Strauss McGraw Hill.
- Pulse and Switching Circuits by Sanjeev Kumar; Dhanpat Rai & Company

BTEC406 LAB Analog Communication Systems

- To generate a FM Signal using Varactor & reactance modulation.
- Detection of FM Signal using PLL & foster seelay & resonant detector.
- To Study Super heterodyne AM receiver and measurement of receiver parameters viz. sensitivity, selectivity & fidelity.
- To study the circuit of PWM & PPM modulator & Demodulator
- Study of Frequency Division Multiplexing / Demultiplexing with sinusoidal & audio inputs Using DSBSC.
- Generation & study of Analog TDM at least 4 channels.
- Sampling Theorem & Reconstruction of Signal from its samples using Natural Sampling, Flat Top Sampling & Sample & Hold Circuits & effect of duty cycle.
- To draw & study Polar plots & polarization of Helical, Ground plane, Yagiuda & dipole Antenna & calculate Antenna gain, Antenna beam width, Element current & Front-back ratio of antenna.
- To study Antenna matching using stubline.
- To study a transmission line attenuation & frequency characteristics.
BTEC407 Electronic Measurement & Instrumentation

- Measurement of Inductance by Maxwell’s Bridge.
- Measurement of small resistance by Kelvin’s Bridge.
- Measurement of Capacitance by Schering Bridge.
- Measurement of Frequency by Wein Bridge.
- Measurement of medium resistance by Wheat Stone’s Bridge.
- Determination of frequency & phase angle using C.R.O.
- To find the Q of a coil using LCR-Q meter.
- To determine output characteristic of a LVDT and determine its sensitivity.
- Study characteristics of temperature transducer like Thermocouple, Thermistor and RTD with implementation of small project using signal conditioning circuit.
- Study characteristics of Light transducer like Photovoltaic cell, Phototransistor and Pin Photodiode with implementation of small project using signal conditioning circuit.
- To study input- output characteristics of a potentiometer and to use two potentiometers as an error detector.
- To study transmitter- receiver characteristics of a synchro set to use the set as control component.
- To study the operation of a d-c positional servo system and to investigate the effect of damping and supply voltage on its response.
- To study the operation of an a.c. position servo-system and to obtain effects of supply voltage and system parameter on its transient response.
- To study a stepper motor and control its direction speed and number of steps with the help of a microprocessor.

BTEC408 Lab Signal & Systems Using MATLAB / MENTOR DSP

- Generation of continuous and Discrete Unit step signal.
- Generation of exponential and Ramp Signal in Continuous and Discrete Domain.
- Continuous and Discrete time Convolution.
- Adding and subtracting two Given Signals (Continues as well as Discrete Signals)
- To generate a random binary wave.
- To Generate a Random Sequences with arbitrary distribution, means and Variances for following:
  - Rayleigh Distribution
  - Uniform distribution
  - Gaussian distribution.
- To Plot Probability density functions. Find Mean and Variance for the above distribution
• To study Power Spectrum Density
• To study Difference Equation to develop elementary signal function modules (m-files) for unit sample, unit step, exponential and unit ramp sequences.
• To develop program modules based on operation on sequences like signal shifting, signal folding, signal addition and signal multiplication.
• To develop program for discrete convolution and correlation.
• To develop program for finding response of the LTI system described by the difference equation.
• To develop program for computing inverse Z-transform.
Fifth Semester
BTCS 304 Data Structures

PART-A

1. **Dynamic Memory Management**: Understanding pointers, usage of pointers, arithmetic on pointers, memory allocation, memory management functions and operators, debugging pointers - dangling pointers, memory leaks, etc.  

2. **Introduction**: Concept of data type, definition and brief description of various data structures, data structures versus data types, operations on data structures, algorithm complexity, Big O notation.  

3. **Arrays**: Linear and multi-dimensional arrays and their representation, operations on arrays, sparse matrices and their storage.  

4. **Linked List**: Linear linked list, operations on linear linked list, doubly linked list, operations on doubly linked list, application of linked lists.  

5. **Stacks**: Sequential and linked representations, operations on stacks, application of stacks such as parenthesis checker, evaluation of postfix expressions, conversion from infix to postfix representation, implementing recursive functions.  

6. **Queues**: Sequential representation of queue, linear queue, circular queue, operations on linear and circular queue, linked representation of a queue and operations on it, dequeue, priority queue, applications of queues.  

PART-B

7. **Trees**: Basic terminology, sequential and linked representations of trees, traversing a binary tree using recursive and non-recursive procedures, inserting a node, deleting a node, brief introduction to threaded binary trees, AVL trees and B-trees.  

8. **Heaps**: Representing a heap in memory, operations on heaps, application of heap in implementing priority queue and heap sort algorithm.  

9. **Graphs**: Basic terminology, representation of graphs (adjacency matrix, adjacency list), traversal of a graph (breadth-first search and depth-first search), and applications of graphs.  

10. **Hashing & Hash Tables**: Comparing direct address tables with hash tables, hash functions, concept of collision and its resolution using open addressing and separate chaining, double hashing, rehashing.  

**Searching & Sorting**: Searching an element using linear search and binary search techniques, Sorting arrays using bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, shell sort and radix sort, complexities of searching & sorting algorithms.  

6. R. S. Salaria, *Test Your Skills in Data Structures*

UNIT-II: - Pulse Code Modulation:- Sampling, Sampling Rate, Aliasing, quantization error, Uniform and Non uniform quantization, Dynamic Range, Coding efficiency, A law & μ law companding, Bandwidth of PCM, Block diagram of PCM system, Delta Modulation, Continuously variable Slope Delta Modulator (CVSDM) or Adaptive Delta Modulation, Differential Pulse Code Modulation, Intersymbol Interference, Eye Patterns, Signal power in binary digital signals.

UNIT-III Line Coding & Multiplexing Techniques: Line Coding & its properties. NRZ & RZ types, signaling format for unipolar, Polar, bipolar (AMI) & Manchester coding and their power spectra (No derivation), HDB and B8ZS signaling, Nyquist’s criterions for pulse shaping, Fundamentals of time division multiplexing, Bit versus word interleaving, Statistical TDM, Codecs & Combo Chips. Basics of TDMA, FDMA and CDMA

UNIT-IV Digital Carrier Modulation & Demodulation Techniques: Introduction, Amplitude Shift Keying (ASK), ASK Spectrum, ASK Modulator, Coherent ASK Detector, Noncoherent ASK Detector, Frequency Shift Keying (FSK), FSK Bit Rate and Baud, Bandwidth and Frequency Spectrum of FSK, FSK Transmitter, Non-coherent FSK Detector, Coherent FSK Detector, FSK Detection Using PLL, Binary Phase Shift Keying, Binary PSK Spectrum, BPSK Transmitter, Coherent PSK Detection, Quadrature Phase Shift Keying (QPSK), QPSK Demodulator, Offset QPSK, π/4 QPSK, Comparison of conventional QPSK, Offset QPSK and π/4 QPSK, M-Ary BPSK, Quadrature Amplitude Modulation (QAM); MQAM transmitters and receivers, Band Width efficiency, Carrier Recovery; Squaring Loop & Costas Loop, Differential PSK, DBPSK transmitter and receiver, Constant Envelop Modulation; Minimum Shift Keying (MSK) & Gaussian Minimum Shift Keying (GMSK ), matched filter receivers, bandwidth consideration and probability of error calculations for ASK, PSK, FSK schemes.

TEXT BOOK RECOMMENDED

BOOKS RECOMMENDED

5. Modulation and Coding Techniques in Wireless Communications by EVGENII KROUK, SERGEI SEMENOV, WILEY, 2011.
UNIT I
Introduction: Limitations of analog signal processing, Advantages of digital signal processing and its applications; Some elementary discrete time sequences and systems; Basic elements of digital signal processing such as convolution, correlation and autocorrelation, Concepts of stability, causality, linearity, difference equations. DFT and its properties; Linear Periodic and Circular convolution; Linear Filtering Methods based on DFT; Fast Fourier Transform algorithm using decimation in time and decimation frequency techniques; Goertzel algorithm.

UNIT II
The Z Transform: Introduction, Z-Transform, Region of convergence; Inverse Z Transform methods, properties of Z transform.

UNIT III

UNIT IV
DSP Processors: Architectures of ADSP and TMS series of processor.

RECOMMENDED TEXT BOOK

Books Recommended
UNIT I

UNIT II
INTRODUCTION TO OPERATIONAL AMPLIFIERS: Block diagram of a typical Op-Amp, Schematic symbol, integrated circuits and their types, IC package types, Pin Identification and temperature range, Interpretation of data sheets, Overview of typical set of data sheets, Characteristics and performance parameters of op-amp, Ideal Op-Amp, Equivalent circuit of an Op-Amp, Ideal voltage transfer curve, Open loop configurations: Differential, Inverting & Non Inverting, Practical Op-Amp: Input offset voltage, Input bias current, Input offset current, total output offset voltage, Thermal drift, Effect of variation in power supply voltages on offset voltage, Change in Input offset voltage and Input offset current with time, Temperature and supply voltage sensitive parameters, Noise, Common Mode configuration and common mode rejection Ratio. Feedback configurations.

UNIT III

UNIT IV

Recommended Text Book:


Recommended Reference Books

1. Op Amps & Linear Integrated circuits by Coughlin

Unit I
INTRODUCTION TO 8085 MICROPROCESSOR: History and evolution of Microprocessors, 8085 Microprocessor, Memory Interfacing, Memory mapped I/O and peripheral mapped I/O 8085 Microprocessor Programming model. Introduction to 8085 instructions, programming techniques, counters and time delays, stack and subroutines, interrupts.

Unit II
8051 MICROCONTROLLER: Comparison of Microprocessor and Microcontroller, microcontroller and embedded processors, Architecture and pin configuration of 8051

Unit III
8051 ASSEMBLY LANGUAGE PROGRAMMING: Introduction to 8051 Assembly programming, Data Types and directives, 8051 flag bits and PSW register. Register banks and stack. Jump loop and call instructions, I/O Port programming: Addressing modes and accessing memory using various addressing modes. Arithmetic instructions and programs, Logic instructions and programs, Single bit instructions and programming, Timer/counter programming in the 8051.

Unit IV
SERIAL COMMUNICATION: 8051 connection to RS 232, 8051 serial communication programming, interfacing of 8051 microcontroller: LCD, ADC and DAC, Stepper motor.

Recommended Text Books:-
1. Microprocessor Architecture, Programming and application with 8085 by Gaonkar
2. The 8051 Microcontroller and embedded Systems by: - Ali Mazidi, Pearson Education
List Of Experiments:

Perform the following exercises using MATLAB

1. To develop elementary signal function modules (m-files) for unit sample, unit step, exponential and unit ramp sequences.
2. Write a program in MATLAB to generate standard sequences.
3. Write a program in MATLAB to compute power density spectrum of a sequence.
4. To develop program modules based on operation on sequences like signal shifting, signal folding, signal addition and signal multiplication.
5. Write a program in MATLAB to verify linear convolution.
6. Write a program in MATLAB to verify the circular convolution.
7. To develop program for finding magnitude and phase response of LTI system described by system function H(z).
8. To develop program for finding response of the LTI system described by the difference equation.
9. To develop program for computing inverse Z-transform.
10. To develop program for computing DFT and IDFT.
11. To develop program for conversion of direct form realization to cascade form realization.
12. To develop program for cascade realization of IIR and FIR filters.
13. To develop program for designing FIR filter.
14. To develop program for designing IIR filter.
15. To write a MATLAB program for noise reduction using correlation and autocorrelation methods.
16. To write a MATLAB programs for pole-zero plot, amplitude, phase response and impulse response from the given transfer function of a discrete-time causal system.
17. Write a program in MATLAB to find frequency response of different types of analog filters.
18. Write a program in MATLAB to design FIR filter (LP/HP) through Window technique
   a. Using rectangular window
   b. Using triangular window
BTEC-506          LAB LINEAR INTEGRATED CIRUIT

Internal Marks: 30                     L T P
External Marks: 20                     0 0 2
Total Marks: 50

List Of Experiments:

1. To study differential amplifier configurations.
2. To measure the performance parameters of an Op amp.
4. To study frequency response of an Op Amp
5. To use the Op-Amp as summing, scaling & averaging amplifier.
6. To use the Op-Amp as Instrumentation amplifier
14. Design a series regulators with an error amplifier to provide an output voltage of 5 volt at a load current of 1.5 Amp. Use a 741 Op-Amp and specify the Zener voltage necessary transistor gain and the maximum power dissipation of the transistor.
15. Design a delay circuit using 555.
16. To examine the operation of a PLL and to determine the free running frequency, the capture range and the lock in range of PLL.
17. Verification of hardware results obtained using SPICE.
LIST OF EXPERIMENTS

1. Study of Time Division Multiplexing system.
2. Study of pulse code modulation and demodulation.
3. Study of delta modulation and demodulation and observe effect of slope overload.
4. Study pulse data coding techniques for various formats.
5. Data decoding techniques for various formats.
7. Study of frequency shift keying modulator and demodulator.
8. Study of phase shift keying modulator and demodulator.
10. Digital link simulation; error introduction & error estimation in a digital link using MATLAB (SIMULINK)/ communication simulation packages.
LIST OF EXPERIMENTS

Note: Any Eight Experiments each from Part A and Part-B Part-A:
List of Experiments using 8085/8086:
1. Study of 8085 and 8086 Microprocessor Kits.
2. Write a program to add two 8-bit number using 8085.
3. Write a program to add two 16-bit number using 8085.
4. Write a program to subtract two 8-bit number using 8085.
5. Write a program to subtract two 16-bit number using 8085.
6. Write a program to multiply two 8 bit numbers by repetitive addition method using 8085.
7. Write a program to sort series using bubble sort algorithm using 8085.
8. Write a program to copy 12 bytes of data from source to destination using 8086.
9. Write a program to find maximum and minimum from series using 8086.
10. Write a program to control the operation of stepper motor using 8085/8086 microprocessors and 8255 PPI.
11. Write a program to control speed of DC motor using 8085/8086 microprocessors and 8255 PPI.

Part-B: List of Experiments using 8051:
1. Study of 8051/8031 Micro controller kits.
2. Write a program to add two numbers lying at two memory locations and display the result.
3. Write a program for multiplication of two numbers lying at memory location and display the result.
4. Write a Program to arrange 10 numbers stored in memory location in Ascending and Descending order.
5. Write a program to show the use of INT0 and INT1.
6. Write a program of Flashing LED connected to port 1 of the Micro Controller
7. Write a program to generate a Ramp waveform using DAC with micro controller.
8. Write a program to interface the ADC.
9. Write a program to control a stepper motor in direction, speed and number of steps.
10. Write a program to control the speed of DC motor.
11. Interfacing of high power devices to Micro-controller port-lines, LED, relays and LCD display.
Sixth Semester
PART-A

1. Introduction to Operating system, Role of Operating System as resource manager, function of kernel and shell, operating system structures, views of an operating system.


PART-B

4. Device Management: I/O system and secondary storage structure, Device management policies, Role of I/O traffic controller, scheduler.


6. Brief study to multiprocessor and distributed operating systems.


Suggested Readings/Books:
4. Operating System by Madnick Donovan
5. Operating System by Stallings
Microwave Tubes: Limitations of conventional tubes, construction, operation and properties of Klystron Amplifier, reflex Klystron, Magnetron, Travelling Wave Tube (TWT), Backward Wave Oscillator (BWO), Crossed field amplifiers.

Microwave Solid State Devices: Limitation of conventional solid state devices at Microwaves, Transistors (Bipolar, FET), Diodes (Tunnel, Varactor, PIN), Transferred Electron Devices (Gunn diode), Avalanche transit time effect (IMPATT, TRAPATT, SBD), Microwave Amplification by Stimulated Emission of Radiation (MASER).

Microwave Components: Analysis of Microwave components using s-parameters, Junctions (E, H, Hybrid), Directional coupler, Bends and Corners, Microwave posts, S.S. tuners, Attenuators, Phase shifter, Ferrite devices (Isolator, Circulator, Gyraor), Cavity resonator, Matched termination.

Microwave Measurements: Power measurements using calorimeters and bolometers, Measurement of Standing Wave Ratio (SWR), Frequency and wavelength, Microwave bridges.

Introduction to Radar Systems: Basic Principle: Block diagram and operation of Radar, Radar range Equation, Pulse Repetition Frequency (PRF) and Range Ambiguities, Applications of Radar.

Doppler Radars: Doppler determination of velocity, Continuous Wave (CW) radar and its limitations, Frequency Modulated Continuous Wave (FMCW) radar, Basic principle and operation of Moving Target Indicator (MTI) radar, Delay line cancellers, Blind speeds and staggered PRFs.

Scanning and Tracking Techniques: Various scanning techniques (Horizontal, vertical, spiral, palmer, raster, nodding), Angle tracking systems (Lobe switching, conical scan, monopulse), Range tracking systems, Doppler (velocity) tracking systems.

Text books:
1. Microwave devices and circuits: Samuel Liao; PHI
2. Microwave devices and Radar Engg: M. Kulkarni; Umesh Publications
3. Introduction to radar systems: Merill I. Skolnik

Reference Books:
1. Foundation of Microwave Engg. : R.E. Collin; McGraw Hill

Elements of Cellular Radio Systems Design: General description of the problem, concept of frequency reuse channels, co-channel interference reduction factor, desired C/I from a normal case in an omni directional antenna system, cell splitting, consideration of the components of cellular systems.

Digital Communication through fading multipath channels: Fading channel and their characteristics- Channel modeling, Digital signaling over a frequency non selective slowly fading channel. Concept of diversity branches and signal paths. Combining methods: Selective diversity combining, Switched combining, maximal ratio combining, Equal gain combining.

Multiple Access Techniques for Wireless Communications: Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Spread Spectrum Multiple Access, Space Division Multiple Access, Packet Radio Protocols; Pure ALOHA, Slotted ALOHA.


Future trends: 4G mobile techniques, LTE-Advance systems

Recommended Text Books:

4. Wireless and Digital Communications; Dr. Kamilo Feher (PHI)
Cost analysis: Break-even analysis, two and three alternatives, graphical solution. Breakeven charts, effects of changes in fixed and variable costs. Minimum cost analysis, economics order quality. Effect of risk and uncertainty on lot size.

Replacement Studies: Reasons for replacement, factors to be considered in replacement Studies, discounted cash flow analysis, economic life of a project, challenger and defender.

Economic Analysis Of Investment Alternatives: Basic economy study patterns and their comparison, decision making in selection of alternative by present worth methods, rate of return method, payout period method and uniform annual cost method, economic analysis of new projects, effect of taxation on economic studies.


Depreciation: Types of depreciation and their Methods.


Productivity: Definition, measurement, productivity index, types of production system, Industrial Ownership.

Designing Organizational Structures: Concept, Importance and characteristics of organization, Types of organization - Project, matrix and informal organization. Span of control, Delegation of authority.


TEXT BOOKS
1. O.P Khanna, Industrial Engineering.
2. T.N. Bhagooiwal Economics of Labour and Industrial Relations (Sahitya BhawanAgra)

REFERENCES
1. Minappa and Personnel Managements M.S. Saiyada (Tata Mc Graw Hill)
2. C.B. Mamoria Personnel Management (Himalaya publishing house Bombay)
3. Engg. Economics Analysis Bullinger
4. Introduction to Econometrics : Kliwen Prentice Hall
Introduction: Introduction to Computer-aided design tools for digital systems. Hardware description languages, Introduction to VHDL, Data objects, Classes and data types, Operators, Overloading, and Logical operators. Types of delays, Entity and Architecture declaration Introduction to behavioral, dataflow and structural models


Applications of VHDL: Combinational Circuit Design such as such as Multiplexers, Encoders, Decoders, Code Converters, Comparators, and Implementation of Boolean functions etc., Sequential Circuit Design such as Shift registers, Counters etc.

Review of MOS Devices: MOS Structure, Enhancement & Depletion Transistor, Threshold Voltage, MOS device design equations MOS Transistor Models. NMOS, PMOS, CMOS.

Basic Electrical Properties and Circuit Concepts: The NMOS Inverter and Transfer Characteristics pull up and pull down ratios of NMOS, alternative forms of pull up the CMOS Inverter and transfer characteristics. CMOS Inverter Delays. Driving large Capacitive loads, Propagation delays and effect of wiring capacitance.


Recommended Text Books:
BTEC-605  LAB VLSI

Internal Marks:  30  L  T  P
External Marks: 20  0  0  2
Total Marks: 50

List of Experiments:

Combinational Design Exercises

1. Design of basic Gates: AND, OR, NOT.

2. Design of universal gates

3. Design of 2:1 Mux using other basic gates

4. Design of 2 to 4 Decoder

5. Design of Half-Adder, Full Adder, Half Subtractor, Full Subtractor

6. Design of 3:8 Decoder

7. Design of 8:3 Priority Encoder

8. Design of 4 Bit Binary to Grey code Converter

9. Design of 4 Bit Binary to BCD Converter using sequential statement

10. Design an 8 Bit parity generator (with for loop and Generic statements)

11. Design of 2,s Complementary for 8-bit Binary number using Generate statements

Sequential Design Exercises

12. Design of all type of Flip-Flops using (if-then-else) Sequential Constructs

13. Design of 8-Bit Shift Register with shift Right, Rhisft Left, Load and Synchronous reset.


15. Design of Synchronous 8-Bit universal shift register (parallel-in, parallel-out) with 3-state output (IC 74299)


17. Design counters (MOD 3, MOD 5, MOD 8, MOD 16)

18. Design a decimal up/down counter that counts up from 00 to 99 or down from 99 to 00.

19. Design 3-line to 8-line decoder with address latch
BTEC-606 LAB MICROWAVE ENGINEERING

Internal Marks: 30
External Marks: 20
Total Marks: 50

List of Experiments:

1. Study of microwave components and instruments.
2. Measurement of crystal characteristics and proof of the square law characteristics of the diode.
8. Calibration of the attenuation constant of an attenuator.
9. Determination of the radiation characteristics and gain of an antenna.
11. Determination of the standing wave pattern on a transmission line and finding the length and position of the short circuited stub.
BTEC 901  RELATIONAL DATABASE MANAGEMENT SYSTEM

Internal Marks: 40
External Marks: 60
Total Marks: 100

Introduction to Database Systems:

Physical Data organization: File Organization and Indexing, Index Data Structures, Hashing, B-trees, Clustered Index, Sparse Index, Dense Index, Fixed length and Variable length Records.


The Relational Model: Introduction to the Relational Model, ER to Relational Model Conversion, Integrity Constraints over Relations, Enforcing Integrity Constraints, Relational Algebra, Relational Calculus, querying Relational Data.

Relational Query Languages: SQL: Basic SQL Query, Creating Table and Views, SQL as DML, DDL and DCL, SQL algebraic Operations, Nested Queries, Aggregate Operations, Cursors, Dynamic SQL. Integrity Constraints in SQL, Triggers and Active Database, Relational Completeness. Basic query Optimization Strategies. Algebraic Manipulation and Equivalences.


Transaction Management:
ACID properties, Serializability, Two-phase Commit protocol, Concurrency Control, Lock Management, Lost Update Problem, Inconsistent Read problem, Read-Write Locks, Deadlocks Handling, 2pL protocol.

Database Protection:
Threats, Access Control Mechanisms, Discretionary Access Control, Grant and Revoke, Mandatory Access Control, Bell LaPadula Model, Role Based Security, Firewalls, Encryption and Digital Signatures.

Suggested Reading Books:
2. C.J. Date, An Introduction to Database Systems, Eighth Edition, Pearson Education
INTRODUCTION: Advantages of IC’s, General classification of IC’s (Linear/Digital IC’s, Monolithic/ Hybrid IC’s), Basic IC fabrication steps.

CRYSTAL GROWTH AND EPITAXY: Starting material for formation of crystal, Horizontal Bridgeman Method, Czochralski growth, Distribution of dopants, Zone refining, Silicon Float Zone process, Si-Wafer preparation, Epitaxial growth, Techniques used for epitaxial growth (LPE, VPE, MBE)

SILICON OXIDATION: Thermal oxidation process (Kinetics of growth, Thin oxide growth), Effect of impurities on the oxidation rate, Preoxidation Cleaning, Various oxidation techniques, Masking properties of SiO2, IV PHOTO LITHOGRAPHY AND ETCHING, Pattern generation/Mask making, Contact and Proximity printing, Photoresistsl, Photolithography Process (Lift off technology, Fine line photolithography), Wet/Dry etching, Reactive Plasma etching techniques and applications

DIFFUSION AND ION IMPLANTATION: Basic diffusion process (Diffusion equation, Diffusion profiles), Extrinsic diffusion, Lateral Diffusion, Ion Implantation Process (Ion distribution, Ion Stopping), Implant Damage and Annealing process (Furnace and RTA), VI

IC PACKAGING, Isolation Techniques, Testing of the Chip, Wire Bonding techniques, Flip Chip technique, Various Packaging methods and Materials, VII FABRICATION OF MONOLITHIC COMPONENTS, Fabrication of Diodes, Resistors, capacitors and inductors, Fabrication of BJT and FET, Fabrication of MOS Devices, CMOS fabrication techniques (nwell and p-well process sequences), Introduction to MEMS.

Recommended Text Books:
1. Fundamental of Semiconductor Fabrication: Gray S. May and Simon M. Sze
2. VLSI Technology: Sze.

Reference Books:
1. Microelectronics: Jacob and Millman
Characteristics of Selected Devices: Fast recovery diodes, Schottky diode, SCR, gate trigger and commutation circuits, series and parallel connection of SCRs, Diac, Triac, UJT, Power MOSFETs.

Controlled Rectifier: Half wave and full wave with resistive & R-L-E and resistive-inductive loads. Free-wheeling diode, three phase rectifiers, Bridge rectifiers -half controlled and fully controlled.

Inverter, Chopper and Cyclo converter: Voltage driven, current driven, bridge, parallel, SCR versions, control of output voltage-PWM schemes, harmonic reduction

Motor Control: D.C. and A.C. motor control, reversible drives, closed loop control, commutator less D.C. motor control.

A.C. Voltage Controllers: Types of AC Voltage Controllers, Integral cycle control, single phase voltage controller, Sequence control of AC voltage (Transformer tap changers)

Books Recommended:

BTEC 904  DIGITAL SYSTEM DESIGN

Internal Marks: 40  L  T  P
External Marks: 60  4  1  0
Total Marks: 100

**Combinational Logic:** Review of adders, Subtractor, Multipliers, Multiplexers, ROM, PLA, PAL and PLD.

**Synchronous Sequential Logic:** Flip-flops, Triggering of flip-flops, Analysis of clocked sequential circuits, State reduction and assignment, Flip-flop excitation tables, Design procedure, Design of counters,

**Finite State Machines:** Finite state model, Memory elements and their excitation functions, Synthesis of Synchronous sequential circuits, Capabilities and limitations of FSM, Design, Modeling and Simulation of Moore and Mealy machines.

**Algorithmic State Machines:** ASM chart, Timing considerations, Control implementation, Control Design with multiplexers, PLAs, etc.

**Asynchronous Sequential Logic:** Analysis Procedure, Circuits with latches, Design procedure, Reduction of state and flow tables, Race-free state assignment, Hazards, Design examples.

**Designing with Programmable Logic Devices and Programmable Gate Arrays:** Read only memories, Programmable logic arrays, Programmable array logic, Designing with FPGAs, Xilinx series FPGAs

**TEXT BOOKS:**

**REFERENCE BOOKS:**
3. VHDL – Zainalabedin Navabbi.
4. VHDL – D. Smith.
Basic of intellectual property Rights

Introduction, Justification and Classification of intellectual property Rights, Classification of Treaties relating to intellectual property Rights, Stranded setting treaties, Global protection system treaties, and Classification treaties.

Patent System

History of the patent system, Patent on genetic resources, patents on chemicals, designs, patent based on software, business methods, internet patent, Exception to exclusive rights conferred to a patent holder, Remember for infringement of a patent.

Copyrights and related rights


Design rights

Nature and scope of protection of design rights, protection of layout designs (topographies) of integrated circuits, protection of undisclosed information, protection of trademarks, domain names and geographical indications.

Practical aspects of a patent

Drafting of a patent, Few Exercises on the preliminary rules on preparing an application seeking a patent.

Recommended Text Books:


INSTRUMENTATION

Introduction about Instrumentation systems, Types of Instrumentation systems, Data acquisition system (DAS) and its uses in intelligent Instrumentation system, Detailed study of each block involved in making of DAS, Signal Conditioners: as DA, IA, Signal Converters (ADC & DAC), Sample and hold, Designing of Pressure, Temperature measuring instrumentation system using DAS, Data logger.

AUTOMATION

Introduction about Automation system, Concepts of Control Schemes, Types of Controllers, Components involved in implementation of Automation system i.e., DAS, DOS, Converter (I to P) and Actuators: Pneumatic cylinder, Relay, Solenoid (Final Control Element), Computer Supervisory Control System (SCADA), Direct Digital Control’s Structure and Software.

PLC

Introduction of Programmable logic controller, Principles of operation, Architecture of Programmable controllers, Programming the Programmable controller.

INTELLIGENT CONTROLLER

Introduction to Intelligent Controllers, Model based controllers, Predictive control, Artificial Intelligent Based Systems, Experts Controller, Fuzzy Logic System and Controller, Artificial Neural Networks, Neuro-Fuzzy Controller system.

Reference Text Books:

3. “Electronics instrumentation” by H. S. Kalsi [TMH]
4. “Computer-Based Industrial Control”, by Krishna Kant, PHI.
**Basic Concepts of Information Theory:** The concept of Amount of Information, Average Information, Entropy, Information rate, Shannon’s Theorem, Mutual information; Channel capacity; BSC and other channels, Capacity of a Gaussian Channel, Bandwidth – S/N Trade-off, Introduction to Channel Capacity & Coding, Channel Models, Channel Capacity Theorem, Shannon Limit. Huffman source coding algorithm, Lempel Ziv source coding algorithm.

**Introduction to Error Control Coding:**

**Linear Block Codes:** Introduction to Linear Block codes, Syndrome and Error detection, Minimum distance of block code, Hamming Code.

**Cyclic Codes:** Description of Cyclic codes, Generator and parity check matrices of cyclic codes, error detection decoding of cyclic codes.

**BCH Codes:** Description of codes, Decoding of BCH codes, Implementation of error connection.

**Convolution Codes:** Encoding of convolution codes, structural properties of Convolution codes, Distance Properties of convolution codes.

**Automatic Repeat Request Strategies:** Stop and wait, Go back and selective repeat ARQ strategies, Hybrid ARQ Schemes.

**Recommended Books:**
1. F.M Reza: Information Theory, Mc Graw Hill
2. ShuLin & J Costeib: Error Control Coding, PHI
5. Related IEEE/IEE publications
1. The Software Engineering Problem
The software engineering problem and software products. All of the software engineering activities. The concept of software product like cycle model.

2. Software Evolution
The concept of a software like cycle, The various forms of a software product form initial conception through development and operation to retirement. Controlling activities and disciplines to support evolution. Planned and unplanned events that affect software evolution. The role changing technology.

3. Technical Communication
Fundamentals of technical communication. Oral and Written communications, preparing oral presentation and supporting material. Software project documentation of all kinds, ISO/Other, e.g. IEEE.

4. Software Configuration Management

5. Software Quality Assurance
Software quality assurance as a controlling discipline. Organizational structures for quality assurance. Independent verification and validation teams. Test and evaluation teams. Software technical reviews. Software quality assurance plans: ISO 9000, ANSI/IEEE.

6. Standards

7. Software Project Organizational and Management Issues
Staffing - development, organizations, quality assurance teams. project planning - choice of process model, project scheduling and milestones, resource allocation.

8. Software Project Economics
Cost estimation, risk analysis for software projects. factors that affect cost.

REFERENCES
Seventh/Eighth Semester
BTCS-403 Computer Networks

Internal Marks: 40  L  T  P  3  1  0
External Marks: 60
Total Marks: 100

Unit-I Introduction

Introduction, Network Topologies, Wired Vs wireless Networks, LAN, MAN, WAN, Internet, Intranet & Extranet, Connection-Oriented and Connectionless Services, Need of Protocols, TCP/IP reference Model, comparison of OSI & TCP/IP. Bridges, Hubs and Switches, Virtual LANs

Unit-II Network Protocols

ALOHA, Carrier Sense Multiple Access Protocols, ARP, RARP, Framing, One-Bit Sliding Window Protocol, Protocol Using Go Back N, Protocol Using Selective Repeat, High-Level Data Link Control (HDLC)

Unit-III Congestion Control in Data Networks

Congestion Prevention Policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnets, Effects of Congestion, Load Shedding, Jitter Control, Congestion Control in Packet-Switching Networks

Unit-IV Routing Algorithms

The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing for Mobile Hosts, Routing in Ad Hoc Networks, Node Lookup in Peer-to-Peer Networks

Unit-V Internetwork Protocols

Internet Protocol & IP Addresses, Principles of Internetworking, Internet Protocol Operation, IPv6, Virtual Private Networks and IP Security

Reference Books:

2. Andrew S. Tanenbaum “Computer Networks”, PHI
BTEC-701 Embedded Systems

Internal Marks: 40
External Marks: 60
Total Marks: 100

Unit-I: Arm Processor Architecture
Architecture, Registers, Interrupts & Vector Table, I/O Ports, ARM Processor family, JTAG, I2C bus

Unit-II: Arm Programming Instructions
Instruction Set: Data processing instructions, Addressing modes, Load Store Instructions, PSR (Program Status Register) Instructions, Conditional Instructions, Interrupt Instructions

Unit-III: C Programming
Integrated Development Environment (IDE) for C/C++ Programming, C/C++ Programs using Function Calls, Pointers, Structures, Integers & Floating Point Arithmetic, Assembly Code using Instruction Scheduling, Register Allocation, Conditional Execution & Loops

Unit-IV: Interfacing Peripherals
Interfacing: ADC & DAC, Sensors, Memory, LCD Display, Stepper Motor, DC Motor, SD-MMC Card, Biometric & RFID, ZIGBEE, GSM Interfaces, Debugging Tools

References Books:
5. ARM Architecture Reference Manual
6. Website www.arm.com
# BTEC-702 Optical Communication

**Internal Marks:** 40  
**External Marks:** 60  
**Total Marks:** 100  

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## Unit-I Introduction
Need of Fiber Optic Communications, Evolution of Light wave Systems, Basic Concepts; Analog & Digital Signals, Channel Multiplexing, Modulation Formats, Optical Communication Systems, Light wave System Components; Optical Fibers as a Communication Channel, Optical Transmitters, Optical Receivers.

## Unit-II Optical Fibers
Geometrical-Optics Description; Step-Index Fibers, Graded Index Fibers, Wave Propagation; Maxwell’s Equations, Fiber Modes, Single-Mode-Fibers, Dispersion in Single-Mode Fibers; Group Velocity Dispersion, Material Dispersion, Wave guide Dispersion, Higher-order Dispersion, Polarization-Mode Dispersion, Dispersion-Induced Limitations; Basic Propagation Equation, Chirped Gaussian Pulses, Limitations on the Bit Rate, Fiber Bandwidth , Fiber Losses; Attenuation Coefficient, Material Absorption, Rayleigh Scattering, wave guide Imperfections, Nonlinear Optical effects; Stimulated Light Scattering, Nonlinear Phase Modulation, Four Wave Mixing, Fiber Manufacturing; Design Issues, Fabrication Methods, Cables and Connectors

## Unit-III Optical Transmitters

## Unit-IV Optical Receivers
Basic concepts, p-n Photo Diodes, p-i-n Photo Diodes, Avalanche Photo Diode, MSM Photo detector, Receiver Design, Receiver Noise; Noise mechanism, Receiver sensitivity; Bit error rate, Minimum Receiver Power, Sensitivity Degradation, Receiver Performance.

## Unit-V Light Wave Systems
System Architecture, Loss limited Light wave systems, Dispersion limited Light wave systems, Power Budget, Long Haul systems, Sources of Power Penalty; Model Noise, Dispersive Pulse Broadening, Mode Partition Noise, Frequency Chirping, Reflection Feedback Noise

## Unit-VI Multi channel Systems
WDM Light wave systems, Optical TDM Systems, Subscriber Multiplexing, Code Division Multiplexing.

## Reference Books:
1. Senior J. Optical Fiber Communications, Principles & Practice, PHI.  
BTEC-703 Lab Wireless and Optical Systems & Networks

Internal Marks: 30
External Marks: 20
Total Marks: 50

1. Study and measurement of attenuation and loss in optical fiber.
2. Study and measurement of bending loss in optical fiber.
3. Study and measurement of numerical aperture of optical fiber.
4. Measurement of optical power using optical power meter.
5. To Study the transmission of TDM signal through optical fiber.
6. To determine the bit rate of the optical fiber link.
7. Study of various multiplexing techniques.
8. To determine the BER of wireless system using M-ARY (BPSK,QPSK,8PSK,16PSK) technique.
9. To determine the BER of wireless system using QAM technique.
List of Experiments

2. Study of Interrupt structure in ARM Processors
3. Write ARM Processor program to Flash LED
4. Interfacing of an LCD Display
5. Write a program to interface an ADC
6. Write a program to generate a Ramp waveform using DAC interface
7. Write a program to control a Stepper Motor
8. Write a program to control the speed of DC motor
9. Interface relays and write a program to control them
10. Interface ZIGBEE with ARM to control more external devices
11. Interfacing of Biometric information recorder
12. Interfacing RFID module with ARM Microcontroller
BTEC 908 CMOS Based Design

Unit-I Introduction to MOS Device
MOS Transistor, MOS models MOS Transistor under static conditions, threshold voltage-Resistive operation, saturation region, channel length modulation, body effect, DC transfer characteristics, Tristate inverters, velocity saturation, Hot carrier effect, drain current Vs voltage charts, sub threshold conduction, MOS structure capacitance, CMOS logic, fabrication and layout, stick diagrams

Unit-II CMOS Processing
CMOS technologies, wafer formation photolithography channel formation, isolation, gate oxide, gate source, drain formation, contacts and metallization, layout design rules, design rule checking,

Unit-III Circuit Characterization & Performance Estimation
Delay estimation, transistor sizing, power dissipation, Sheet resistance, area capacitance, design margin, reliability, Scaling models, scaling factor for device parameters, Advantages and Limitations of scaling.

Unit-IV Design of Combinational Logic
Static CMOS design, complementary CMOS, static properties, complementary CMOS design, Power consumption in CMOS logic gates, dynamic or glitching transitions, Design to reduce switching activity, Radioed logic, DC VSL, pass transistor logic, Differential pass transistor logic, sizing of level restorer, sizing in pass transistor, Dynamic CMOS design, Domino logic, optimization of Domino logic, NPCMOS, Designing logic for reduced supply voltages

Reference Books:
1. Nail H.E. Weste, David Harris, Ayan Banerjee, “CMOS VLSI DESIGN”, Pearson Education.
BTEC 909 Biomedical Signal Processing

Internal Marks: 40
External Marks: 60
Total Marks: 100

Unit-I Introduction to Biomedical Signals
Tasks in Biomedical Signal Processing, Computer Aided Diagnosis, Examples of Biomedical signals: ECG, EEG, EMG etc., Review of linear systems, Fourier Transform and Time Frequency Analysis (Wavelet) of biomedical signals, Processing of Random & Stochastic signals, spectral estimation, Properties and effects of noise in biomedical instruments, Filtering in biomedical instruments

Unit-II Cardio-logical Signal Processing
Pre-processing, QRS Detection Methods, Rhythm analysis, Arrhythmia Detection Algorithms, Automated ECG Analysis, ECG Pattern Recognition, Heart rate variability analysis.

Unit-III Adaptive Noise Canceling

Unit-IV Neurological Signal Processing
Modeling of EEG Signals, Detection of spikes and spindles, Detection of Alpha, Beta and Gamma Waves, Auto Regressive (A.R.) modeling of seizure EEG, Sleep Stage analysis, Inverse Filtering, Least squares and polynomial modeling.

Reference Books:

2. Willis J Tompkins, Biomedical Signal Processing, Prentice Hall, 1993
BTEC 910 Satellite Communication

Internal Marks: 40
External Marks: 60
Total Marks: 100

Unit-I Introduction to Satellite Communication


Unit-II Satellite Link Design

Link design equation, system noise temperature, C/N & G/T ratio, atmospheric & econospheric effects on link design, complete link design, interference effects on complete link design, earth station parameters, Earth space propagation effects, Frequency window, Free space loss, Atmospheric absorption, Rainfall Attenuation, Ionospheric scintillation, Telemetry, Tracking and command of satellites.

Unit-III Satellite Multiple Access System

FDMA techniques, SCPC & CSSB systems, TDMA frame structure, burst structure, frame efficiency, super-frame, frame acquisition & synchronization, TDMA vs FDMA, burst time plan, beam hopping, satellite switched, Erlang call congestion formula, DA-FDMA, DA-TDMA.

Unit-IV Satellite Services


Unit-V Laser & Satellite Communication

Link analysis, optical satellite link Tx & Rx, Satellite, beam acquisition, tracking & pointing, cable channel frequency, head end equation, distribution of signal, n/w specifications and architecture, optical fibre CATV system.

Reference Books:

Unit-I: Introduction
Approaches to intelligent control, Architecture of intelligent control, Linguistic reasoning, Rule-base, Knowledge representation.

Unit-II: Artificial Neural Networks
Biological neuron, Artificial Neural Network, Mathematical Models, McCulloch Neural Model, Perceptron, Adaline and Madaline, Learning & Training in ANN, Hopfield Neural Network, Self-Organizing Networks, Recurrent Networks, Associative memories

Unit-III: Fuzzy Logic System
Crisp Vs Fuzzy set theory, Membership functions, Fuzzy set operations, Fuzzy rules, Mamdani and Sugeno fuzzy inference systems, Defuzzification methods

Unit-IV: Artificial Neural Networks
Introduction and biological background of GA, String Encoding of chromosomes, Selection methods, Single & multi-point crossover operation, Mutation, Adjustment of strategy parameters such as Population size, Mutation & Crossover probabilities

Unit-V: Tools & Applications
MATLAB Toolboxes: Fuzzy Logic Toolbox, Neural Network Toolbox, FLS for Antilock Breaking System (ABS), GA in route planning for Travelling Sales Person, Time-Series forecasting using ANN

Reference Books:
1. Jacek M. Zurada – Introduction to Artificial Neural Systems
3. John Yen, Reza Langari – Fuzzy Logic Intelligence, Control, and Information
BTEC 912 Speech & Image Processing

Internal Marks: 40
External Marks: 60
Total Marks: 100

Unit-I Introduction to Image Processing

Historical background, visual perception, image formation, Elements of Storage, sampling & Quantization, Relationships between pixels-neighbors of pixel, connectivity labeling of connected components, Relations, equivalence and Transitive closure, Distance measures, Arithmetic/ Logic operation, Imaging Geometry Basic and perspective transformation stereo imaging, application of image Processing.

Unit-II Image Enhancement

Spatial and frequency domain methods point processing, intensity transformation, Histogram processing image substation and Averaging spatial filtering, LP, HP and homo-morphic felling, generation of spatial marks, Color image processing.

Unit-III Image Compression

Redundancy models, error free compression, Lossy compression, Image compression standards.

Unit-IV Image Segmentation

Detection of Discontinuity, Edge detection, Boundary detection, Thresholding, Regional oriented segmentation, use of motion in segmentation.

Unit-V Speech Processing

Review of human speech and Acoustic theory, nature of sound, harmonics, resonance measurement, virtual display. Music theory, pitch, duration, intervals, rhythm. Human speech production, the vocal tract, the Larynx, the source filter. Speech signal processing-the phasor mode, Fourier transfer, DFT, FFT. The hardware use of FIR & IIR filters. Software, Elements of speech Synthesis-speech Recognition-speech in the computer-human interface.

Reference Books:

4. Speech and Audio Processing for multimedia PC’s - by Iain Murray
BTEC 91 Human Resource Management

Internal Marks: 40
External Marks: 60
Total Marks: 100

Unit-I Introduction to Human Resource

Definition, Role and Functions of Human Resource Management, Concept and Significance of HR, Changing role of HR managers, HR functions and Global Environment, role of a HR Manager.

Unit-II Human Resources Planning


Unit-III Training and Development

Principles of Training, Employee Development, Need for skill up gradation, Assessment of training needs, Retraining and Redeployment methods and techniques of training employees and executives, performance appraisal systems Career Development & Planning.

Unit-IV Job analysis, Design and Satisfaction

Job Analysis: Job Description & Job Description, Job Specification, Job satisfaction and its importance; Motivation, Factors affecting motivation, introduction to Motivation Theory; Workers ’ Participation, Quality of work life.

Unit-V Industrial Relations

Factors influencing industrial relations, State Interventions and Legal Framework, Role of Trade unions, Collective Bargaining, Worker’s participation in management.

Reference Books:

1. T.N.Chhabra- Human Resource Management (Dhanpat Rai & Co.).
BTEC 914 Computer organization and Architecture

Unit-I Introduction


Unit-II Internal and Cache Memory


Unit-III Basic non pipelined CPU Architecture and Operating System

CPU Architecture types (accumulator, register, stack, memory/register) detailed data path of a typical register based CPU, Fetch-Decode-Execute cycle (typically 3 to 5 stage), microinstruction sequencing, implementation of control unit, Enhancing performance with pipelining, Operating System Overview, Scheduling, Memory Management, Pentium Memory Management.

Unit-IV Parallel Processing and Multi-core Computer


Reference Books:

BTIT 504 Cyber Law & IPR

Unit Marks: 40
External Marks: 60
Total Marks: 100

Unit-I Basics of Computer & Internet Technology

Internet, ISP & domain name; Network Security; Encryption Techniques and Algorithms; Digital Signatures

Unit-II Introduction to Cyber World
Introduction to Cyberspace and Cyber Law; Different Components of cyber Laws; Cyber Law and Netizens.

Unit-III E-Commerce
Introduction to E-Commerce; Different E-Commerce Models; E-Commerce Trends and Prospects; E-Commerce and Taxation; Legal Aspects of E-Commerce.

Unit IV- Intellectual Property Rights
IPR Regime in the Digital Society; Copyright and Patents; International Treaties and Conventions; Business Software Patents; Domain Name Disputes and Resolution.

Unit V- IT ACT 2000
Aims and Objectives; Overview of the Act; Jurisdiction; Role of Certifying Authority; Regulators under IT Act; Cyber Crimes-Offences and Contraventions; Grey Areas of IT Act.

Unit VI- Project Work
Candidates will be required to work on a project. At the end of the course students will make a presentation and submit the project report.

Reference Books:

2. Law and practice of intellectual property in India by Vikas Vashishth
3. Intellectual property- patents, copyrights, trademarks and allied rights by Cornish W R
4. Keith Merill & Deepti Chopra (IK Inter.), Cyber Cops, Cyber Criminals & Internet
Vakul Sharma (Mc Millian), Handbook of Cyber Laws
BTEC-915 Electromagnetic Interference & Compatibility

Internal Marks : 40
External Marks : 60
Total Marks : 100

Unit-I Overview of EMI/EMC:

Electromagnetic environment, History, Concepts and definitions, Overview of EMI/EMC, Natural and Nuclear sources of EMI, conducted and radiated EMI, Transient EMI, Time domain Vs Frequency domain EMI, Units of measurement parameters.

Unit-II EMI Coupling Principles:

Electromagnetic emissions, noise from relays and switches, Nonlinearities in circuits, passive inter-modulation, cross talk in transmission lines, transients in power supply lines, Conducted, Radiated and Transient Coupling, Common Impedance Ground Coupling, Radiated Common Mode and Ground Loop Coupling, Radiated Differential Mode Coupling, Cable to Cable Coupling, Power Mains and Power Supply coupling.

Unit-III Radiated and Conducted Interference Measurements:

EMI Test Instruments/ Systems, Anechoic chamber, TEM cell, GH TEM Cell, characterization of conduction currents/voltages, conducted EM noise on power lines, conducted EMI from equipment, Immunity to conducted EMI, detectors and measurements, EMI Shielded Chamber, Open Area Test Site, TEM Cell, Sensors/ Injectors/ Couplers, Test beds for ESD and EFT.

Unit-IV EMI Control Techniques:


Reference Books:
BTECH-916  Neural Networks And Fuzzy Logic

Internal Marks: 40  L  T  P
External Marks: 60  3  1  0
Total Marks: 100

Unit-I: Introduction To Neural Networks
Human brain and Biological Neuron, Artificial Neural Network, ANN Terminology, McCulloch-Pitts Neural Model, Activation functions, Topology, Feedforward Neural Networks, ANN Learning: Supervised, Un-supervised, Competitive learning, Reinforcement learning, Knowledge representation.

Unit-II: Hopfield Neural Model
Learning Laws:- Hebb’s rule, Delta rule, Widrow & Hoff LMS learning rule, Correlation learning rule, Instar and Outstar learning rules, Back-propagation Neural Networks, K-means clustering algorithm, Kohenen’s feature maps, Associative Memories

Unit-III: Radial Basis Neural Networks
Function Neural Networks, Basic learning laws in RBF Nets, Recurrent Networks, Recurrent Back-propagation, Counter-Propagation Networks, CMAC Networks, ART Networks.

Unit-IV: Fuzzy Logic Sets & System

Reference Books:
2. Yagna Narayanan – Artifical Neural Networks
3. Bart Kosko – Neural Networks & Fuzzy logic
4. Simon Haykin – Neural Networks
BTEC 917 Robotics

Internal Marks: 40
External Marks: 60
Total Marks: 100

L     T      P
3      1      0

Unit-I Introduction
Definition and Need for Robots, Robot Anatomy, Co-ordinate Systems, Work Envelope, types and classification, Specifications, Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load, Robot Parts and Their Functions, Different Applications

Unit-II Sensors

Unit-III Drive Systems & Grippers for Robot
Drives systems (Mechanical, Electrical, Pneumatic Drives, Hydraulic), D.C.Servo Motors, Stepper Motor, A.C. Servo Motors, Comparison of all Drives, End Effectors, Grippers (Mechanical, Pneumatic, Hydraulic, Magnetic, Vacuum Grippers), Two Fingered and Three Fingered Grippers, Internal Grippers and External Grippers, Selection and Design Considerations

Unit-IV Machine Vision

Unit-V Robot Kinematics & Programming
Forward Kinematics, Inverse Kinematics and Differences; Forward Kinematics and Reverse Kinematics of Manipulators with Two, Three Degrees of Freedom (In 2 Dimensional), Four Degrees of Freedom (In 3 Dimensional), Deviations and Problems Teach Pendant Programming, Lead through programming, Robot programming Languages, VAL Programming, Motion Commands, Sensor Commands, End effector commands.

Reference Books:
BTEC 918 Operation Research

Internal Marks: 40  L  T  P  3  1  0
External Marks: 60
Total Marks: 100

Unit-I Introduction to Operations Research
Definition, scope, objectives, phases, models and limitations of Operations Research, Linear Programming Problem, Formulation of LPP, Graphical solution of LPP, Simplex method, slack, surplus and artificial variables, Concept of duality, big-M method two phase method, dual simplex method, degeneracy and unbound solutions, procedure for resolving degenerate cases.

Unit-II Transportation Problem
Formulation of transportation model, Optimality Methods, Unbalanced transportation problem, Basic feasible solution, Northwest corner rule, least cost method, Vogel’s approximation method, Applications of Transportation problems, Assignment Problem, Formulation, unbalanced assignment problem, Traveling salesman problem, Optimality test, the stepping stone method, MODI method.

Unit-III Sequencing Models
Johnsons algorithm, Processing n Jobs through 2 Machines, Processing n Jobs through 3 Machines, Processing 2 Jobs through m machines, Processing n Jobs through m Machines, Graphical solutions priority rules.

Unit-IV Dynamic programming
Characteristics of dynamic programming, Dynamic programming approach for Priority Management employment smoothening, capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems.

Unit-V Games Theory
Competitive games, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. Solution of games with saddle points, dominance principle. Rectangular games without saddle point – mixed strategy for 2 X 2 games.

Reference Books:
BTEC 919 Mobile Computing

Internal Marks: 40
External Marks: 60
Total Marks: 100

Unit-I Introduction
Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems

Unit II Mobile Network & Transport Layer
Mobile IP Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, Dynamic Host Configuration Protocol (DHCP), Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

Unit III Wireless Networking

Unit III Mobile Ad hoc Networks
Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment, Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

Reference Books:
2. Raj Pandya, Mobile & Personal Communication Systems and Service, PHI.
BTEC 920 Wireless Sensor Network

Internal Marks: 40  
External Marks: 60  
Total Marks: 100

Unit-I Introduction to Wireless Sensor Networks

Constraints and Challenges of sensor networks, Emerging technologies for wireless sensor networks, Node architecture, Hardware components overview, Energy consumption of Sensor nodes, Dynamic energy and power management on System level, some examples of Sensor nodes, Optimization goals and figures of merit, QOS, Energy Efficiency, scalability, robustness Advantages of sensor networks, Sensor network applications.

Unit-II Topology Control

Location driven, Geographic Adaptive Fidelity (GAF), Geographic Random Forwarding (GeRaF), GEAR, Connectivity driven, SPAN, ASCENT.

Unit-III WSN Sensors


Unit-IV WSN Platforms & Tools

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

Reference Books:

BTEC 921 Numerical Methods

Internal Marks: 40  L T P
External Marks: 60   3 1 0
Total Marks: 100

Unit-I Errors in Numerical Calculation

Unit-II Solution of Equations

Unit-III Interpolation
Interpolation: Finite differences, difference tables, Newton’s forward and backward interpolation, Lagrange’s and Newton’s divided difference formula for unequal intervals, Numerical differentiation, Numerical integration: Newton-Cotes formula, Trapezoidal, Simpson’s one third and three-eight rules.

Unit-IV Numerical Solution of Ordinary Differential Equations

Reference Books: