School of Engineering & Technology
MATS University
Raipur

Syllabus Scheme
(3rd to 8th Semester)

For
Bachelor of Engineering
In
Electronics & Communication Engineering

Scheme of Teaching & Examination
III Semester Electronics & Communication Engineering

S.no.	Subject Name	Code	Scheme of marks				
			L	P	ESE	IM	Total Marks
1.	Engg. Mathematics - III	BE330	5	-	70	30	100
2.	Network Analysis & Synthesis	BE331	5	-	70	30	100
3.	Analog Circuit	BE332	5	-	70	30	100
4.	Electronic Measurement & instruments	BE333	5	-	70	30	100
5.	Electronic Material & components	BE334	5	-	70	30	100
6.	Programming with C	BE335	5	-	70	30	100
7.	Programming with C Lab	BE336	-	3	20	30	50
8.	Analog Circuit Lab	BE337	-	3	20	30	50
9.	Electronic measurement & instrumentation Lab	BE338	-	3	20	30	50
10.	Network Analysis & synthesis Lab	BE339	-	3	20	30	50

L-Lecture, P - Practical, ESE- End Semester Examination, IM- Internal Marks

MATS UNIVERSITY

Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Engineering Mathematics –III
Total Theory Periods	:	40
Code	:	BE330

UNIT-1
FOURIER SERIES
Periodic functions, Euler's formula, Dirichlet conditions, change of interval, Even and odd functions, half range Fourier series, Parseval's identity, Practical harmonic analysis.

UNIT-2
PARTIAL DIFFERENTIAL EQUATION
Formation, Solution of PDE by direct integration method, Linear PDE of first order, Homogeneous linear equations with constant coefficients, Non-homogeneous linear P.D.E., Solution of PDE by method of separation of variables.

UNIT-3
COMPLEX VARIABLES
Limit and derivative ,Analytic functions , Cauchy-Riemann equations, Harmonic functions, Flow problems, Complex integration, Cauchy's theorem, Cauchy integral formula, Taylor& Laurent series, Singularities, Residues, Cauchy's residue theorem, Evaluation of real definite integrals.

UNIT-4
FOURIER TRANSFORM
Definition of Fourier integrals- Fourier sine and cosine integrals, Complex form of Fourier integral , Fourier sine and cosine transform, complex form of Fourier transform , linearity , shifting and scaling properties , modulation theorem , inverse Fourier transform , Fourier transform of derivatives.

UNIT-5
CORRELATION AND REGRESSION
Linear correlation, Measure of correlation, Karl Pearson coefficient of correlation, Spearman's rank correlation coefficient, bivariate frequency distribution, Regression, lines of regression, and coff. of regression, Standard error estimate.

TEXT BOOKS:-

1. Higher Engg. Mathematics by Dr.B.S.Grewal - Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig - John Wiley &Sons.

REFERENCE BOOKS :-

1. Advanced Engg.Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. 2.Applied Mathematics by P.N.Wartikar & J.N. Wartikar. Vol- II– Pune Vidyarthi Griha Prakashan,Pune.

MATS UNIVERSITY

Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Network Analysis & Synthesis
Total Theory Periods	:	40
Code	:	BE331

UNIT-1

CIRCUITS CONCEPTS: CIRCUITS ELEMENTS

R, L, C and their characteristics in terms of linearity and time dependence, KCL and KVL analysis, analysis of magnetically coupled circuits, Dot convention, coupling co-efficient, Series and parallel resonance, Independent and dependent sources, signals and wave forms; step, ramp, impulse, network theorem, Superposition, thevenin's , Norton's maximum power transfer, Reciprocity theorem, principle of duality.

UNIT-2

LAPLACE TRANSFORMATION & ITS APPLICATION IN CIRCUIT ANALYSIS: Introduction, Laplace Transformation, Laplace Transform of a Derivative df(t) /dt, Laplace Transform of an Integral, Laplace Transform of Common Forcing Function, Initial And Final Value Theorem, Convolution, Application of Laplace Transformation technique in Electric Circuit Analysis, Partial Fraction Expansion Method, Step Response of RL, RC Circuits, Impulse Response of Series RC, RL Network, Response of RL Circuit with Pulse Input, Pulse Response of Series RC Circuit, Step Response of RLC Series Circuit.

UNIT-3

TWO PORT NETWORK ANALYSIS: Introduction Z parameters ,Y-parameters, hybrid parameter ABCD parameters condition of reciprocity and symmetry in two port parameters presentation interrelationship between parameters of two port network Expression of input and output impedance in terms of two port parameter ladder network equivalent T and Ω section representation in parametric form.

UNIT-4

NETWORK GRAPH THEORY: Introduction, Concept of Network Graph, Terminology Used in Network Graph, Properties of Tree in a Graph, Formation of Incidence Matrix, Properties of Incidence Matrix, Number of Tree in a Graph, Cut Set Matrix, Tieset Matrix, Fundamental Tieset Matrix, Fundamental Cutset Matrix.

UNIT-5

NETWORK SYNTHESIS: Concept of Stability of a System from Pole Zero Concept, Necessary condition of Stability of a Network Function, Hurwitz Polynomial, Properties of Hurwitz Polynomials, Positive Real Function, Concept of Network Synthesis, Reactive Network, Driving Point Immitance of LC Network, LC Network Synthesis, Foster and Caurr form, RC and RL Network Synthesis By Foster and Caurr form.

TEXT BOOKS:

1. Network analysis & synthesis by Van Valkenberg
2. Network analysis & synthesis by Sudhakar sham Mohan

REFERENCE BOOKS:

1. Network synthesis by IVS Iyer
2. Electric circuit by JA A dminster
3. Circuit theory by A chakraborty

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Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Analog Circuit
Total Theory Periods	:	40
Code	:	BE332

UNIT-I

LOW FREQUENCY TRANSISTOR AMPLIFIER: Graphical Analysis of CE amplifier; h-parameter Models for CB, CE, CC configurations and their Interrelationship; Analysis and Comparison of the three Configurations; Linear analysis of Transistor Circuits: Miller's Theorem: Cascading: Simplified Models and Calculation of CE and CC Amplifiers; Effect of emitter Resistance in CE amplifiers: Cascade amplifiers: Darlington Pair, analysis of Single stage FET amplifier-CS and CD Configuration, FET as VVR.

UNIT-II

HIGH FREQUENCY TRANSISTOR AMPLIFIERS: CE hybrid-model: Validity and parameter, Variation: Current Gain with Resistive load: frequency response of a single stage CE Amplifier: Gain-Bandwidth product.

LARGE SIGNAL AMPLIFIER: Analysis and design of class A, B, AB, C amplifiers, push-pull amplifiers, transformer less output stages, distortion calculations.

UNIT-III

MULTISTAGE AMPLIFIERS: Classification: Distortion in Ampli1iers: Frequency Response: Bode plots: Step Response: pass band of Cascaded Stages: Response of a Two-stage RC Coupled Amplifier at Low and high frequencies: Multistage amplifiers: Sources of Noise in Transistor Circuits, Noise Figure.

UNIT-IV

TUNED AMPLIFIER: General behavior of tuned amplifiers, Advantages and disadvantages of tuned amplifiers, Application of tuned amplifiers, Single tuned amplifiers, voltage gain & frequency response of single tuned amplifiers, double tuned amplifiers, staggered tuned amplifier.

UNIT-V

FEEDBACK AMPLIFIERS: Classification: Feedback concept; Ideal Feedback amplifier: Properties of Negative Feedback Amplifier Topologies: Method of Analysis of Feedback amplifiers: Voltage series Feedback: Voltage series Feedback pair: Current series, Current shunt and Voltage shunt feedback; Effect of feedback on amplifier Bandwidth and stability.

OSCILLATOR: Sinusoidal oscillator: phase shift oscillators, Wien Bridge oscillator: Resonant circuit oscillators: LC Collpit & LC Hartley, Amplitude Frequency and phase stability analysis of all Oscillators, General form of Oscillator Configuration; Crystal oscillator.

TEXT BOOKS:

1. Integrated Electronics – Millman & Halkias, TMH.
2. Microelectronics – Millman and Grabel, TMH.

REFERENCE BOOKS:

1. Electronic Devices & Circuits – David A. Bell, PHI
2. Electronic Devices & circuit theory by R. Boylestad
3. Electronic Devices & Circuit by G.K.Mittal
4. Electronic Devices & circuit-II by A.P. Godse & U.A. Bakshi

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Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Electronic Measurement & Instrumentation
Total Theory Periods	:	40
Code	:	BE333

UNIT-1

PERFORMANCE CHARACTERISTICS OF INSTRUMENT: Need of measurement, Classification of electronic instruments, Selection of Instruments, Static characteristics: Accuracy, Resolution, Precision, Expected value, Error, Sensitivity, Error in measurements, Dynamics Characteristics: Speed of response, Fidelity, Lag & dynamic error, Zero Order, first order and second order systems & their response, Error & corrections, standards, calibration, loading effects.

UNIT-2

ERROR ANALYSIS: Types of errors, Methods of error analysis, uncertainty analysis, statistical analysis.

AC BRIDGES: Maxwell's bridge (Inductance and Inductance-Capacitance), Hay's bridge, Schering bridge (High voltage and Relative permittivity), Wein bridge.

DC & AC MEASUREMENT: DC measurements, DC voltmeter, Ammeter ohmmeter, digital type voltmeter, Ammeter ohmmeter, AC measurement, Ammeter, ohmmeter, AC voltmeter using rectifier, true RMS voltmeter, Digital VOM meter.

UNIT-3

TRANSDUCERS: Principles and classification of transducers, guidelines for selection and application of transducers, basic requirements of transducers. Different types of transducers, displacement, strain gauge, LVDT & RVDT, potentiometer, capacitive & inductive, Temperature Transducer- Resistance Temperature Detector (RTD), Thermistor, Thermocouple, Piezo-electric transducer, Optical Transducer- Photo emissive, Photo conductive, Photo voltaic, Photo-diode, Photo Transistor, Nuclear Radiation Detector.

UNIT-4

ELECTRONIC INSTRUMENTS: Signal generator: fix & variable, Telemetry &Remote sensing, GIS (Geographical Information System), AF oscillator, AF sine & square wave signal generator, function generator, Sweep frequency generator, frequency; Wave analyzer, Spectrum analyzer.

UNIT-5

INDICATING AND RECORDING SYSTEMS: Digital R-L-C meters, digital frequency Meter& Universal Counter. X-Y & X-T recorders, General-purpose Oscilloscopes, Delayed Time Base, Sampling and Digital Storage types, Protocol analyser, Instruments used in medical ECG, scanner.

TEXT BOOKS:

1. Electronic Instrumentation& Measurement by WilliamD Cooper & Albert C.Helfric,PHI Pub.
2. Instrumentation, Measurement& Analysis by K K Chaudhury& R C Nakra,TMH

REFERENCE BOOKS:

1. Instruments & Measurement for Electronic by Clyde N.Herrick
2. Instrumentation, Measurement& Feedback by Barry Jones,PHI

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Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Electronic Material & Components
Total Theory Periods	:	40
Code	:	BE334

UNIT – I

DIELECTRIC PROPERTIES OF INSULATORS: Static field, static dielectric constant; Polarization; Dielectric constant of monatomic gases; Dielectric constant of solids, properties of Ferro electric material; spontaneous polarization piezoelectricity; **Alternating fields**, Electronic and ionic polarizability, frequency Dependence, complex dielectric constant of non-dipolar solids, dipolar relaxation and dielectric losses.

UNIT – II

MAGNETIC PROPERTIES OF MATERIALS: Summary of Concepts pertaining to Magnetic Fields; Magnetic Dipole moment of a Current Loop; Magnetization; Orbital Magnetic Dipole Moment and Angular Moment of Two Simple Atomic Models; Lenz's: Induced Dipole Moment, Classification of Magnetic Materials: Diamagnetism, paramagnetism, ferromagnetism .Origin of Permanent Magnetic Dipole in matter: Paramagnetic Spain System: Properties of Ferromagnetic Materials: Spontaneous Magnetization and Curie-Weiss Law; Ferromagnetic Domains and Coercive Forces; Anti Ferromagnetic and Ferrimagnetic Materials.

UNIT - III

CONDUCTION IN SEMICONDUCTOR: Semiconductors materials**,** Energy band theory of crystals insulators. Semiconductors and metals mobility and conductivity: energy distribution of in a metal; Fermi Dirac distribution; density of states, electron emission from a metal. Electron and holes; carrier concentration in intrinsic semiconductors; donor and acceptor impurities; Fermi level in extrinsic semiconductors; conductivity modulation; generation and recombination of charges; diffusion; continuity equation; injected minority charges , potential variation in a graded semiconductors.

UNIT – IV

CONDUCTION IN METALS: Ohm's law & ohmic contact, Free electron theory of metals , factors affecting electric conductivity of metals, Relaxation time ,Collision Time and Mean Free Path; Electron Scattering & Receptivity of Metals; Heat Developed in Current Carrying Conductors; Thermal Conductivity of Metals, super conductivity.

UNIT – V

COMPONENTS: Various types of resistors, capacitance, inductors & packaging**,** Resistances: Resistive Elements: Terminals and Protective Means: Characteristics of Resistor,Characteristics of Different Capacitors and Their Selection Factors: Variable Capacitors: Precision Variable Capacitors: General Purpose Variable Capacitors: Trimmers: Characteristics of Electronics power Transformers and Audio Transformers: Design Consideration: Low and High Frequency Equivalent Circuits of Audio Transformers; High Frequency Equivalent Circuits of Components.

TEXT BOOKS:

1. Electrical Engineering Materials – A.J. Dekker, PHI.
2. Electronic Engineering Materials and Devices – John Allison, TMH

REFERENCE BOOKS:

1. Integrated Electronics – Millmann & Halkias, TMH
2. A Monograph on Electronics Design Principals:N.C. Goyal & R.K. Khetan Khanna Publisher
3. Electrical Engineering Materials – S.P. Seth & P.V. Gupta, Dhanpat Rai Publications

MATS UNIVERSITY

Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Programming with C
Total Theory Periods	:	40
Code	:	BE335

UNIT – 1

INTRODUCTION TO C LANGUAGE : History and development .C compilers. Data types, types of instructions, input/output functions. Operators , precedence and associativity of operators. Type casting, Developing simple programs , compilation , debugging and testing of programs. Relevance of C language.

UNIT – II

CONDITIONAL CONSTRUCTS: if statement , if-else statements , nested if-else ,forms of if. Conditional operator, Switch case construct .Loop control structures ,nested loops,break and continue statements. goto statement. Arrays : Syntax and definition, one and multidimensional arrays, readind and writing an array. Pointers and arrays.

UNIT – III

FUNCTIONS: Declaring and defining functions ,storage classes ,call by value, introduction to pointer data type ,call by reference, using library functions in programs, macro definitions. Preprocessor directives - #if, #elif, #define etc. Passing arrays into functions. Recursion.

UNIT – IV

STRINGS: reading and writing strings, passing a string into a function, using library functions to manipulate strings. Array of strings. Structures: Declaring and using structures. Array of structures, passing structures into function. Unions and enums, Pointers to structures Bit fields.

UNIT – V

FILE HANDLING: reading and writing text files though C programs . File manipulating functions : fputc,fgetc, fgets, fputs, fseek, ftell etc. Working with Binary files , fread and fwrite. Command line arguments. Bitwise operators in C.

TEXT BOOKS:

1. Let us C – Yashwant Kanetkar BPB Publication
2. Programming in ANSIC – E. Balaguruswamy Tata Mc-Gcraw Hill

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Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Programming with C Lab
Code	:	BE336

LIST OF EXPERIMENTS:-

1. Write a program to take the radius of a sphere as input and print the volume and surface & surface area of that sphere.
2. Write a program to take a 5-digit number as input and calculate the sum of its digits.
3. Write a program to take three sides of a triangle as input and verify whether the triangle is an isosceles, scalene or an equilateral triangle.
4. Write a program that will take 3 positive integers as input and verify whether or not they form a Pythagorean triplet or not.
5. Write a program to print all the Prime numbers between a given range.
6. Write a program to define a function that will take an integer as argument and return the sum of digits of that integer.
7. Write a program to define a macro that can calculate the greater of two of its arguments. Use this macro to calculate the greatest of 4 integers.
8. Write a program to define a recursive function that will print the reverse of its integer argument.
9. Write a program to print the sum of first N even numbers using recursive function.
10. Write a program to sort an array using Bubble sort technique.
11. Write a program that will take the elements of two integer arrays of 5 element each, and insert the common elements of both the array into a third array (Set intersection).
12. Write a program to take 5 names as input and print the longest name.
13. Write a program to define a structure Student that will contain the roll number, name and total marks of a student. The program will ask the user to input the details of 5 students and print the details of all the students whose total marks is greater than a given value.
14. Write a program to define a union Contact that will contain the members Mobile no and E-mail id. Now define a structure Employee that will contain name, roll number, mode of contact (mob/e-mail) and a variable of type Contact as members. The program will ask the user to give the details of two Employees including mode of contact and the contact num/ E-mail. Print the details of both the Employees.
15. Write a program that will ask the user to input a file name and copy the contents of that file into another file.
16. Write a program that will take any number of integers from the command line as argument and print the sum of all those integers.

TEXT BOOKS:

1. Let us C – Yashwant Kanitkar BPB Publication
2. Programming in ANSI C – E. Balaguruswamy Tata Mc-Gcraw Hill

MATS UNIVERSITY

Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Analog Circuit Lab
Code	:	BE337

LIST OF EXPERIMENTS:-

1. Static input and output characteristics curves of CE transistor.
2. Static input and output characteristic curve of CB transistor.
3. To design and study the frequency response of single stage CE transistor amplifier.
4. To study the frequency response of RC coupled double stage CE transistor amplifier.
5. To study the frequency response of RC coupled double stage CE transistor amplifier with voltage feedback.
6. To study the frequency response of RC coupled double stage CE transistor amplifier with current feedback.
7. To plot the voltage gain vs. load characteristics of common collector (emitter follower) n-p-n Transistor.
8. To study Wien- Bridge Oscillator.
9. Experiment with emitter follower a voltage series feedback amplifier.
10. General study of push pull audio power amplifier.
11. To study RC phase shift oscillator.
12. Study of various topologies of feedback amplifier.
13. Experiment with Darlington pair amplifier.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Analog Trainer Kit, Patch Cords, Power Supply, CRO, Function Generator, Multimeter.

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Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Electronic Measurement & Instrumentation Lab
Code	:	BE338

LIST OF EXPERIMENTS:-

1. To Measure Resistance by Wheat Stone Bridge.
2. To Measure Resistance by Kelvin's Doubble Bridge.
3. To Measure unknown Inductance by Maxwells Inductance Capacitance Bridge.
4. To Measure unknown Inductance by Hay's Bridge.
5. To To Measure unknown Inductance by Anderson's Bridge.
6. To Measure Capacitance of coil by Shearing Bridge.
7. To measure a displacement using LVDT .
8. To study strain Gauge.
9. Measure a Temperature using Thermocouple & Transducer.
10. To study the characteristics of LDR, Photo-diode and Phototransistors
11. To measure a Temperature using Thermistor Transducer.
12. Measurement of temperature through RTD Transducer.
13. To study CRO.
14. To study DVM.
15. To study characteristics of Photovoltic & Photo conductive cell.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Trainer Kit, Patch Cords, Power Supply, CRO, Function Generator, Multimeter.

MATS UNIVERSITY

Semester	:	3rd BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Network Analysis & Synthesis Lab
Code	:	BE339

LIST OF EXPERIMENTS:-

1. To calculate & verify the Q factor of a given RL series circuit.
2. To calculate & verify the Q factor of a given RC series circuit.
3. To calculate & verify the *fo* factor of a given RLC series / parallel circuit.
4. To calculate & verify the *fo*, Q factor of a given RLC parallel circuit
5. For a given equivalent circuit by applying source transformation theory find V_o (Thevenin's equivalent circuit).
6. For a given equivalent circuit by applying source transformation theory find i_o (Norton's equivalent circuit).
7. For a given equivalent circuit select a appropriate dual network (duality property).
8. To calculate & verify the value of **do* for a given equivalent circuit by superposition theorem.
9. To analyze the pulse response of a series RL circuit.
10. To analyze the pulse response of a series RC circuit.
11. To analyze the impulse response of a series RC circuit (Low pass filter).
12. To analyze the impulse response of a series CR circuit (High pass filter).
13. To analyze the impulse response of a band pass filter.
14. To calculate the value of impedance by applying Millman theorem and also satisfy the condition of duality for Millman theorem.
15. For a given Two-port network calculate Z & Y parameter
16. For a given Two-port network calculate ABCD (Transmission)
17. For given Two-port network calculate h (hybrid) parameter & g (inverse hybrid) parameter.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Trainer Kit, Patch Cords, Power Supply, CRO, Function Generator, Multimeter.

Scheme of Teaching & Examination
IV Semester Electronics & Communication Engineering

S.no.	Subject Name	Code	Scheme of marks				
			L	P	ESE	IM	Total Marks
1.	Engg. Mathematics – IV	BE430	5	-	70	30	100
2.	Electrical Machines	BE431	5	-	70	30	100
3.	Signals & Systems	BE432	5	-	70	30	100
4.	Electromagnetic Field theory	BE433	5	-	70	30	100
5.	Linear Integrated Circuit	BE434	5	-	70	30	100
6.	Digital Electronics	BE435	5	-	70	30	100
7.	Programming with C++ lab	BE436	-	3	20	30	50
8.	Linear Integrated Circuit lab	BE437	-	3	20	30	50
9.	Electronics Workshop	BE438	-	3	20	30	50
10.	Digital Electronics lab	BE439	-	3	20	30	50

L-Lecture, P - Practical, ESE- End Semester Examination, IM- Internal Marks

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Engineering Mathematics-IV
Total Theory Periods	:	40
Code	:	BE430

UNIT-1

SERIES SOLUTION OF DIFFERENTIAL EQUATION AND SPECIAL FUNCTIONS: Series solution of differential equations, the method of Frobenius, Bessel's differential equation, Bessel's function of the First Kind, Recurrence relations, generating function, orthogonality, Legendre's differential equation, Legendre's polynomial-Rodriguez's formula, generating function, recurrence relations, orthogonality.

UNIT-2

APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS: Initial &boundary value problems, Vibrations of a stretched string , D'Alembert's solution, One dimensional heat flow, Transmission of signals along a cable-Telephone equation, Telegraph & radio equation.

UNIT-3

Z-TRANSFORM: Sequence, Basic operations on sequences, definition of Z-transform , Linearity , Change of scale & shifting properties, Z-transform of standard sequences, Inverse Z-transform , multiplication by n and division by n, Initial value and final value theorems, Convolution of sequences, Convolution theorem, inverse Z-transform by partial fraction, power series and residue methods, Application to solution of difference equations.

UNIT-4

RANDOM VARIABLE & PROBABILITY DISTRIBUTIONS: Random variable, discrete and continuous probability distributions, Mathematical Expectation, Mean and variance, Moments and moment generating function, Probability distributions-Binomial, Poisson and Normal distributions.

UNIT-5

NUMERICAL SOLUTION OF ORDINARY & PARTIAL DIFFERENTIAL EQUATIONS

Numerical solution of ODE's by Taylor's series method, Picard's method, Euler's method, Euler's modified method, Runge –Kutta methods, Predictor-corrector methods-Milne's method, Adams-Bashforth method.

Numerical solution of PDE's : Classifications of second order PDE, Elliptic equations , solution of laplace equations, solution of poissons equation, Solution of elliptic equation by relaxation method, Parabolic equations, solution of one dimensional and 2-D heat equations, hyperbolic equation, Wave equations.

TEXT BOOKS:

1. Higher Engg. Mathematics by Dr.B.S.Grewal-Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig-John Wiley &Sons.

REFERENCE BOOKS:

1. Advanced Engg.Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.
2. Applied Mathematics by P.N.Wartikar & J.N. Wartikar. Vol- II– Pune Vidyarthi Griha Prakashan,Pune.
3. Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH.

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Electrical Machine
Total Theory Periods	:	40
Code	:	BE431

UNIT-1

TRANSFORMER: Construction, Operating principles of single phase & three phase transformer, Emf equation, Phasor diagram, Equivalent circuit, Different transformer connections and their vector groups, Scott connection, Paralleling of single phase and three phase transformer, Testing of transformers, Auto Transformers.

UNIT-2

DC MACHINES: Construction of DC machines. Operating principles of DC generator, Emf equation, Different excitation systems, Armature reaction, Commutation, Characteristics of separately excited and self-excited generators, Voltage regulation, Parallel operation of DC generators, Operating principles of DC motors, Torque equation, Characteristics of separately excited and self-excited motors, Testing of motors, Starting and speed control of DC motors, Speed regulation.

UNIT-3

ALTERNATOR

Construction, Principle of operation, single phase & poly-phase winding pitch and distribution factor, emf equation, phasor diagram, synchronous reactance & impedance, voltage regulation by synchronous impedance methods.

UNIT-4

PHASE INDUCTION MOTORS

Construction, Principle of operation, wound rotor and squirrel cage type rotors, equivalent circuit diagram, phasor diagram, torque-slip characteristics, Methods of starting & speed control of induction motors, losses, efficiency.

UNIT-5

SYNCHRONOUS MOTOR AND DRIVES

Construction and principle of operation, phasor diagram, effect of excitation on power factor, synchronous condenser, methods of starting of synchronous motors, construction and starting methods of single phase induction motor, servo motor.

TEXT BOOKS:

1. I.J. Nagrath and D.P. Kothari, "Electric Machines", Tata McGraw Hill
2. B.L. Thareja, "Text Book of Electrical Technology Vol. II", S. Chand Publication

REFERENCE BOOKS :

1. P.S. Bhimra, "Electric Machinery", Khanna Publications.
2. P.K. Mukherjee, S. Chakraortyi, "Electric Machinery", Dhapat Rai Publications.
3. Fitzgerald, Kingsley and Umans, "Electric Machinery" Tata McGraw Hill.

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Signals & Systems
Total Theory Periods	:	40
Code	:	BE432

UNIT – I

CLASSIFICATION OF SIGNALS & SYSTEMS:

Definition, types of signals and their representations: Continuous-time/discrete-time, periodic/non-periodic, even/odd, energy/power, deterministic/ random, one-dimensional/multidimensional; commonly used signals (in continuous-time as well as in discrete-time): unit impulse, unit step, unit ramp (and their interrelationships), exponential, rectangular pulse, sinusoidal, Classification of discrete time systems: Static & Dynamic, Causal & Non-causal, Time Invariant & Time variant, Linear & Non-linear, Stable & Unstable systems.

UNIT – II

CONTINUOUS TRANSFORMS (FOURIER & LAPLACE):

(i) Definition, conditions of existence of FT, properties, magnitude and phase spectra, Some important FT theorems, Parseval's theorem, Inverse FT, relation between LT and FT (ii) LT of some common signals, important theorems and properties of LT, inverse LT, solutions of differential equations using LT, Regions of convergence (ROC) .

UNIT – III

DISCRETE TRANSFORMS (Z.DFT,DTFT):

(i) One sided and Bilateral Z-transforms, ZT of some common signals, ROC, Properties and theorems, solution of difference equations using one-sided ZT, s- to z-plane mapping.

(ii) Discrete Fourier transform (DFT), Discrete Time Fourier Transform (DTFT), inverse DTFT, convergence, properties and theorems, Comparison between continuous time FT and DTFT.

UNIT – IV

LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEM:

Transfer function and impulse response, block diagram representation and reduction technique, convolution integral, state variable techniques, state equations for electrical networks, state equations from transfer function**.**

UNIT – V

LINEAR TIME INVARIANT DISCRETE TIME SYSTEM:

Transfer function and impulse response, Eigen function and Eigen value. causality, stability, LTI system characterized by linear constant, convolution sum, Convolution by graphical method, block diagram representation for LTI, system described by difference equation, unit impulse response, introduction to FFT.

TEXT BOOK:

1. P. Ramakrishna Rao, `Signal and Systems' 2008 Edn., Tata MGH, New Delhi
2. Signals & Systems: Smarjit Ghosh, Pearson Education
3. Signals & Systems: Nagrath, Sharan, Ranjan & Kumar, TMH

REFERENCE BOOKS:

1. Chi-Tsong Chen, `Signals and Systems', 3rd Edition, Oxford University Press, 2004
2. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'signals & System', PEARSON Education, Second Edition, 2003.

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Electromagnetic Field Theory
Total Theory Periods	:	40
Code	:	BE433

UNIT-1

COORDINATE SYSTEMS AND TRANSFORMATION: Cartesian coordinates, circular cylindrical coordinates, spherical coordinates Vector calculus: Differential length, area and volume, line surface and volume integrals, Del operator, gradient of a scalar, divergence of a vector and divergence theorem, curl of a vector and Stokes theorem, Laplacian of a scalar.

UNIT-2

ELECTROSTATICS: Coulomb's law, Electric field intensity-fields due to different charge distributions, Electric flux density, Gauss law, Maxwell's equations for electrostatic fields.

ELECTRIC FIELD IN MATERIAL SPACE: Convection and conduction currents, Isotropic and homogeneous, Continuity equation and relaxation time, Poisson's and Laplace's equations, Capacitance-Parallel plate, Co-axial.

UNIT-3

MAGNETO STATICS: Magneto-static fields, Biot-Savart's law, Ampere's circuit law, Maxwell's equation for magnetostatic fields, Magnetic flux density, Magnetic scalar and vector potential.

MAGNETIC FORCES, MATERIALS AND DEVICES: Forces due to magnetic field, Faraday's law and Transformer emf, Inductance & magnetic energy, Boundary Conditions: dielectric-dielectric and dielectric-conductor.

UNIT-4

TRANSMISSION LINES-I: Types, Parameters, Transmission line equations, Expression for Characteristics Impedance, Propagation Constant, Lossless and Distortionless characterization, Phase and Group Velocities, Loading and it's types.

UNIT-5

TRANSMISSION LINES-II: Input impedance relations, SC and OC Lines, Reflection Coefficient, Voltage Standing Wave Ratio, UHF lines as circuit elements: $\lambda/2$, $\lambda/4$, $\lambda/8$, Smith Chart configuration, Stub Matching.

TEXT BOOK:

1. M. N. O. Sadiku, "Elements of Electromagnetics", 4th Ed, Oxford University Press.
2. W. H. Hayt and J. A. Buck, "Electromagnetic field theory", 7th TMH

REFERENCE BOOKS:

1. Electromagnetic waves & radio system by Jorden R.F.
2. Principle and applications of Electromagnetic fields by Ptonsey R and Collin R.P
3. Electromagnetic Field Theory and Transmission lines- G.S.N.Raju. Pearson Edn
4. Electromagnetic Field Theory and Transmission lines- Godse & Bakshi

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Linear Integrated Circuit
Total Theory Periods	:	40
Code	:	BE434

UNIT – I

OPERATIONAL AMPLIFIERS: OAMP Symbol and terminal characteristics, Block Schematic of OPAMP, Basics of Differential Amplifier, Ideal OPAMP Characteristics, Practical OPAMP Characteristics, Open Loop Configuration of OPAMP, Closed Loop Configuration of OPAMP. Input & Output impedance of closed loop OPAMP. Input Bias and Offset Currents, Low-input bias-Current Op Amps, Input Offset Voltage, Low-input-offset-Voltage Op Amps, Input Offset-error compensation, Maximum Ratings. Inverting Amplifier, Non-Inverting Amplifier, Voltage Follower.

UNIT – II

APPLICATIONS OF OPAMP: Comparator, Schmitt Trigger, Zero Crossing Detector, Level Detector, Window Detector, Precision Half Wave Rectifier, Precision Full Wave Rectifier, Current to Voltage and voltage to current Converter, Phase Shifter, Differential Amplifier, Bridge Amplifier, Instrumentation Amplifier. Differentiator, Integrator. Logarithmic amplifier, Analog Switches, Peak Detectors, Sample- and- Hold Amplifiers. Norton Amplifier, Sense amplifier, Bootstrap amplifier.

UNIT – III

SIGNAL GENERATORS & CONDITIONERS: Square Wave Generator, Triangular Wave Generator, Sawtooth Wave generator, Clipper Circuits: Series Clipper, Parallel Clipper. Clamper Circuits: Negative Clamper, Positive Clamper. High Pass RC Circuit as Differentiator, Low Pass RC Circuit as Integrator. Voltage sweep generator, Current Sweep generator.

UNIT – IV

MULTIVIBRATORS: Transistor as Switch, Types of Multivibrator (bistable, astable & monostable), Fixed and self-biased binary, use of Commutating Capacitor, improving resolution, Schmitt trigger Emitter Coupled, Monostable Multivibrator: Collector – Coupled and Emitter – Coupled Multivibrator.

UNIT – V

TIMER & REGULATORS: 555 Timer: Functional Diagram: Monostable and Astable operation. Voltage Regulators: Voltage regulator characteristics, Regulator Performance parameters, Types of Voltage regulator, Shunt Regulator using OPAMP, Transistorised Series Feedback Regulator, Safe Operating Area, Protection Circuit, Short Circuit Protection, Current Limiting Circuit, Foldback Limiting, Three Terminal IC Regulator, Three Terminal IC Regulator (LM 317, LM 337, 78XX, 79XX) [Description, Schematic Diagram and Pin Diagram], General Purpose IC Regulator (723): Important features and Internal Structure.

TEXT BOOKS:

1. OP-AMP and linear integrated circuits 2nd edition, PLHI by Ramakant A. Gayakwad.
2. Design with operation amplifiers and Analog Integrated circuits by Sergei Franco.

REFERENCE BOOKS:

1. Pulse, Digital and Switching Waveforms by Millman & Taub, TMH Publishing Co.
2. Integrated Electronics by Millman & Halkias, TMH Publishing Co.
3. Operational Amplifiers and Linear Integrated Circuits, Lal Kishore, PHI
4. Design and Applications of Analog Integrated Circuits, Soclof, PHI

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Digital electronics
Total Theory Periods	:	40
Code	:	BE435

UNIT-1

NUMBER SYSTEMS & CODES: Introduction, decimal number system, binary number, octal number, hexadecimal number,9's & 10's complement of decimal number,1's & 2's complement of binary number, binary, octal, hexadecimal arithmetic, weighted & unweighted codes ,BCD code,excess-3 code, gray code, ASCII code **LOGIC GATES:** AND, OR, NOT, universal gate, NAND, NOR, Ex-OR, Ex-NOR gates.

UNIT-2

BOOLEAN ALGEBRA

Boolean theorems, distributive, associative, commutative, other laws, de-Morgan's theorem, duality theorem, sum of products(SOP),product of sums(POS), canonical form, standard form, simplification of boolean expressions, karnaugh map simplification, don't care condition, quine-mccluskey procedure.

UNIT-3

COMBINATIONAL CIRCUITS: Adder & Subtractor *:* Half adder, Full adder, half subtractor, Full Subtractor, Parallel Binary adder, Look Ahead carry adder, Serial adder, BCD adder. Code converter, Parity Bit generator/Checker, Comparator. *Decoder*: 3-line to 8-line decoder, 8-4-2-1 BCD to Decimal decoder, BCD to Seven segment decoder. *Encoder*: Octal to binary and Decimal to BCD encoder. *Multiplexer*: 2- Input multiplexer, 4-input multiplexer, 16-input multiplexer Demultiplexer*:* 1-line to 4-line & 1-line to 8- Line demultiplexer, Multiplexer as Universal Logic Function Generator. **Digital memories:** Read only memory (ROM), random access memory (RAM), PROM, EPROM, PLA, PAL, EEPROM

UNIT-4

SEQUENTIAL CIRCUITS: *Flip-Flops & Timing Circuit*: S-R Latch; Gated S-R Latch; D Latch; J-K Flip-Flop; T Flip-Flip: Edge Triggered S-R, D, J-K and T Flips-Flops; Master - Slave Flip-Flops; Direct Preset and Clear Inputs. *Shift Registers:* PIPO, SIPO, PISO, SISO, Bi-Directional Shift Registers; Universal Shift register. *Counter:* Asynchronous Counter: Ripple Counters; Design of asynchronous Counters, Effects of propagation delay in Ripple counters, Synchronous Counters: 4-bit synchronous up Counter, 4-bit synchronous down counter, Design of synchronous counters, Ring counter, Johnson counter, Pulse train generators using counter, Design of Sequence Generators; Digital Clock using Counters.

UNIT-5

LOGIC FAMILIES: Introduction, fan-in, fan-out, propagation delay time, power dissipation, noise margin, Basic Concepts of RTL and DTL; *TTL*: Open collector gates, TTL subfamilies, IIL, ECL; MOS Logic: CMOS Logic, Dynamic MOS Logic, Interfacing: TTL to ECL, ECL to TTL, TTL to CMOS, CMOS to TTL, Comparison among various logic families, Manufacturer's specification.

TEXT BOOKS:-

1. M. Mano; "Digital Logic & Computer Design"; PHI.
2. Malvino & Leach; "Digital Principles & Applications"; TMH

REFERENCE BOOKS:

1. Millman & Taub; "Pulse, Digital & Switching Waveforms";
2. Jain RP; Modern digital Electronics; TMH

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Programming with C++ Lab
Code	:	BE436

LIST OF EXPERIMENTS:-

1. Write a Program to check whether number is prime or not.
2. Write a Program to read number and to display the largest value between:
   (1) Two number
   (2) Three Numbers
   (3) Four number by using switch-case statements.
3. Write a Program to find sum of first natural numbers : sum= 1+2+3+4+……. 100 by using
   a. for loop b. while loop c. do-while loop
4. Write a Program to find sum of the following series using function declaration.
   Sum= x-(x)3/3!+(x)5/5!-……..(x)n/n!
5. Write a Program to read the element of the given two matrix & to perform the matrix multiplication.
6. Write a Program to exchange the contents of two variable by using
   (a) call by value (b) Call by reference.
7. Write a Program to perform the following arithmetic operations of a complex number using a structure
   (a). Addition of the two complex number
   (b). Subtraction of the two complex number
   (c). Multiplication of the two complex number
   (d). Division of the two complex number.
8. Write a Program to generate a series of Fibonacci Nos. using the constructor where the constructor member function had been defines
   (a). is the scope of class definition itself
   (b). out of the class definitions using the scope resolutions operator. Also make this program with the help of the copy constructor.
9. Write a Program to demonstrate how ambiguity is avoided using scope resolution operator in the following inheritance
   (a). Single inheritance (b). Multiple inheritance
10. Write a Program to perform the swapping of two data items of integer, floating point number and character type with the help of function overloading.
11. Write a Program to generate a Fibonacci series by overloading
    a. Prefix Operator
    b. Postfix Operator.
12. Write a Program to access the private data of a class by non-member function through friend function where the friend function is declared :
    (1). is the location of public category
    (2). is the location of private category
    (3). With in the scope of a class definition itself

(4). Defined with inline code subtraction.

13 Write a Program to demonstrate how a pure virtual function defined declared and invoked from the object of derived class through the pointed of the base class.

14 Write a Program to Bubble Sort Using template function.

15 Write a Program for invoking for that Generate & Handle exception.

LIST OF EQUIPMENT/MACHINE REQUIRED

Pentium IV machine, Turbo C++ compiler

TEXT BOOKS :

1. Programming with C++ : D Ravichandran
2. OOP's with C++ : E. Balaguruswamy .

REFERENCE BOOKS:

1. Programming with C++ : Venugopal .
2. Object Oriented Programming in C++ : StroutStrups.
3. OOP with C++ : Robert Lafore
4. Let us C++ : Yaswant Kanitkar.

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Linear Integrated Circuit Lab
Code	:	BE437

LIST OF EXPERIMENTS:-

1. To design a Bistable multivibrator circuit and to draw its output waveform.
2. To design a Monostable multivibrator circuit and to draw its output waveform.
3. To design a Astable multivibrator circuit and to draw its output waveform.
4. To design an inverting amplifier using OPAMP (741) and study its frequency response.
5. To design a non-inverting amplifier using OPAMP (741) and study its frequency response.
6. To design a summing amplifier using opamp (741)
7. To design a differential amplifier using opamp (741) and find its CMRR.
8. To determine SVRR and slew rate of an opamp (741)
9. To design an astable multivirator using 555 timer
10. To design a monostable multivibrator using 555 timer.
11. To design and study a diode clamper circuit.
12. To design and study diode series and shunt clipper.
13. To measure the input impedance of an voltage follower using opamp (741)
14. To design and study comparator circuit using opamp (741)
15. To study the voltage regulation of 78XX and 79XX series of voltage regulators.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Trainer Kit, Patch Cords, Power Supply, CRO, Function Generator, Multimeter.

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Electronics Workshop
Code	:	BE438

OBJECTIVE: To create interest in Hardware Technology.

1. Winding shop: Step down transformer winding of less than 5VA.
2. Soldering shop: Fabrication of DC regulated power supply
3. PCB Lab: (a) Artwork & printing of a simple PCB.
   (b) Etching & drilling of PCB.
4. Wiring & fitting shop: Fitting of power supply along with a meter in cabinet.
5. Testing of regulated power supply fabricated.
6. Fabricate and test the audio amplifier circuit by using above power supply.
7. Mini project.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Bread Board/PCB, Patch Cords, Power Supply, CRO, Function Generator, Multimeter, Soldering Iron, Electronics Components.

MATS UNIVERSITY

Semester	:	4th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Digital electronics Lab
Code	:	BE439

LIST OF EXPERIMENTS:-

1. Study & verify AND /NAND and OR /NOR gates as a universal logic.
2. Study and prove Demorgan's Theorem.
3. To verify the various Boolean expressions.
4. Design half adder circuits using logic gates.
5. Design Full adder circuits using logic gates.
6. Design half subtractor circuits using logic gates.
7. Design full subtractor circuits using logic gates
8. Study & verify encoder & decoder.
9. Study & verify multiplexer & demultiplexer.
10. Study & verify Up-Down counter.
11. Design 4 bit magnitude comparator circuits.
12. Study the 7 segment decoder.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Digital Trainer Kit, Patch Cords, Power Supply.

Scheme of Teaching & Examination
V Semester Electronics & Communication Engineering

Sr.No.	Subject Name	Code	Scheme of marks				
			L	P	ESE	IM	Total Marks
1.	Analog Communication System	BE530	5	-	70	30	100
2.	Microprocessor-I	BE531	5	-	70	30	100
3.	Automatic control systems	BE532	5	-	70	30	100
4.	Antenna & wave propagation	BE533	5	-	70	30	100
5.	Radio & TV Engg.	BE534	5	-	70	30	100
6.	Principles of Management	BE535	5	-	70	30	100
7.	Analog Communication lab	BE536	-	1	30	30	50
8.	Microprocessor lab	BE537	-	1	20	30	50
9	Simulation lab	BE-538	-	1	20	30	50
10.	Advanced Electronic circuit lab	BE539	-	1	30	20	50

L-Lecture, P - Practical, ESE- End Semester Examination, IM- Internal Marks

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Analog Communications
Total Theory Periods	:	30
Code	:	BE530

UNIT-I

MODULATION:- Introduction to communication system, Need for modulation, Frequency division multiplexing, Amplitude modulation, Definition, Time domain & Frequency domain description, Single-tone modulation, Power relations in AM waves, Generation of AM waves: Square law modulator, Switching modulator, Detection of AM waves: Square law detector, Envelope detector Noise in AM ,Noise Figure calculations

UNIT-II

DSB/SSB MODULATION:-Double side-band suppressed carrier modulators, Time domain & Frequency domain description, Generation of DSB-SC waves, Balanced modulators, Ring modulators, Coherent detection of DSB-SC modulated waves, Noise in DSB-SC. Frequency domain description, Frequency discrimination methods for generation of AM SSB modulated waves, Time domain description, Phase discrimination methods for generation of AM SSB modulated wave, Noise in SSB-SC, Noise Figure calculations ,Vestigial side band.

UNIT-III

ANGLE MODULATION:-Basic concepts, Frequency modulation, Single-tone frequency modulation, Spectrum analysis of sinusoidal FM waves, Narrowband FM, Wideband FM, Transmission bandwidth of FM wave, Generation of FM wave: Direct FM, Detection of FM wave: Balanced frequency discriminator, Zero crossing detector, Phase locked loop. Noise in FM, Noise Figure calculations

UNIT-IV

TRANSMITTERS & RECEIVERS:-General block diagram of AM, FM, &PM transmitter, Block diagram of high level and low level AM transmitter**,** Effect of feedback on performance of AM & FM transmitter, FM transmitter-Variable reactance type and phase modulated FM transmitter, frequency stability in FM transmitter. Radio receiver, types-tuned radio frequency and superheterodyne receiver, RF section and characteristics-frequency changing and tracking, Intermediate frequency, AGC, FM receiver performance comparison with AM receiver.

UNIT-V

NOISE IN CW MODULATION: Various noise sources, Noise calculations for – single noise sources, multiple noise sources, cascade and cascade amplifiers. Noise figure and its measurement, Noise temperature, Equivalent input noise resistance, noise Bandwidth, noise measurement on line and channel. Band – pass noise representation, noise figure calculation for various modulation systems (DSB-AM, DSB-SC, SSB and FM), Effects of transmitter noise. Noise in Angle Modulated systems: Noise in FM systems, Threshold in FM, Threshold improvement through De-emphasis, Noise in phase modulation.

TEXT BOKS:

1. Principles of communication systems-Simon Haykin, John Wiley, 2nd Ed.
2. Communication systems-B.P. Lathi,B.S.Publication, 2006

REFERENCE BOOK:

1. Communication system: Sanjay Sharma, Katson publications.
2. Communication systems –R.P. Singh, S.P. Sapre, TMH, 2007

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Microprocessor-I
Total Theory Periods	:	30
Code	:	BE531

UNIT – I

MICROPROCESSOR ARCHITECTURE: Introduction to Microprocessors, Architecture of 8085, Pin Configuration and Function; internal register & flag register, Generation of Control Signals: Bus Timings: Demultiplexing of address /data bus; Fetch Cycle, Execute Cycle, Instruction Cycle, Instruction Timings and Operation Status, Timing Diagram.

UNIT – II

INSTRUCTION SET AND PROGRAMMING WITH 8085: Instruction for Data Transfer. Arithmetic and Logical Operations. Branching Operation: Machine Cycle Concept; Addressing Modes; Instructions Format: Stacks. Subroutine and Related Instructions. Elementary Concepts of Assemblers, Assembler Directives, Looping and Counting: Software Counters with Time Delays: Simple Programs using Instruction Set of 8085: Debugging: Programs Involving Subroutines. Programs for Code Conversion e.g. BCD to Binary, Binary to BCD. Binary to Seven-Segment LED Display. Binary to ASCII. ASCII to Binary: Program for Addition Subtraction: Programs for Multiplication and Division of Unsigned Binary Numbers.

UNIT – III

DATA TRANSFER AND DEVICE SELECTION: Format of Data Transfer: Modes of Data Transfer: Type of I/O Addressing: Condition of Data Transfer: Microprocessor Controlled Data Transfer: Peripheral Controlled Data Transfer: Absolute and Linear Select Decoding: Memory and I/O Interfacing: Use of Decoders Selection: Memory organization and Mapping.

UNIT – IV

INTERRUPTS: Restart Instruction; Hardware Implementation: Interrupt Processing; Multiple Interrupts and Priority Concepts: Interrupt Structure of 8085: Instructions related to interrupts: Pending Interrupts: Use of Interrupt and Handshaking Signals in Interfacing: Application of Interrupts and Illustrative Programs.

UNIT – V

ARCHITECTURE OF PERIPHERAL INTERFACING DEVICES: Architecture, Pin Diagram and functioning of 8155/8156 (RAM), 8355/8755 (ROM), 8255 (PPI). Simple programs like Initialization and I/O operations of the ports, Timer operation of 8155. Programmable Internal Timer 8253/8254: Block Diagram, Pin Configuration, Modes, Initialization Instruction, Interfacing and Simple Programmes to generate various types of signals. Architecture, Pin diagram, description and initialization of Keyboard and display interface (8279), USART (8251).

TEXT BOOKS:

1. Microprocessor Architecture, Programming & Application by R.S.Gaonkar, Wiley Eastern.
2. Microprocessor, Vibuthi

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Automatic Control Systems
Total Theory Periods	:	40
Code	:	BE532

UNIT-I

INTRODUCTION

Concepts of control systems-Open loop & Closed loop control systems along with its differences, different examples of control systems-Classification of control systems, Feedback characteristics, Effects of feedback, Mathematical methods- Differential equations, Impulse response and transfer functions, Translational & Rotational mechanical systems, Transfer function of DC Servo motor, AC servo motor, Synchronous transmitter and receiver.

UNIT-II

TIME RESPONSE ANALYSIS

Representation of Signal flow graph, Reduction using mason's gain formula, Standard test signals-Time response of 1st order systems- Characteristic equation of Feedback control systems, Transient response of 2nd order systems- Time domain specifications- Steady state response- Steady state errors & error constants- Effects of proportional derivative, Proportional integral systems.

UNIT-III

STABILITY ANALYSIS IN S-DOMAIN

Concept of stability- Routh's stability criterion- qualitative stability & conditional stability- limitations of Routh's stability.

ROOT LOCUS TECHNIQUE

Root locus concept- construction of root loci- effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT-IV

FREQUENCY RESPONSE ANALYSIS

Introduction, Frequency domain specifications- Bode diagrams- Determination of Frequency domain specifications and transfer function from the Bode diagram- Phase margin & Gain margin, Stability Analysis from Bode plots.

STABILITY ANALYSIS IN FREQUENCY DOMAIN

Polar plots, Nyquist plots stability analysis

UNIT-V

CLASSICAL CONTROL DESIGN TECHNIQUES

Compensation techniques- Lag, Lead, Lag-Lead controllers design in frequency domain, PID controllers.

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Concepts of state, state variables & state model, derivation of state models from block diagrams. concept of controllability and observability.

TEXT BOOKS:-

1. Automatic Control Systems 8th edition- by B.C.Kuo 2003- John wiley and son's.
2. Control Systems Engineering- by I.J.Nagrath and M.Gopal, New Age International (P) Limited, Publishers, 2nd edition.

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Antenna & Wave Propagation
Total Theory Periods	:	40
Code	:	BE533

UNIT-I

ANTENNA FUNDAMENTALS

Introduction, Radiation mechanism, Antenna parameters, Radiation patterns, Patterns in principal planes, Main lobe and side lobes, Beamwidths, Beam area, Radiation intensity, Beam efficiency, Directivity, Gain and Resolution, Antenna aperture, Aperture efficiency, Effective height, Evaluation of field components- Power radiated & Radiation resistance of Current element and Half wave dipole, Related problems.

UNIT-II

NON-RESONANT RADIATORS

Introduction, Travelling wave radiator- Basic concept, Long wire antennas- Field strength calculation and pattern, V-antennas, Rhombic antennas and Design relations, Broadband antennas: Helical Antenna- Design considerations in Axial mode and in normal mode

UNIT-III

VHF, UHF & MICROWAVE ANTENNA-I

Arrays in parasitic elements, Yagi-Uda arrays, Folded dipoles & their characteristics, Reflector antennas: Flat sheet, Corner Reflector and Paraboloidal Reflectors- Geometry Characteristics, Types of feeds, F/D Ratio, Spill over, Back lobes, Aperture blocking, Offset feeds, Cassegrain feeds.

UNIT-IV

VHF, UHF & MICROWAVE ANTENNA-II

Horn antennas- Types, Optimum horns, Design characteristics of Pyramidal horns, Lens Antennas- Geometry, Features, Dielectric lenses & Zoning, Applications. Antenna measurements- Patterns required, Set-up, Distance, Directivity & Gain (Comparison & Absolute method)

UNIT-V

WAVE PROPAGATION

Concepts of propagation, Frequency ranges & types of propagation, Ground wave propagation, Sky wave propagation- Formation of Ionospheric layers, Critical frequency, MUF & Skip distance, Optimum frequency, LUHF, Virtual height, Space wave propagation- LOS & Radio horizon, Tropospheric wave propagation- Radius of curvature of path.

TEXT BOOKS

1. Electromagnetic waves & radiating system- E.C.Jordan & K.G.Balman, PHI, 2nd edition.
2. Antennas & wave propagation- K.D.Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Antennas & wave propagation- G.S.N.Raju, Pearson Edition.

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Radio & TV Engineering
Total Theory Periods	:	40
Code	:	BE534

UNIT-I

RADIO TRANSCEIVERS

Classification of Radio transmitters, Carrier Frequency Requirements, Master Oscillator, frequency Synthesizers, Harmonic Generators, Radio Broadcast Transmitters, Radio Telephone Transmitters, Peak Limiters, Peak Clippers, Volume Compressors, VODAS, Privacy Devices in Radio Telephony, Broad band Techniques, FDM and TDM Hierarchy, Classification of Radio receivers, Principle of AM Radio Receivers, TRF receivers; Practical TRF Receivers, Super heterodyne Receivers.

UNIT-II

INTRODUCTION TO TV

Block diagram of TV transmitter & receiver, Synchronization, Television pictures: Geometric form & Aspect ratio, Image continuity, Interlaced scanning, Picture resolution, Composite video signal: Horizontal & Vertical Sync, Color signal generation & encoding, Perception of brightness & colors, Additive color mixing, Luminance signal, Color difference signals, Formation of chrominance signals.

UNIT-III

TV SIGNAL TRANSMISSION & PROPAGATION

Picture signal transmission, positive & negative modulation, VSB transmission, Sound signal transmission, Standard channel BW, TV transmitter, TV signal propagation, Interference, TV broadcast channels, TV transmission antennas

TV CAMERAS

Camera tube types, Vidicon, Silicon Diode Array, Monochrome TV camera, color camera, CCD image sensors.

UNIT-IV

PICTURE TUBES

Monochrome picture tube, Electrostatic focusing, Beam deflection, picture tube characteristics & specifications, color picture tubes, TV Standards: American 525-line BW TV system, NTSC color system, 625-line monochrome system, PAL color systems, TV standards.

VISION IF SUBSYSTEM: AGC, noise cancellation, video & intercarrier sound signal detection, VHF & UHF tuners, digital tuner techniques.

UNIT-V

SYNC SEPERATION, AFC & DEFLECTION OSCILLATORS

PAL encoder, PAL-D decoder, Chroma signal amplifiers, Separation of U and V signals, Synchronous separation, Separation of frame & line sync pulses, AFC, Single ended AFC circuit, Deflection oscillators, Receiver antennas, DIGITAL Digital satellite TV, Direct to Home satellite TV, Digital TV Receiver, Digital Terrestrial TV.

TEXT BOOKS

1. Radio Engineering , G.K. Mithal, Khanna Publishers,
2. Modern Television Practice- R.R.Gulati, New Age International Publication, 2002.
3. Monochrome & Color TV- R.R.Gulati, New Age International Publication, 2002.

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Management Principles
Total Theory Periods	:	40
Code	:	BE535

UNIT-I

PRINCIPLES OF MANAGEMENT

Definition of management, Administration, Functions of management, Planning, Organizing, Staffing, Directing, Controlling, Decision making. Social Attitude belief & value, Social responsibility of Business, Business Environment. Communication, Importance, Process, Barriers to communications, Negative and Positive communication.

UNIT-II

HUMAN RESOURCE MANAGEMENT

HRM Definition, Nature & Scope, Planning, Training & Development, Recruitment & Selection, Motivation-Definition, Need & Purpose, Theories of Motivation, Want Satisfaction Chain, Maslow hierarchy of need. Leadership-Definition, Need & Styles of leadership, Quality of working life, Job Enrichment, Job Enlargement, Job Specification.

UNIT-III

MARKETING & FINANCIAL MANAGEMENT

Marketing Environment: Consumer markets and buyer behavior, Marketing Mix, Advertising and sales promotion, Channel of Distribution. Financial management: Book keeping(single & double entry system), Journal, Ledger, Financial statement, Financial ratios, Budgeting, Capital budgeting, Break even analysis.

UNIT-IV

M.I.S & TOTAL QUALITY MANAGEMENT

Management Information System, Definition, Evolution and effectiveness of information system, Data processing, MIS vs Data processing. Total quality management, Definition, Need and Scope, Just in time, Quality Circle, Zero Defect concept, Concept of Stress.

UNIT-V

PRODUCTION MANAGEMENT & GLOBALISATION

Production & Productivity, Production Planning & Control, Demand & Supply, Purchasing Procedure, ABC Analysis of Inventory, Lead time, Re-order level, Bin-card. Globalisation, WTO, Business Process Re-engineering, Outsourcing.

TEXT BOOKS:-

1. Principles of Management: K.Anubuvelan(Laxmi Publication)
2. Essential Management: H.Koontz & H.Weihrich
3. MIS conceptual foundation, Structure & development: G.B.Devis & M.H.Oison

REFERENCE BOOKS:-

1. Human Resource Management- Luthans Fred (McGraw Hill)
2. Financial Management- M.Y.Khan & P.K.Jain
3. Industrial Management- K.K.Ahuja(Khanna Publisher's)

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Analog Communication Lab
Code	:	BE536

LIST OF EXPERIMENTS:-

1. To study Amplitude Modulation & Demodulation on trainer kit.
2. To study Frequency Modulation & Demodulation to trace the frequency modulated waveform on CRO using trainer kits.
3. Design of a Frequency Demodulator Using PLL.
4. To plot amplitude modulation of a signal and to calculate modulation index.
5. To generate SSB-SC signal and to study its characteristics.
6. To generate DSB-SC signal using Balanced Modulator and to study its characteristics.
7. To design a Square Law modulator using FET and to study its characteristics.
8. To design a ring modulator and to study its characteristics.
9. To study the characteristics of Synchronous detector.
10. To study the characteristics of Pre-emphasis & De-emphasis.
11. To study the characteristics of Frequency synthesizer.
12. To study the principles of Superheterodyne receiver.
13. To study the characteristics of Automatic gain circuits.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Trainer Kit, Patch Cords, Power Supply, CRO, Function Generator, Multimeter.

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Microprocessor Lab
Code	:	BE537

LIST OF EXPERIMENTS:-

1. WAP to perform 8-bit Binary addition using 8085.
2. WAP to perform 8-bit Binary subtraction using 8085.
3. WAP to perform 16-bit BCD addition using 8085.
4. WAP to perform Binary to BCD conversion
5. WAP to perform BCD to Binary conversion
6. WAP to add two 10 byte data.
7. Check the even & odd Parity of 32 byte data.
8. WAP to add two 16 signed binary number.
9. WAP to arrange the word in the same location in ascending order.
10. WAP to transfer a block in reverse order and save the result in another location.
11. WAP to transfer a block in reverse order and save the result in another location whenever RST 6.5 key is enabled.
12. WAP to find largest number in an array & store the result in memory location.
13. WAP to find larges number in an array & store the result in memory location.
14. WAP to perform ASCII to BCD conversion.
15. WAP to perform BCD to ASCII conversion.
16. WAP to generate Delay.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Trainer Kit, Patch Cords, Power Supply.

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Simulation lab
Code	:	BE538

LIST OF EXPERIMENTS:-

1. To Design, implement and Simulate Fixed bias and self-bias transistorized circuit for determining the bandwidth.
2. To Design, implement and Simulate Fixed bias and self-bias transistor for studying the low frequency and high frequency effect.
3. To Design, implement and Simulate Miller integrator for determining the nonlinearities.
4. To Design, implement and simulate current Sweep generator for determining the nonlinearities.
5. To Design, implement and Simulate 1st & 2nd order LPF for determining the bandwidth and studying output.
6. To Design, implement and Simulate Half ware & Full ware rectifier way op-Amp for determining the bandwidth.
7. To Design, implement and Simulate Series and Shunt Clipper for studying output responses.
8. To Design, implement and Simulate R -2R ladder type Digital to analog converter.
9. To Design, implement and Simulate Flash Memory.
10. To Design, implement and Simulate Instrumentation Amplifier using three op-Amp for determining the bandwidth

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Desktop PCs, Simulation Software for Analog Circuits like MULTISIM, PSPICE etc.

MATS UNIVERSITY

Semester	:	5th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Advanced Electronic Circuits lab
Code	:	BE539

LIST OF EXPERIMENTS:-

1. To design a LPF using R & C and to study its characteristics
2. To design a HPF using R & C and to study its characteristics
3. To design a BPF using R & C and to study its characteristics.
4. To design a Sample & Hold circuit and to study its output response.
5. To design All Pass filter using OPAMP and to plot its frequency response.
6. To design Bandpass filter using OPAMP and to plot its frequency response.
7. To design a DAC using Weighted Resistor method.
8. To design a ADC using parallel comparator method.
9. To design a Op-amp acts as a adder.
10. To design a Op-amp acts as a subtractor.
11. To design a circuit of a Schmitt trigger.
12. To design a circuit in which transistor acts a switch.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Discrete Components, Function Generator, Power Supply, CRO, AVO Meter, Multimeter, Voltmeter.

Scheme of Teaching & Examination
VI Semester Electronics & Communication Engineering

Sr. No	Course code	SUBJECT	Periods per week		Evaluation scheme		Total
			L	P	Internal	External	
THEORY							
1.	BE630	Digital Communication	5	0	30	70	100
2.	BE631	Microprocessor-II	5	0	30	70	100
3.	BE632	Digital signal processing	5	0	30	70	100
4.	BE633	Satellite communication	5	0	30	70	100
5.	BE634	Microwave Engineering	5	0	30	70	100
6.	Refer Table 1	Professional Elective-1	5	0	30	70	100
PRACTICAL/DESIGN/DRAWING							
7.	BE636	Digital Communication lab	0	3	20	30	50
8.	BE637	Microprocessor & Interfacing Lab	0	3	20	30	50
9.	BE638	Microwave Lab.	0	3	20	30	50
10.	BE639	Digital Signal Processing Lab	0	3	20	30	50

L-Lecturer, P-Practical

TABLE 1		
PROFESSIONAL ELECTIVE-1		
SR. NO.	**COURSE CODE**	**SUBJECT**
1	BE6351	Medical Electronics
2	BE6352	Computer Organization & Architecture
3	BE6353	Telecommunication switching & Network

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Digital Communication
Total Theory Periods	:	40
Code	:	BE630

UNIT-1

PULSE DIGITAL MODULATION: Elements of digital communication, Advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding in PCM systems, Differential PCM systems.

UNIT-2

DELTA MODULATION: Delta modulation, its drawbacks, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

DIGITAL MODULATION TECHNIQUES: Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, similarity between BFSK & BPSK.

UNIT-3

DATA TRANSMISSION: Baseband signal receiver, Probability of error, Optimum filter, Matched filter, Probability of error using matched filter, Coherent reception, Non-coherent detection of FSK, Calculation of error probability of ASK, BPSK, BFSK, QPSK.

UNIT-4

INFORMATION THEORY: Discrete messages, Concept of amount of information and its properties, Average information, Entropy and its properties, Information rate, Mutual information and its properties.

SOURCE CODING: Introduction, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding.

UNIT-5

LINEAR BLOCK CODES: Introduction, Matrix description of Linear Block codes, Error detection and Error correction capabilities of Linear block codes, Hamming codes.

CONVOLUTION CODES: Introduction, Encoding of convolution codes, Time domain approach, Transform domain approach.

TEXT BOOKS:

1. Digital Communications:- Simon Haykin, John Wiley, 2005.
2. Principles of Communication Systems:- H.Taub and D.Schilling, TMH, 2003.
3. Modern Analog & Digital Communication:- B.P.Lathi, Oxford reprint, 3rd edition, 2004.
4. Communication Systems:- Sanjay Sharma, Katson Publications.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Microprocessor-II
Total Theory Periods	:	40
Code	:	BE631

UNIT – I

ARCHITECTURE & INSTRUCTION SET FOR 8086: Architecture and pin configuration of 8086, Instruction Format; Addressing modes, Data Transfer Instruction; Arithmetic Instructions; Branching and Looping Instructions, NOP and Halt, Flag Manipulation Instructions; Logical, Shift and Rotate Instruction. Byte and String Manipulation: String Instructions; REP Prefix, Table Translation, Number Format conversions. Assembler Directives and Operators; Assembly Process; Translation of assembler Instructions. Programming of microprocessor 8086.

UNIT – II

SYSTEM BUS STRUCTURE: Basic 8086/8088 system bus architecture, Minimum mode Configuration, Maximum mode configuration; memory interfacing with 8086/8088 in minimum and maximum mode; System Bus Timings, Bus Standards. Interrupts of microprocessor 8086.

UNIT – III

ARCHITECTURE OF INTERFACING DEVICES: Programmable interrupt controller (PIC) 8259, Programmable DMA Controller (8257). *(Architecture and Functioning only)* 8-bit ADC and DAC, Programming for Interfacing of 8253/8254, 8251, 8279, ADC and DAC with 8086.

UNIT – IV

ARCHITECTURE OF 32 BIT MICROPROCESSORS: Intel 80386 Architecture –Special 80386 Registers –Memory management – interrupts and exceptions – management of tasks – Real, protected and virtual 8086 mode- Introduction to 80486 microprocessor – Architecture – Comparison with 80386 processor. Introduction to RISC and CISC Processor.

UNIT – V

MULTIPROCESSOR ARCHITECTURE & PROGRAMMING: Numeric data Processor 8087; I/O Processor 8089, Communication between CPU and I0P, Related Instructions; programming of 8087 numeric data processor.

TEXT BOOKS

1. Microprocessor & Interfacing, Douglas U. Hall, 2007.
2. Advanced microprocessor and peripherals, A.K.Ray and K.M.Bhurchandi, TMH, 2000.
3. The 8088 and 8086 microprocessors, PHI, 4th edition, 2003.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Digital Signal Processing
Total Theory Periods	:	40
Code	:	BE632

UNIT-1

INTRODUCTION: Introduction to digital signal processing: Discrete time signals & sequences, Linear shift invariant systems, stability and causality, Linear constant coefficient difference equations, Frequency domain representation of discrete time signals and systems.

UNIT-2

DISCRETE FOURIER SERIES: Properties of discrete fourier series, DFS representation of periodic sequences, Discrete fourier transforms: Properties of DFT, Linear convolution of sequences using DFT, Computation of DFT, Relation between Z-transforms and DFS.

UNIT-3

FAST FOURIER TRANSFORMS: Fast fourier transforms (FFT)- Radix-2 decimation in time and decimation in frequency FFT algorithms, Inverse FFT, and FFT for composite N.

UNIT-4

REALIZATION OF DIGITAL FILTERS: Review of Z-transforms, Applications of Z-transforms, solution of difference equations of digital filters, Block diagram representation of linear constant coefficient difference equations, Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems, System function.

UNIT-5

IIR DIGITAL FILTERS: Analog filter approximations-Butterworth and chebyshev, Design of IIR digital filters from analog filters, Design Examples: Analog-Digital transformations.

FIR DIGITAL FILTERS: Characteristics of FIR Digital filters, Frequency response, Design of FIR digital filters using window techniques, Frequency sampling technique, Comparison of IIR & FIR.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithm, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education/PHI, 2007.
2. Discrete Time Signal Processing: A.V.Oppenheim and R.W. Schaffer, PHI.
3. Digital Signal Processing: P. Ramesh Babu, Scitech Publications.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Satellite Communication
Total Theory Periods	:	40
Code	:	BE633

UNIT-I

INTRODUCTION: Synchronous satellite; Synchronous orbit; Orbital parameters; Satellite location with respect to earth; Look angles; Earth coverage and slant range; Eclipse effect; Satellite frequency allocation and band spectrum; General and technical characteristics of satellite communication system; Advantages of the satellite communication; Active and Passive satellite systems; Current trends in satellite communication.

UNIT-II

COMMUNICATION SATELLITE LINK DESIGN: Link design equation; System noise temperature; C/N, G/T ratio; Atmosphere and ionosphere effects on link design; Uplink deign; Complete link design; Interference effects on complete link design; Earth station parameters. **SATELLITE COMMUNICATION LINKS:** Analog baseband signal; FDM techniques: SNR and CNR in FM in satellite link; SNR in FM with multiplexed telephone signals: SCPC system CSSB system; Analog FM/FDM TV satellite link; Intermodulation effects in FM/FDM system; Energy dispersal in FM/FDM signals; Digital baseband signal; K digital satellite design.

UNIT-III

MULTIPLE ACCESS TECHNIQUES: TDMA-Frame and burst structure; Frame Efficiency; Superframe: TDMA frame acquisition and synchronization: FDMA compared to TDMA; TDMA burst TME plan; multiple beam TDMA satellite system; Beam hopping TDMA; CDMA and hybrid access techniques; CSMA.

UNIT-IV

COMMUNICATION SATELLITE SUBSYSTEM: Power supply; Attitude and orbit control; Propulsion subsystem; Repeaters; Antenna subsystem; TTC subsystem; Thermal subsystem; Structure subsystem; Reliability of satellite subsystem.

UNIT-V

SATELLITE EARTH STATIONS: Earth station design requirements; Earth station subsystem; Monitoring and control; Frequency coordination; Small earth station VSAT; Mobile and transport earth station; TVRO system.

TEXT BOOKS:

1. Fundamentals of Satellite Communication, Raja Rao, Pearson Education.
2. Satellite Communication, Mitra, PHI

REFERENCE BOOKS:

1. Satellite Communications, Dr. D.C. Agarwal, Khanna Publishers
2. Satellite Communication System Engineering, Pritchard, Pearson Education
3. Satellite Communication, Timothy Pratt, John Wiley & sons
4. Satellite Communication, Robert M. Gagliardi, CBS Publishers & Distributors

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Microwave Engineering
Total Theory Periods	:	40
Code	:	BE634

UNIT-1

MICROWAVE TRANSMISSION LINES: Introduction, Microwave spectrum and bands, Applications of microwaves, Rectangular waveguides-TE/TM mode analysis, Expression for fields, Characteristic equation and cut-off frequencies, Filter characteristics, Dominant and Degenerate modes, Sketches of TE and TM mode fields in the cross-section, Mode characteristics-Phase and Group Velocities, Wavelengths and Impedance Relations: Power transmission and power losses in rectangular guide, Related problems.

UNIT-2

CIRCULAR WAVEGUIDES: Introduction, Nature of fields, Characteristics equation, Impossibility of TEM mode, Microstrip Lines-Introduction, Z_0 Relations, Effective dielectric constant, Losses, Q-factor, Cavity Resonators- Introduction, Rectangular and Cylindrical cavities, Resonant frequencies, Coupling coefficients, Related problems.

UNIT-3

WAVEGUIDE COMPONENTS & APPLICATIONS: Coupling mechanisms-Probe, Loop, Aperture types, Waveguide attenuators- Resistive card, Rotary vane types, Waveguide phase shifters- Dielectric, Rotary vane types, Waveguide multiport junctions- E plane and H plane tees, Magic tee, Hybrid ring, Dielectric couplers- 2 hole, Bethe hole types.

FERRITES: Composition and characteristics, Faraday rotation, Ferrite components- Gyrator, Isolator, Circulator.

UNIT-4

MICROWAVE TUBES: Limitations and losses of conventional tubes at microwave frequencies, Microwave tubes-O-type and M-type classification, O-type tubes: 2 cavity klystrons- Structure, Reentrant cavities, Velocity modulation process and Applegate diagram, Bunching process and small signal theory-Expression for output power and efficiency, Reflex klystron- Structure, Applegate diagram and principle of working, mathematical theory of bunching, power output, efficiency, Related problems.

UNIT-5

MICROWAVE SOLID STATE DEVICES: Introduction, Classification, Applications, Gunn diode- principle, RWH theory, Characteristics, Basic modes of operation, Oscillation modes, Avalanche transit time devices- Introduction, IMPATT and TRAPATT diodes- Principle of operation and characteristics.

MICROWAVE MEASUREMENTS: Description of microwave bench- Different blocks and their features, Precautions, Microwave power measurement- Bolometer method, Measurement of attenuation, frequency, VSWR.

TEXT BOOKS:

1. Microwave devices and circuits- Samuel Y. Liao, PHI, 3rd Edition, 1994.
2. Microwave and radar engineering- M.Kulkarni, Umesh Publications, 1998.
3. Microwave engineering passive circuits- Peter A. Rizzi, PHI, 1999.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Medical Electronics
Total Theory Periods	:	40
Code	:	BE6351

UNIT-1

Components of Medical Instrumention system, Bioamplifier, Static & Dynamic characteristics of medical instruments, Biosignals & characteristics. Organisation of cell, Derivation of Nernst equation for membrane, Resting potential generation & Propagation of Action potential, Conduction through nerve to neuro-muscular junction.

UNIT-2

Bio-electrodes, Bio-potential electrodes- External electrodes, Internal electrodes, Bio-chemical electrodes, Electrical conduction system of the heart, Cardiac cycle.

UNIT-3

Cardiac Instrumentation blood pressure and blood flow measurement, Specification of ECG machine, Eithoven triangle, Standard 12-lead configurations, Interpretation of ECG waveform with respect to electro mechanical activity of the heart.

UNIT-4

Therapeutic equipment, Pacemaker, Defibrillator, Shortwave diathermy, Hemodialysis machine, Neuro-muscular instrumentation specification of EEG and EMG machines along with its recording.

UNIT-5

Respiratory Instrumentation mechanism of respiration, Spirometry, Pnemuotachograph ventilators.

TEXT BOOKS:

1. Biomedical Instrumentation and Measurements- Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, PHI, 2nd Edition, 1980.
2. Medical Instrumentation, Application and Design- John G. Webster, John wiley, 3rd Edition, 1998.

REFERENCES:

1. Principles of Applied Biomedical Instrumentation- L.A. Geoddes and L.E. Baker, John wiley, 1975.
2. Hand-book of Biomedical instrumentation- R.S.Khandpur, TMH, 2nd Edition, 2003.
3. Biomedical telemetry- Mackay, Stuart R., John wiley, 1968.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Computer Organization & Architecture
Total Theory Periods	:	40
Code	:	BE6352

UNIT-1

BASIC STRUCTURE OF COMPUTERS: Computer types, Functional units, Bus structures, Software, Performance, Multi-processors & Multi-computers, Data types, Data representation, Fixed point representation, Floating point representation, Error detection codes.

UNIT-2

CENTRAL PROCESSING UNIT: Stack organization, Instruction formats, Addressing modes, Data transfer & manipulation, Program control, Reduced instruction set computer.

MICRO PROGRAMMED CONTROL: Control memory, Addressing sequencing, Micro program example, Design of control unit- Hard wired control, Micro programmed control.

UNIT-3

THE MEMORY SYSTEM: Memory hierarchy, Main memory, Auxillary memory, Associative memory, Cache memory, Virtual memory, Memory management hardware.

INPUT-OUTPUT ORGANISATION: Peripheral devices, Input-Output interface, Asynchronous data transfer modes of transfer, Priority interrupt, Direct memory access, Input-Output processor (IOP), Serial communication.

UNIT-4

PIPELINE AND VECTOR PROCESSING: Parallel processing, Pipelining, Arithematic pipeline, Instruction pipeline, RISC pipeline vector processing, Array processors.

UNIT-5

MULTI-PROCESSORS: Characteristics of Multiprocessors, Interconnection structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache coherence.

TEXT BOOKS:

1. Computer System Architecture- M.Moris Mano, IIIrd Edition, PHI/Pearson,2006.
2. Computer Organization- Car hamacher, Zvonks Vranesic, Safwat Zaky, V Edition, Mc Graw Hill, 2002.

REFERENCES:

1. Computer Organization and Architecture- William Stallings 7th Edition, PHI/Pearson, 2006.
2. Computer Architecture and Organization- John P. Hayes, Mc Graw Hill International editions.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Telecommunication Switching & Network
Total Theory Periods	:	40
Code	:	BE6353

UNIT-1

TELECOMMUNICATION SWITCHING SYSTEMS: Introduction, Evolution of telecommunication switches, Strowger Switch, Rotatory Dial, Signalling Tone, Cross bar switch, Reed relay, Elements of switching systems, Basic principles of SPC Exchanges, Control structure, Call Processing, Switching network configuration, Digital switching, Electronic space division switching, Time division switching, Combination switching.

UNIT-2

SIGNALING TECHNIQUES: Introduction of signaling, In channel signaling, Common channel signaling, Transmission Plan, Numbering Plan, Changing Plan, Network traffic load & parameters, Grade of service.

UNIT-3

ATM Switching fundamentals, Hardware configuration of typical ATM switch, Low capacity, ATM switch, Public switched data networks, Connection oriented & Connection less service, Circuit switching, Packet switching & Virtual switching concepts, OSI reference model, LAN, WAN, MAN & Internet, Repeaters, Bridges, Routers and Gate ways.

UNIT-4

INTEGRATED SERVICES DIGITAL NETWORK (ISDN): IP based switch, Hardware architecture, Features of IP switch, Typical low capacity IP switch configuration, Congestion in IP switch, Speech and Data network in IP switch.

UNIT-5

DATA NETWORK EVOLUTION: Evolution in data network, **ISDN:** Introduction, Architecture, Interfaces, Functional Grouping, Reference points, Protocol Architecture, **DCN & CCN** network configurations, MPLS data network.

TEXT BOOKS:

1. Telecommunication switching system and networks: Thyagarajan Viswanath, PHI, 2000.
2. Advanced electronic communication systems- Wayne Tomasi, PHI, 2004.

REFERENCES:

1. Digital telephony- J.Bellamy, John Wiley, 2nd Edition, 2001.
2. Data communication & networks- Achyut. S. Godbole, TMH, 2004.
3. Principles of communication systems- H. Taub & D. Schilling, TMH, 2nd Edition, 2003.
4. Data communication & networking- B.A. Forouzan, TMH, 3rd Edition, 2004.
5. Telecommunication switching, traffic & networks- J.E. Flood, Pearson Education, 2002.
6. Telecommunication switching & network- P. Gnanasivam.
7. Wireless communication networks- William Stallings.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Digital Communication lab
Code	:	BE636

LIST OF EXPERIMENTS:-

1. To design a PPM-PWM modulation & demodulation characteristics.
2. To design a sampling and reconstruction characteristics.
3. To plot the characteristics of TDM pulse code modulation/transmitter.
4. To plot the characteristics of TDM pulse code demodulation/receiver.
5. To find the characteristics of Delta modulation & demodulation.
6. To find the characteristics of Adaptive delta modulation & demodulation.
7. To generate the output of Data formatting & Carrier modulation transmission.
8. To generate the output of Carrier modulation & Data reformattion receiver.
9. To find the charateristics of Variable binary data generator.
10. To verify the characteristics of TDM pulse amplitude modulation.
11. To verify the characteristics of TDM pulse amplitude demodulation.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Discrete Components, Function Generator, Power Supply, CRO, Multimeter.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Microprocessor & Interfacing lab
Code	:	BE637

LIST OF EXPERIMENTS:-

1. WAP to perform addition & subtraction of two 48-bit no.'s using 8086.
2. WAP To perform multiplication & division of two 16-bit no.'s using 8086.
3. WAP to scan a byte from an array & store that memory location .
4. To perform ASCII code operation using 8086.
5. WAP to solve equation 2AX + 5 DX + 4DI =SI
6. WAP to multiply one array to another array & store the result in another memory location.
7. To perform a ASCII to BCD conversion.
8. To perform a BCD to ASCII conversion.
9. WAP to transfer 10-byte from one location to another location using string instruction.
10. WAP to transfer 10-byte from one location to another location in reverse direction.
11. WAP to find largest number in an array & store the result in M.L. DOOO H.
12. WAP to find smallest number in an array & store the result in M.L. DOOO H.
13. WAP to arrange array in ascending order in same location.
14. WAP to arrange array in ascending order in same location.
15. To Perform interface with Seven segment display or 8255.
16. To Interface with Stepper motor controller or 8257.
17. To Interface with 8 Channel 8 bit ADC.
18. To Interface with 2 Channel 8 bit DAC.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Computer, Trainer Kit, Keyboards, Power Supply, Emulator Software.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Microwave lab
Code	:	BE638

LIST OF EXPERIMENTS:-

1. To perform two cavity klystron characteristics.
2. To perform Gunn diode characteristics.
3. To perform Magic tee characteristics.
4. To plot the characteristics of Matched termination.
5. To plot the characteristics of Multi-hole directional coupler.
6. To design the characteristics of Fixed attenuator.
7. To measure the frequency of Standard gain horn & H-sectorial horn.
8. To perform the Y-circulator characteristics.
9. To design the parameters of waveguide twist.
10. To plot the characteristics of pick-up horn.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Function Generator, Power Supply, CRO, Multimeter.

MATS UNIVERSITY

Semester	:	6th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Digital Signal Processing lab
Code	:	BE639

LIST OF EXPERIMENTS:-

1. To perform the linear convolution of the signals.
2. To perform the circular convolution of the signals.
3. To plot the graph of FFT algorithm.
4. To plot the graph of IIR digital filter.
5. To plot the graph of FIR digital filter.
6. To design the characteristics using Butterworth filter.
7. To design the characteristics using Chebyshev fitler.
8. To plot the characteristics for interpolation.
9. To plot the characteristics for decimation.
10. To design the characteristics for Inverse FFT.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

MATLAB 7.0 software, PC's.

Scheme of Teaching & Examination
VII Semester Electronics & Communication Engineering

Sr. No	Course code	SUBJECT	Periods per week		Evaluation scheme		Total
			L	P	Internal	External	
THEORY							
1	BE730	Mobile Communication	5	0	30	70	100
2	BE731	Microcontroller & Embedded System	5	0	30	70	100
3	BE732	Radar Engineering	5	0	30	70	100
4	BE733	Computer Network	5	0	30	70	100
5	Refer Table 2	Professional Elective-2	5	0	30	70	100
PRACTICAL/DESIGN/DRAWING							
6	BE735	Microcontroller & Embedded System Lab	0	3	20	30	50
7	BE736	Advance Signal Processing Lab	0	3	20	30	50
8	BE737	Digital Circuit Simulation Laboratory	0	3	20	30	50
9	BE738	Minor Project	0	3	50	100	150

L-Lecturer, P-Practical

TABLE 2		
PROFESSIONAL ELECTIVE-2		
SR. NO.	**COURSE CODE**	**SUBJECT**
1	BE7341	Artificial Intelligence & Expert Systems
2	BE7342	Neural Network & Fuzzy Logic
3	BE7343	Consumer Electronics
4	BE7344	Speech Signal Processing
5	BE7345	Nano electronics

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Mobile Communication
Total Theory Periods	:	40
Code	:	BE730

UNIT – I

INTRODUCTION TO MOBILE AND WIRELESS DEVICES: Mobile and wireless devices, history, Applications, Wireless transmission, frequencies for radio transmission, regulations, signals, antennas, signal propagation, multiplexing, modulation, Wireless LANs and Wireless WANs, spread spectrum, FHSS and DSSS Spread Spectrum Technology; cellular systems, Medium Access Control, specialized MAC; Problems in wireless communications, Various Multiple Access Techniques, Vocoding.

UNIT – II

TELECOMMUNICATIONS AND BROADCAST SYSTEMS: GSM; Mobile services, System architecture, GSM subsystems, GSM communication frame, localization and calling, handover, security, new data services; Satellite systems, applications, GEO, LEO, MEO, routing, localization, handover; Broadcast systems, cyclic repetition of data.

UNIT – III

WIRELESS NETWORKS AND OTHER 3G TECHNOLOGIES: Wireless LAN, Infrared v/s radio transmission; Infrastructure and ad hoc networks, IEEE 802.11, architecture (details of protocol not required); DFWMAC schemes, MAC frames, MAC management, Roaming; HIPERLAN (just basics, frame and protocol details not required); Bluetooth, applications, physical layer, modes, MAC layer, packet format, networking, security, Link Management, Brief discussions (frame details and protocols not required) on GPRS, DECT, TETRA, UMTS,IMT-2000; CDPD.

UNIT – IV

MOBILE NETWORK AND TRANSPORT LAYERS: Mobile Network Layer; requirements, entities, IP packet delivery, agent advertisement and discovery, registration, encapsulation and tunneling, optimization, messages, reverse tunneling, IPv6, DHCP; Mobile IP, DHCP, Ad hoc networks; Mobile Transport Layer; Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP; Fast transmit/fast recovery, transmission/time out freezing, selective retransmission, transaction oriented TCP.

UNIT – V

SIGNALING AND INTELLIGENT NETWORKS: Signaling: Introduction, Out of Band Signaling, Signaling Network Architecture, Basic Signaling Architecture, SS7 Link Types, Basic Call Setup, Database query, SS7 Protocol Layers, SS7 Addressing, Signal unit Structure, Functions of Signaling Units, Intelligent Networks: Network Evolution, Benefits of Intelligent Network, AIN Releases, AIN Release 1 Architecture, The Call Model, AIN Release 0, AIN Release 0.1, AIN Release 0.2, AIN Service creation, AIN Services.

TEXT BOOKS:

1. Mobile Communications – Schiller, Jochen; 2nd Indian Reprint, Pearson Education Asia – Addison Wesley Longman Pte. Ltd.
2. Mobile Communication Engineering by W.C. Lee, TMH Pub.

REFERENCE BOOKS:

1. Mobile Cellular Telecommunications by W.C. Lee, TMH Pub.
2. The Essential Guide to Wireless Communication Applications – Dornan, A.; Pearson Education Asia

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Microcontroller & Embedded System
Total Theory Periods	:	40
Code	:	BE731

UNIT - I

INTRODUCTION TO MICROCONTROLLER: A brief History of 8051, 8052, 8031, 8751, AT89651, Pin configuration of 8051, 89C52RD2.

UNIT - II

INSTRUCTION SET OF 8051: Assembly language programming, Internal structure of 8051, Power resetting, Built up RAM & ROM, I/O programming and Addressing modes.

UNIT - III

COUNTER AND TIMER DETAILS: Counter and timer programming using 8051, interrupt programming, Types of interrupt.

UNIT - IV

ASYNCHRONOUS SERIAL COMMUNICATION: Data programming, RS232 standard, RS422 Standard, 1488 & 1489 standard, GPIB, Max 232 Driver, Serial communication programming.

UNIT - V

INTERFACING: ADC & DAC interfacing, stepper motor interfacing, keyboard interfacing, Memory interfacing, embedded design concept, Embedded design card, 8096 Architecture.

TEXT BOOKS:

1. Microcontrollers: Architecture, Programming, Interfacing and System Design, Rajkamal, Pearson Education.
2. The 8051 Microcontroller and Embedded Systems using Assembly and C, Mazidi, Mazidi & McKinlay, 2nd Ed.,PHI.

REFERENCE BOOKS:

1. 8051 Programming, Interfacing and Applications K.J.Ayala, Penram Pub.
2. 8 bit Microcontrollers & Embedded Systems Manual.
3. Programming and Customizing the 8051 Microcontroller, Predko; TMH
4. Handbook of Microcontroller

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Radar Engineering
Total Theory Periods	:	40
Code	:	BE732

UNIT – I

PRINCIPLES AND APPLICATIONS: Basic Radar, Radar Block Diagram, Radar Frequencies, Applications of Radar, Radar Range Equation, Probabilities of Detection of False Alarm Integration of Radar Pulses, Radar Cross Section of Targets.

UNIT – II

MTI AND PULSE DOPPLER RADAR: Introduction to Doppler and MTI Radar, delay line cancellers, staggered PRF. Range gated Doppler filter, limitations to MTI performance. Tracking with Radar, Monopulse Tracking, Conical Scan and Sequential Lobing, Limitations to Tracking Accuracy, Low Angle Tracking, Tracking in range, Comparison of Trackers.

UNIT – III

PROPAGATION OF RADAR WAVES: Forward Scattering from a Flat Earth, Scattering from Round Earth‟s Surface, Atmospheric Refraction – Standard Propagation, Non-Standard Propagation, Diffraction, Attenuation by Atmospheric Gases, External or Environmental Noise, Other Propagation Effects.

UNIT – IV

ANTENNAS FOR DETECTION OF RADAR SIGNALS: Parabolic antennas, introduction to phased array, cosecant squared antenna, radome.

UNIT – V

RADAR TRANSMITTER AND RECEIVER: Radar Receiver, Receiver Noise Figure, Superheterodyne Receiver, Duplexers and Receiver Protectors, Radar Displays, introduction to ECM and ECCM, Linear Beam Power Tubes, Solid State Power Sources, Magnetron.

TEXT BOOKS:

1. Introduction to Radar Systems by M.I Skolnik, TMH Pub. Co.
2. Microwave Radar and Navigational Aids by A.K. Sen and A.B. Bhattacharya, Khanna Publisher.

REFERENCE BOOKS:

1. Radar: Principles, Technology, Applications by Edde, Pearson Ecuation Pub.
2. Elements of Electronic Navigation by Nagaraj, TMH Pub

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Computer Network
Total Theory Periods	:	40
Code	:	BE733

UNIT –I

NETWORK TOPOLOGIES AND PHYSICAL LAYER: Transmission modes, Categories of network, The OSI model, DTE-DCE interface, Null Modem, OSI Physical Layer Components, V.34 and V.90 Modems, routers, bridges, repeaters, gateways.

UNIT – II

NETWORK TOPOLOGIES AND PHYSICAL LAYER: Basics of - Data Link Layer: Flow Control: Stop & Wait, Sliding Window, Error control: CRC, ARQ, Stop & Wait ARQ, Sliding Window ARQ, Errors- Types, Detection, CRC and Checksum: Error Correction- Single bit, burst error, HDLC.

UNIT – III

LOCAL AREA NETWORKS: Basics of - IEEE802.1, LLC, MAC, PDU; ETHERNET: Access Method: CSMA/CD, Addressing, Electrical Specification, Frame format, Implementation, Switched Ethernet, Fast Ethernet, Gigabyte Ethernet; Token Bus; Token Ring; FDDI, wireless lan-IEEE802.11.

UNIT – IV

OTHER OSI LAYERS: Basics of - Network Layer, Transport Layer, Session Layer, Presentation Layer - Translation, encryption/decryption, authorization, data compression Application layer; Principles of Internetworking, Internet Protocol: IP Addresses, Transport services, TCP services, TCP Header format.

UNIT – V

HIGH SPEED NETWORKS: Basics of – High Speed LAN, Fast Ethernet systems, Gigabit Ethernet, FDDI, 100VG – Any LAN TCP/IP PROTOCOL SUITE: - Overview, network layer, addressing, sub netting, other protocols in network layer, transport layer, BOOTP, DHCP and DNS.

TEXT BOOKS:

1. "Data Communication and Computer Networking", B.A. Forouzan, Tata McGraw Hill, 2nd Edition.
2. "Data and Computer Communications", William Stalling; Pearson Education.

REFERENCE BOOKS:

1. "Understanding Data Communications & Networks", William A. Shay, 2nd. Ed., Thomson-Vikas
2. "Computer Networks – A Systems Approach", LL Peterson & BS Davie, 3rd Ed., Elsevier
3. "Computer Networks – Fundamentals and Applications", Rajesh, Easwarakumar, Balasubramanian, Thomson-Vikas
4. "Data and Network Communications", Michael A. Miller, Thomson-Vikas

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Artificial Intelligence & Expert Systems
Total Theory Periods	:	40
Code	:	BE7341

UNIT – I

OVERVIEW OF AI: What is AI? The importance of AI, Early works in AI, AI and Related fields. Knowledge: Importance of Knowledge, knowledge-based system representation, organization, manipulation, acquisition.

UNIT – II

SEARCH TECHNIQUES: Problem Solving, State space search, Blind search: Depth first search, Breadth first search, informed search: Heuristic search, Hill climbing search, Best first search, A*, AO*, Constraint satisfaction. Game Playing: Minimax search, Alpha – beta pruning.

UNIT – III

KNOWLEDGE REPRESENTATION: Predicate Logic (well-formed formulas, quantifiers, Prenex Normal Form, Skolemization , Unification, Modus pones, Resolution refutation – various strategies), Rule Based Systems (Forward reasoning: Conflict resolution , Conflict resolution, backward reasoning: Use of No. Backtracking, Structured Knowledge Representations (Semantic Net: slots, inheritance, Frames: exceptions and defaults handling. Conceptual Dependency formalism, Object oriented representations.

UNIT – IV

HANDLING UNCERTAINTY: Probabilistic reasoning: Bayes Net, Dempster Shafer Theory, Use of certainty Factors, Fuzzy Logic, Non monotonic reasoning, Dependency directed backtracking, Truth maintenance systems, learning : Concept of learning, Learning automation, The Genetic algorithm, Learning by induction, Neural Networks: Hopfield Networks, Perceptrons- Learning algorithm, Back propagation Network, Boltzman Machine, Recurrent Networks.

UNIT – V

PLANNING: Components of Planning System, Plan Generation Algorithms: Forward state propagation, Backward state propagation, Nonlinear planning using constraint posting, Natural Language Processing: Syntactic analysis, Top down and bottom up parsing, Augmented Transition Networks, Semantic analysis, case grammars.

EXPERT SYSTEM: Need and Justification for expert systems- cognitive problems, Expert System Architectures Rule based systems, Non production system, knowledge acquisition, Case studies: MYCIN , R1.

TEXT BOOKS:

1. Artificial Intelligence By Elaine Rich and Kevin Knight , Tata McGraw Hill.
2. Introduction to AI and Expert Systems By Dan W.Patterson, PHI.

REFERENCE BOOKS:

1. Principles of Artificial Intelligence By Nils J.Nilsson, Narosa Pub. house.
2. Foundation Artificial Intelligence & Expert Systems by VS Janakiraman K, Sarukesi P Gopalakrishnan Macmillan series in c

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Neural Network & Fuzzy Logic
Total Theory Periods	:	40
Code	:	BE7342

UNIT-I

INTRODUCTION TO ANS TECHNOLOGY: Elementary Neurophysiology, Models of a Neuron, Neural Networks viewed as directed graphs, Feedback, from neurons to ANS, Artificial Intelligence and Neural Networks.

UNIT-II

LEARNING AND TRAINING: Hebbian, Memory based, Competitive, Error-Correction Learning, Credit Assignment Problem: Supervised and Unsupervised learning, Memory models, Recall and Adaptation. Network Architectures, Single-layered Feed-forward Networks, Multi-layered Feedforward Networks, Recurrent Networks, Topologies.

UNIT-III

ALGORITMS FOR ANN: Activation and Synaptic Dynamics, Stability and Convergence. A Survey of Neural Network Models : Single-layered Perceptron – least mean square algorithm, Multi-layered Perceptrons – Back propagation Algorithm, XOR – Problem, The generalized Delta rule, BPN Applications, Adalines and Madalines – Algorithm and applications.

UNIT-IV

APPLICATIONS: The Traveling salesperson problem, Talking Network and Phonetic typewriter : Speech Generation and Speech recognition, Character Recognition and Retrieval, Handwritten Digit recognition.

UNIT-V

ADAPTIVE FUZZY SYSTEMS: Introduction to Fuzzy sets and operations, Examples of Fuzzy logic, Fuzzy Associative memories, Fuzziness in neural networks, Comparison of Fuzzy and neural Truck-Backer upper control systems.

TEXT BOOKS:

1. Artificial Neural Networks by B. Yagna Narayan, PHI
2. Neural Network: A Comprehensive Foundation, Haykin, Pearson Education

REFERENCE BOOKS:

1. Neural Networks, Freeman, Pearson Education
2. Fundamentals of Artificial Neural Networks, Hassoun, PHI

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Consumer Electronics
Total Theory Periods	:	40
Code	:	BE7343

UNIT – I

AUDIO INPUT EQUIPMENTS: Microphones: characteristics, Types – Carbon, Crystal Dynamic, Ribbon, Capacitor, Electret, Gun, Lavalier, Tie-clip, Wireless, Dual-unit. Headphones and Headsets: Types - Movingiron,Crystal, Dynamic, Electrostatic, Electret. Hearing Impairments, Audiometry, Hearing Aids - internals,controls, filters, AGC.

UNIT – II

AUDIO OUTPUT EQUIPMENTS AND ACOUSTICS FUNDAMENTALS: Ideal Loudspeaker, Basic Loudspeaker, Types:Crystal, Electrostatic, Dynamic Loudspeakers, Permanent Magnet. Loudspeaker construction, Permanentmagnet, Voice Coil, Loudspeaker impedance, Acoustic Impedance and Resonance, Woofers, Mid-range andExtended range Loudspeakers, HF Loudspeakers, Tweeters: Cone-type, Dome type, Horn type. Hi-Fi,Multispeaker Systems, Crossover Networks, Impedance Matching. Speaker Baffles and enclosures, Acousticdoublets, baffles, Infinite Baffle systems, Bass-reflex systems, Acoustic Labyrinth Systems, Folded-HornSystems, Corner folded Horn Systems. Acoustics: Reflection of sound, Reverberation, Absorption of Sound,Sabin's Equation, Listening Room Characteristics, Live Rooms, Dead Rooms, Absorbent Materials, AcousticDesign of Auditoriums, Acoustics of Studios, Sound Insulation, Noise. Commercial sound: Electric Guitar,Electric Wind Instruments, Recording, Manual Synthesizer, Programmed Synthesizer, PA System, planning,speaker matching, characteristics, amplifiers, Megaphones, Intercommunication Equipment, Background Music and Paging Systems, Anatomy of Hi-Fi System, Source Units, Signal Propagation, Signal Multiplex,Compatibility, Theatre Sound System: Sound Track, Types of Sound Film, Theatre Sound Reproduction Systems, Working of a Projector, Sound Pick-up, Cine Screens, DTS and Dolby Systems for Theatres, Satellite relay system

UNIT – III

MUSICAL EQUIPMENTS: Portable Stereo: Eight-Track System, Stereo Car-cassette player, Auto-reverse Car Stereo Player, Car-Cassette Stereo Player with Auto-eject and Fast-Forward, Rewind System. Electronic Music Synthesizers: Typical Generators, Basic Modifiers, Voltage Control, Envelop Generator, Other Signal Modifiers. Set-Top Boxes: Interoperable Set-top boxes, Middleware for Set-top boxes.

UNIT – IV

MULTIPURPOSE EQUIPMENTS: Facsimile, Xerography: Xerographic Process, Extension to a dynamic copier, Calculators: Structure, internal organization. Digital Clocks: Working, LSI Digital Clocks, In-Car Computers: Applications, Electronic Ignition, Electronic Ignition Lock System, ABS, ECS, Instrument Panel Displays, Ultrasonic Car Safety Belt System, Air Bag System, Vehicle Proximity Detection System, Car Navigation Systems – Travel Pilot and AVIC-1

UNIT – V

DOMESTIC EQUIPMENTS: Microwave Ovens: Microwave Oven Block Diagram, LCD Timer with alarm, Single chip Controllers, Types of Microwave Ovens, Wiring and Safety, Operating Problems, Care and cleaning. Washing Machines: Electronic Controller for Washing Machines, Washing Machine Hardware, Washing Cycle, Hardware and Software development, Types of Washing Machines, Fuzzy Logic Washing Machines, Air conditioners and Refrigerators: Air Conditioning, Components of Air Conditioning Systems, All-weather and All-air Air Conditioning Systems, Remote Control Buttons, Combination Systems, Unitary and Central Air Conditioning Systems, Split Air Conditioning Systems, Refrigeration, refrigerants, Refrigeration Systems, Domestic refrigerators.

TEXT BOOKS:

Consumer Electronics, Bali S.P., Pearson Education

REFERENCE BOOKS:

K. Blair, Benson "Audio Engineering Hand book"

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Speech Signal Processing
Total Theory Periods	:	40
Code	:	BE7344

UNIT – I

SPEECH: PRODUCTION, PERCEPTION AND ACOUSTIC-PHONETIC CHARACTERIZATION: Introduction, Speech production process, Time and frequency domain representation of speech, Speech sounds and features, The vowels, Diphthongs, Semivowels, Nasal Consonants, Unvoiced Fricatives, Voiced Fricatives, Voiced & Unvoiced Stops, Acoustic-Phonetic Approach to Speech Recognition, Statistical Pattern-Recognition Approach to Speech Recognition, AI Approaches to Speech Recognition, Neural Networks and their Application to Speech Recognition.

UNIT – II

SPECTRAL ANALYSIS OF SPEECH: Short time Fourier analysis, filter bank design, speech coding, subband coding of speech, transform coding, channel vocoder, formant vocoder, cepstral vocoder, vector quantizer coder.

UNIT – III

SPEECH SYNTHESIS: Pitch extraction algorithms, Gold Rabiner pitch trackers, autocorrelation pitch trackers, voice/unvoiced detection, homomorphic speech processing, homomorphic systems for convolution, complex cepstrums, pitch extraction using homomorphic speech processing

UNIT – IV

AUTOMATIC SPEECH RECOGNITION SYSTEMS: Isolated word recognition, connected word recognition, large vocabulary word recognition systems, pattern classification, DTW, HMM, speaker recognition systems, speaker verification systems, speaker identification systems.

UNIT – V

HIDDEN MARKOV MODELS: Discrete-Time Markov Processes, Extensions to HMMs, Coin-toss Models, The Urnand-Ball Model, Elements of an HMM, HMM generator of observations. Three Basic problems for HMMs and their solutions, Probability Evaluation, 'Optimal' State sequence, Parameter estimation, Re-estimation procedure. HMM types, continuous observation densities in HMMs, Autoregressive HMMs, Variants on HMM structures, Inclusion of Explicit State Duration Density in HMMs, Optimization Criterion – ML, MMI and MDI, Comparisons of HMMs.

TEXT BOOKS:

1. Fundamentals of Speech Recognition, Rabiner L. and Juang B., Pearson Education
2. Owens F.J., ''Signal Processing of Speech'', Macmillan New Electronics

REFERENCE BOOKS:

1. Speech and Language Processing, Jurafsky, Pearson Education
2. Discrete Time Speech Signal processing: Principles and Practice, Quatieri, Pearson Education
3. Saito S. & Nakata K., "Fundamentals of Speech Signal Processing", Academic Press

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Nano electronics
Total Theory Periods	:	40
Code	:	BE7345

UNIT-I

INTRODUCTION: The 'Top down' and 'Bottom up' approach, Why Nanoelectronics?, Nanotechnology potential.Band structure and density of states at Nanoscale: energy bands, density of states at low dimensional structure.Electrical transport in Nanostructure : Electrical conduction in metals, insulator/ionic crystals and semiconductors. Conductionmechanism in bulk, thin film and low dimensional system. Introductory quantum mechanics for Nanoscience: size effect in smallersystems, quantum behavior of nanometric world.

UNIT-II

TUNNEL JUNCTION AND APPLICATION OF TUNNELING: Tunneling through a potential barrier, potential energy profiles of material interfaces, applications of tunneling. Quantum wells, wires and dots: Semiconductor hetrostructure and quantum wells, quantum dots and nanoparticles.

UNIT-III

SINGLE ELECTRON TRANSISTOR: Coulomb Blockade, single electron transistor, other SET and FET structures.

UNIT-IV

BALLISTICS AND SPIN TRANSPORT: Classical and semi-classical transport, ballistic transport, carbon nanotubes and nanowires, transport ofspin and spintronics. The era of new Nanostructures of carbon Buck minsterfullerence, Nanodiomond, BN Nanotubes, Molecular Machine,Nanobiometrics.

UNIT V

FABRICATION TECHNOLOGY: Top-down vs bottom-up technology. Lithographic process: Lithography, Nanolithography, split gate technology, self assembly, limitation of lithographic process. On-lithographic techniques: Plasma arc discharge, sputtering, evaporation, chemical vapour deposition, pulsed laser deposition, molecular beam epitaxy, sol-gel technique, electrode position and other process.

REFERENCES:

1. G. W. Hanson: Fundamentals of Nanoelectronics, Pearson Education.
2. K. K. Chattopadhyay and A. N. Banerjee: Introduction to Nanoscience and Nanotechnology, PHI Learning.
3. Vlaadiniz U. Mitin: Introduction to Nanoelectronics, Cambridge University Press.
4. M. Dragman and D. Dragman: Nano electronics- Principles and devices, Artech House.
5. Karl Goser: Nanoelectronics and Nanosystems, Springer.

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Microcontroller & Embedded System Lab
Code	:	BE735

LIST OF EXPERIMENTS:-

1. Write a microcontroller 8051 program to transfer the bytes into RAM locations starting at 50H. Assuming that ROM space starting at 240H contains CHHATTISGARH by using – a) a Counter, b) null Char for end of string.
2. Write a microcontroller 8051 program to get hex data on the range of 00-FFh from port 0 and convert it to decimal. Save the digits in R7, R6 and R5, where the least significant digit is in R7.
3. Write a microcontroller 8051 program to add two 16 Bit unsigned numbers. Operands are two RAM Variables. Results to be in R1-R0 pair.
4. Write a microcontroller 8051 program to subtract an unsigned 16 Bit number from another. Operands are two RAM variables. Results to be in R1-R0 pair.
5. Write a microcontroller 8051 program to add two unsigned 32-bit numbers. Operands are two RAM variables. Results to be in R1-R0 pair.
6. Write a microcontroller 8051 program to add two 16 Bit signed numbers.
7. Write a microcontroller 8051 program to convert a binary number to equivalent BCD
8. Write a microcontroller 8051 program to convert a packed BCD number to two ASCII numbers and Place them in R5 and R6.
9. Write a microcontroller 8051 program to calculate the square root of an 8-bit number using iterative method.
10. Write a microcontroller 8051 program to add two floating-point numbers.
11. Write a microcontroller 8051 program to multiply two floating-point numbers.
12. Write a microcontroller 8051 program that generates 2kHz square wave on pin P1.0, 2.5 kHz on pin P1.2 and 25 Hz on pin P1.3.
13. Write a microcontroller 8051 program for counter 1 in mode 2 to count the pulses and display the State of the TL1 count on P2. Assume that the clock pulses are fed to pin T1.
14. Write a microcontroller 8051 program to transfer letter "N" serially at 9600 baud, continuously. Assume crystal frequency to be 11.0592 MHz.
15. Write a microcontroller 8051 program to transfer word "CSVTU" serially at 4800 baud and one stop bit, continuously. Assume crystal frequency to be 11.0592 MHz.
16. Write a microcontroller 8051 program to receive bytes of data serially, and put them in P1. Set the Baud rate at 2400 baud, 8-bit data, and 1 stop bit. Assume crystal frequency to be 11.0592 MHz.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Microcontroller kit, Interfacing kit, Keyboard, Monitor, SMPS for Microcontroller

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Advance Signal Processing Lab
Code	:	BE736

LIST OF EXPERIMENTS:-

1. Generation of various signals
2. Implementation of Linear convolution, Circular convolution, linear convolution using circular Convolution.
3. DFT Implementation
4. Design & implementation of IIR filters
5. Design & implementation of FIR filters
6. Spectral analysis of Biomedical signals like ECG, EEG, EMG, EOG etc.
7. Design of adaptive noise canceller
8. Design of interference suppressor
9. Detection of abrupt changes in a signal
10. Performance evaluation of a signal
11. Parameter Estimation (Maximum likelihood) of a signal
12. Parameter Estimation (linear and nonlinear least squares) of a signal
13. Parameter Estimation (recursive and sequential least squares) of a signal
14. Parameter Estimation (minimum mean square error) of a signal
15. Parameter Estimation (maximum a posteriori) of a signal
16. Development of a general linear model for a signal.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

PCs, MATLAB, C/C++ editor, DSP Kits**.**

MATS UNIVERSITY

Semester	:	7^{th} BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Digital Circuit Simulation Laboratory
Code	:	BE737

LIST OF EXPERIMENTS:-

1. To Design, implement and Simulate the combinational logic circuit for the function f{A,B,C) = (0,4,5,8,II,I5) + d(1)
2. To Design, implement and Simulate the Full adder using two half adder.
3. To Design, implement and Simulate the 8 bit adder using Full adder.
4. To Design , implement and Simulate the 3 : 8 Decoder.
5. To Design, implement and Simulate the 16 : 1 Multiplexer using 4 : 1 Multiplexer
6. To Design, implement and Simulate the Binary to BCD code Converter by Showing BCD No. on 7segment Display.
7. To Design, implement and Simulate the Look ahead carry.
8. To Design, implement and Simulate the Flip-Flop.
9. To Design, implement and Simulate the Ring Counter.
10. To Design, implement and Simulate the Decade counter using D-Flip-Flop.
11. To Design, implement and Simulate the Divide by 32 (+32) digital logic by counter and flip-flop.
12. To Design, implement and Simulate the Hamming code converter.
13. To Design, implement and Simulate the 4 bit comparator.
14. To Design, implement and Simulate the Finite State Machine by Moore method
15. To Design, implement and Simulate the Finite State Machine by Mealy circuit
16. To Design, implement and Simulate the Digital clock.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

PCs with simulation software like MULTISIM, COMSIM, MATLAB, TINA PRO installed.

MATS UNIVERSITY

Semester	:	7th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Minor Project
Code	:	BE738

- The students are expected to take up a Project under the guidance of a faculty from the Institute.
- The topic of the project should be justified for the degree of BE (Electronics & Telecommunication)
- The project selected should ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivities.
- The students may be asked to work individually or in a group having not more than FOUR students.
- The student/group of student shall collect all necessary information from literature on selected topic/project.
- It should include the scope of project, identification of necessary data, source of data, development of design method and identification, methodology, software analysis.
- Students should deliver a seminar on the selected Project/topic.
- The students are expected to submit the report in standard format approved by the University in partial fulfillment of the requirement for the degree of B.E. (Electronics & Telecommunication).
- There will be an external viva-voce at the end of the semester and the students are to demonstrate the project at the time of viva-voce.

Scheme of Teaching & Examination
VIII Semester Electronics & Communication Engineering

Sr. No	Course code	SUBJECT	Periods per week		Evaluation scheme		Total
			L	P	Internal	External	
THEORY							
1	BE830	Optical Communication	5	0	30	70	100
2	BE831	VLSI Design	5	0	30	70	100
3	BE832	Information Theory & Coding	5	0	30	70	100
4	BE833	Advanced Solid State Devices	5	0	30	70	100
5	Refer Table 2	Professional Elective-3	5	0	30	70	100
PRACTICAL/DESIGN/DRAWING							
6	BE835	Optical Communication Lab	0	3	20	30	50
7	BE836	VLSI Design Lab	0	3	20	30	50
8	BE837	Major Project	0	3	100	100	200

L-Lecturer, P-Practical

TABLE 2		
PROFESSIONAL ELECTIVE-3		
SR. NO.	**COURSE CODE**	**SUBJECT**
1	BE8341	Enterprise Resource Planning
2	BE8342	DSP Processors and Applications
3	BE8343	Industrial Automation
4	BE8344	Cryptography & Secure Communication
5	BE8345	Software Technology

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Optical Communication
Total Theory Periods	:	40
Code	:	BE830

UNIT – I

BASIC OPTICAL LAWS AND DEFINITION: Numerical Aperture; Optical Fiber Modes and propagation; Single Mode and Multi-Mode Fibers; Step Index and Graded Index Fibers Structures; Different types of attenuations in optical fiber communication; Fiber Optic Cable; Fabrication;

UNIT – II

LIGHT SOURCES: Light Emitting diodes and types of LEDS; LASER principles; Laser diode and types of LDs; Operating characteristics and Modulation circuits of LED and LASER diodes.

UNIT – III

OPTICAL COUPLERS AND CONNECTORS: Connector principles; fibre end preparation; splices; connectors; source coupling; Distribution system; Distribution networks; Directional couplers; Star couplers; Switches;

UNIT – IV

LIGHT DETECTORS: Principle of photo-detection; semiconductor photodiode; PIN photodiode; Avalanche photodiode; Noise and Detection; Thermal noise and Shot noise; signal to noise ratio;

UNIT – V

OPTICAL MEASUREMENT & NETWORKS: Numerical Aperture; Attenuation and Dispersion measurement; Optical networks: Introduction to SONET/SDH; SONET/SDH Networks; formats and interface.

TEXT BOOKS:

1. Optical Fiber Communication, Keiser, TMH
2. Fiber Optic Communications, Palais, 4th Ed., Pearson Education
3. Optical Fiber Communication-Principles and Practice, John Senior, PHI

REFERENCE BOOKS:

1. OptoElectronics and Fiber Optic Communication, Sarkar & Sarkar, New Age International Publishers.
2. Text Book on Optical Fiber Communication and its Applications, Gupta, PHI
3. Fundamentals of Optical Fiber Communication, Satish Kumar, PHI
4. Semiconductors Optoelectronic Devices, Bhattacharya, Pearson Education

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	VLSI Design
Total Theory Periods	:	40
Code	:	BE831

UNIT – I

INTRODUCTION TO INTEGRATED CIRCUITS: Brief introduction of SSI, MSI and LSI; VLSI Design flow; Design hierarchy; concept of regularity, Modularity and Locality; **VLSI DESIGN STYLES WITH FPGA AND CPLD:** FPGA and CPLD architecture, logic function implementation using LUT.

UNIT – II

DESIGN ASPECTS: Basic steps of fabrication process of PMOS, CMOS; Basic Bi-CMOS circuits (Inverter, NOR2, NAND2),

LAYOUT DESIGN RULES: Basics of stick diagram for CMOS; CMOS lambda based layout design rules, Layout of CMOS inverter, NAND Gate, NOR Gate, Full Adder, calculation of resistance and capacitance.

UNIT – III

LAY OUT DESIGN: Lay out design of Memories: 6-T SRAM cell, 1-T DRAM cell; 4x4 NAND and NOR based ROM array;

COMBINATIONAL LOGIC: 2:4 Decoder, 4:1 MUX, 1 bit Full Adder, Comparator; **SEQUENTIAL LOGIC:** CMOS SR, JK and D latch.

UNIT – IV

COMBINATIONAL LOGIC DESIGN: Static and Dynamic Power dissipation in CMOS Inverter; Introduction to CAD Tools; Introduction to VHDL and Verilog;

VHDL: Operators, Data Types, Libraries; Entity, Architecture; Data flow, Structural and Behavioral programming, Generic, Signal, Generate, Process, Loops, Case, Variable, Procedure, Component and Configuration.

UNIT – V

SEQUENTIAL LOGIC DESIGN: Sequential design by VHDL: Flip-Flop and Shift Registers;

FSM: Moore and Mealy machine, Counter, Sequence Detector; Bus structure in VHDL, Test bench Modeling in VHDL, Basic concepts of operator overloading, Blocks, Delays, Concepts of Verifications for BIST using Half Adder.

Note: Unit 4 and Unit 5 is based on VHDL programming.

TEXT BOOKS:

1. CMOS VLSI Design: A Circuits and Systems Perspective by Weste, Pearson Education Pub.
2. Basic VLSI Design by Pucknell & Esharghian, 3rd Ed., PHI Pub.
3. Fundamentals of Digital Logic with VHDL Design, Brown TMH, Pub.
4. VHDL Primer by J. Bhaskar, PHI

REFERENCE BOOKS:

1. Modern VLSI Design - System-on-chip Design, Wolf, PHI pub.
2. Modern VLSI Design by Wolf, Pearson Education Pub.
3. VHDL Programming by Perry, TMH Pub.

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Information Theory & Coding
Total Theory Periods	:	40
Code	:	BE832

UNIT-I

UNCERTAINTY, INFORMATION AND ENTROPY: Entropy: information source and entropy, mutual information, information measures for continuous random variables Characteristics on information measure; Shannon's concept of information; Shannon's measure of information; Model for source coding theorem; Communication system; Source coding and line/channel coding; channel mutual information capacity (Bandwidth)

UNIT-II

CHANNEL CODING: Theorem for discrete memory less channel, Information capacity theorem: Error detecting and error correcting codes; Types of codes; Block codes; Tree codes; Hamming and Lee Matrices; Description of linear block codes by matrices; Description of linear tree code by matrices; Parity check codes; Parity check polynomials;

UNIT-III

COMPRESSION: Lossless and lossy; Hoffmann codes; Binary Image compression schemes; Run –length Encoding; CCITT group-3 1D compression; CCITT group-3 2D compression; CCITT group-4 2D compression;

UNIT-IV

VIDEO IMAGE COMPRESSION: Requirement of full motion video compression; CCITT H 261 video coding algorithm; MPEG compression methodology; MPEG-2 compression; Audio (Speech) compression;

UNIT-V

CRYPTOGRAPHY: Encryption; Decryption; Cryptogram (cipher text); Concept of cipher; Crypto-analysis; Keys: Single key (Secret key); Cryptography; two-key (Public key) cryptography; Single key cryptography; Ciphers; Block Cipher code; Stream ciphers; Requirements for secrecy; The data Encryption Standard; Public Key Cryptography; Diffie-Hellmann public key distribution; The Rivest- Shamin Adelman(R-S-A) system for public key cryptography; Digital Signature;

TEXT BOOKS:

1. Digital Communication by Proakis, TMH (For Unit I & II)
2. Digital Image Processing by Gonzales & Woods, Pearson (for Unit – III & IV)
3. Local Area Network by G. Keiser, TMH (for Unit – V)

REFERENCE BOOKS:

1. Digital Communication by Das, Mullick & Chatterjee, New Age Pub.
2. The Mathematics of Coding Theory, Garrett, Pearson Education
3. Norman Abramson, Information Theory, John Wiley
4. T. Cover and Thomas, Elements of Information Theory, John Wiley & Sons 1991.
5. R. Hill, A First Course in Coding Theory, Oxford University Press, 1986
6. M. Y. Rhee, Cryptography and Secure communication, McGraw-Hill, 1994

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Advanced Solid State Devices
Total Theory Periods	:	40
Code	:	BE833

UNIT – I

MATERIAL PROPERTIES AND TECHNOLOGIES: SiGe and group III-V compound semiconductors, band gaps and lattice constants, velocity overshoot, band gap discontinuity, band gap narrowing, strained layer and critical thickness, electron mobility, hole mobility.

UNIT – II

HETEROJUNCTION TECHNOLOGIES: Heterojunction Bipolar Transistors (HBTs), Heterostructure Field Effect Transistors (HFETs), Modulation Doped Field Effect Transistors (MODFETs), High Electron Mobility Transistors (HEMTs), Resonant tunneling diodes (RTDs), Single Electron Transistors (SETs) and Velocity Modulated Transistors (VMTs),

UNIT – III

MOS PHYSICS & TECHNOLOGIES: MOS structure, MOS capacitance, CCD and application, Flat-band threshold voltages, MOS static characteristics, small signal parameters and equivalent circuit, charge –sheet model, strong, moderate and weak inversion, short channel effects, hot –carrier effects, scaling laws of MOS transistors, LDD MOSFET, NMOS and CMOS IC technology, CMOS latch-up phenomenon, Ideal Schottky barrier, current-voltage characteristics, MIS diode , Ohmic contacts, Heterojunction MESFET

UNIT – IV

OPTICAL DEVICES: Optical absorption in a semiconductor, Photovoltaic effect, Solar Cell, Photoconductors, PIN photodiode, Avalanche photodiode, LED, semiconductor lasers.

UNIT – V

OTA & SWITCHED CAPACITOR FILTERS: OTA Amplifiers. Switched Capacitor Circuits and Switched Capacitor Filters.

TEXT BOOKS:

1. Ben G. Streetman, Solid State Electronic Devices, PHI, 5th ed, 2001
2. Ramakant Gayakwad, Opamps & Linear Integrated Circuits, Pearson Education

REFERENCE BOOKS:

1. Fiber Optic Technology D K Mynbaev & LL Scheiner Pearson Education Asia
2. Optical Fiber Communication and applications S C Gupta PHI
3. Dilip K. Roy, Physics of Semiconductor Devices, University Press
4. Dasgupta & Dasgupta, Semiconductor Devices, PHI
5. D.G. Ong, Modern MOS Technology: Processes, Devices and Design, McGraw Hill
6. J. Singh, Semiconductor Devices - Basic Principles; John Wiley & Sons Inc., 2001
7. M. S. Tyagi, Introduction to Semiconductor Materials and Devices, John Wiley & Sons Inc.

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Enterprise Resource Planning
Total Theory Periods	:	40
Code	:	BE8341

UNIT-l

CONCEPTUAL FOUNDATION OF BUSINESS PROCESS REENGINEERING: Role of information Technology and BPR; Process improvement and Process redesign, Process identification and mapping; Role/Activity diagrams, Process Visioning, and benchmarking.

UNIT -2

ENTERPRISE RESOURCE PLANNING: Evolution of ERP- MRP and MRP II, structure of ERP- two tier architecture, three tier architecture, Electronic data processing, management information system, Executive information system, ERP as an integrator of information needs at various Levels.

UNIT -3

TYPICAL BUSINESS PROCESSES: Core processes, Product control, Sales order processing, Purchases, Administrative processes, Human resource, Finance support processes, Marketing, Strategic planning, Research and development, Problems in traditional view.

UNIT -4

ERP MODELS/FUNCTIONALITY: Sales order processing, Production scheduling, forecasting, distribution, finance, features of each of the models, description of data flow across each module, overview of supporting databases & packages.

UNIT -5

ERP IMPLEMENTATION ISSUES: Opportunities and problems in ERP selection, and implementation; ERP implementation: identifying ERP benefits, team formation, Consultant intervention, Selection of ERP, Process of ERP.

TEXT BOOKS:

1. V.K. GARG & N .K. VENKATKRISHNAN: ERP, Concepts and Practices, PM
2. Rahul V. Altekar, Enterprise wide Resource Planning-theory and practice, PHI

REFERENCES:

1. ALEXIS LEON: Enterprise Resource Planning, TMH
2. S. SADAGOPAN: MIS, PM
3. V. RAJARAMAN: Analysis and Design of Information Systems, PHI
4. MONK' & BRADY: Concepts in ERP, Vikas pub, Thomson

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	DSP Processors and Applications
Total Theory Periods	:	40
Code	:	BE8342

UNIT – I

INSTRUCTION SET AND ARCHITECTURE OF DSP PROCESSOR: Computational characteristics of DSP algorithms and applications: their influence on defining a generic instruction-set architecture for DSPs.

UNIT – II

ARCHITECTURAL REQUIREMENT OF DSP's: High throughput, low cost, low power, small code size, embedded application techniques for enhancing computational throughput; parallelism and pipelining.

UNIT – III

DATA-PATH OF DSP's: multiple on-chip memories and buses, dedicated address generator units, specialized processing units. Hardware multiplier, ALU, Shifter and on-chip peripherals for communication and control.

UNIT – IV

CONTROL UNIT OF DSP's: Pipelined instruction execution, specialized hardware for zero-overhead looping, Interrupts. Architecture of Texas instruments fixed-point and floating-point DSPs, Brief description of ADSP 218X/2106X DSPs, Programmer's model.

UNIT – V

ADVANCED DSP's: TI's 320C6X, ADI's Tiger-SHARC, Lucent technologies, DSP 16000 VLIW processors. Applications: a few case studies of application of DSPs in Communication and Multimedia.

TEXT BOOKS:

1. Architecture for Digital Signal Processing, P. Pirsch, Jhon Wiley
2. Digital Signal Processors: Architectures, Implementations and Applications by Kuo, Pearson Education Pub.

REFERENCE BOOKS:

1. Digital Signal Processing in VLSI, R.J. Higgins
2. Texas Instruments TMSC5X, C54X and C6X Users manuals.
3. VLSI Digital Signal Processing Systems, K. Parthi, John Wiley
4. Digital Signal Processing for Multimedia Systems, K. Parthi and T. Nishitani, Marcel Dekker.
5. IEEE Signal Processing Magazine, Oct 86, Jan 89, July 97, Jan 98 and March 2000.

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Industrial Automation
Total Theory Periods	:	40
Code	:	BE8343

UNIT – I

INTRODUCTION TO PROCESS CONTROL: Process Control Nlock Diagram, Control System Evaluation, Digital Control: Supervisory Control, Direct Digital Control, Networked Control Systems, Distributed Digital Control. Smart Sensor. Definitions of the terms used to describe process control. Data Acquisition Systems: DAS Hardware, DAS Software. Data Logger.

UNIT – II

CONTROLLER PRINCIPLES: Process Characteristics: Process Equation, Process Load, Process Lag, Self-Regulation. Control System parameters: Error, Variable Range, Control parameter Range, Control Lag, Dead Time, Cycling, Controller Modes. Discontinuous Controller Mode: Two Position Mode, Multiposition Mode, Floating Control Mode. Continuous Control Mode: Proportional Control Mode, Integral Control Mode, Derivative Control Mode. Composite Control Modes: PI Control, PD Control, PID Control

UNIT – III

ANALOG CONTROLLERS: Introduction, Electronic Controllers: Error Detector, Single Controller Modes, Composite Controller Modes. Pneumatic Controllers: General features, Mode Implementation.

UNIT – IV

PROGRAMMABLE LOGIC CONTROLLER: Evaluation of PLC, PLC Architecture, Basic Structure. PLC Programming: Ladder Diagram – Ladder diagram symbols, Ladder diagram circuits. PLC Communications and Networking, PLC Selection: I/O quanttyt and Type, I/O Remoting requirements, Memory size and type, Programmer Units. PLC Installation, Advantages of using PLCs.

UNIT – V

DISTRIBUTED CONTROL SYSTEM: Introduction, Overview of Distributed Control System, DCS Software configuration, DCS Communication, DCS Supervisory Computer Tasks, DCS Integration with PLCs and Computers, Features of DCS, Advantages of DCS.

TEXT BOOKS:

1. Process Control Instrumentation Technology, C.D. Johnson, PHI
2. Computer Aided Process Control, S.K. Singh, PHI

REFERENCE BOOKS:

1. Introduction to Instrumentation & Control, A.K. Ghosh, Eastern Economy Edition
2. Intelligent Instrumentation , George C. Barney, Prentice Hall India

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Cryptography & Secure Communication
Total Theory Periods	:	40
Code	:	BE8344

UNIT – I

PUBLIC KEY ENCRYPTION: Introduction to number theory: Fermat's and Euler's theorem, discrete algorithm, Principle of public key cryptosystem, RSA algorithm, key management: Diffie-Hellman key exchange.

UNIT – II

MESSAGE AUTHENTICATION AND HASH FUNCTION: Authentication requirement, authentication function, message authentication codes, hash function, security of hash function: Brute force attack.

UNIT – III

HASH ALGORITHM AND DIGITAL SIGNATURE: MD5 Message digest algorithm, secure hash algorithm, digital signature: introduction, authentication protocols, digital signature standards.

UNIT – IV

NETWORK AND SYSTEM SECURITY: IP security: introduction and architecture, web security: threats and web traffic security approaches, SSL architecture and protocol, firewalls: design principle.

UNIT – V

STEGANOGRAPHY: Introduction, Cryptography and Steganography, Simplified model of Steganography, Security using Information theory: Deterministic and Indeterministic model.

TEXT BOOK:

1. Cryptography and Network Security, William Stallings, Pearson Education
2. M. Y. Rhee, Cryptography and Secure communication, McGraw-Hill

REFERENCE BOOKS:

1. Computer Networks, Tannenbum , PHI
2. Internet Cryptography by Smith, Pearson Education Pub.

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Software Technology
Total Theory Periods	:	40
Code	:	BE8345

UNIT-1

ASSEMBLY LANGUAGE PROGRAMMING Pentium Assembly languages-Registers, Memory Model, Addressing mode, 1source Link, Installation, Assembler Directives. **ASSEMBLER DESIGN** Simple manual Assembler, Assembler Design Process, Load and Go Assembler, Object File Formats.

UNIT-2

LINKERS Linking -Combining Object Modules, Pass I, Pass II; Library Linking; Position Independent Code (PIC); Shared Library Linking.
LOADERS Binary Image; Types of Loaders.

UNIT 3

MACROPROCESSORS Macro in NASM- Local Labels in Macro Body, Nested Macros.; Design of Macroprocessors – Major Data Structures, Macroprocessing Technique, Simple macroprocessors without nesting, Nested calls & definitions.

UNIT – 4

COMPILERS Lexical Analysis; Syntax Analysis; Intermediate Code Generation; Target Code Generation; Optimizing Transformation.

UNIT – 5

TEXT EDITORS Design of a Text Editor ; Data Structures for Text Sequences; Text Document Design; Text view Design
DEBUGGER Features; Breakpoint mechanism; Hardware support; context of Debugger; Check pointing & reverse Execution.

TEXTBOOKS

1. SYSTEM SOFTWARE by Santanu Chattopadhyay ; Prentice Hall of India
2. Software Engineering By Roger S Pressman ; Mc-Graw Hill

REFERENCES

1. Foundations of Software Technology and Theoretical Computer Science, By V. (Venkatesh) Raman: Springer
2. Software Visualization by John Stasko; MIT press
3. Software Engineering By Rajib Mall : PHI

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Optical Communication Lab
Code	:	BE835

LIST OF EXPERIMENTS:-

1. To measure bending loss of a fiber.
2. To propagation or attenuation loss in a fiber.
3. To obtain amplitude modulation and to transmit the same over fiber optic cable and to demodulate the same at the receiver end.
4. To determine the numerical aperture of a fiber.
5. To measure various types of losses occur in an optical fiber.
6. To study the AC characteristics of intensity modulation of laser and fiber optic system.
7. To measure optical power of a laser diode Vs. forward current.
8. To monitor photo diode current v/s. laser optical output.
9. Demonstration of voice transmission through optical fiber using FM.
10. Communication between two computers using RS232 interface via optical fiber.
11. To measure plastic fiber patch cord loss for various lengths of fiber.
12. To study voice transmission through fiber optic cable using PWM.
13. To transmit and receive text files over fiber optic cable.
14. To transmit, receive and observe digital signals over fiber optic cable.
15. To measure rise time, fall time, pulse width distortion of a laser and to determine transmission delay.

LIST OF EQUIPMENTS/MACHINE REQUIRED:

Fiber optic trainer kit, optical fiber, Splicing unit, Data Acquisition card for optical signal, O/E & E/O Converter, CRO.

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	VLSI Design Lab
Code	:	BE836

LIST OF EXPERIMENTS:-

1. Layout design of CMOS inverter
2. Layout design of CMOS NAND gate
3. Layout design of CMOS nor gate
4. Layout design of CMOS 2:1 mux
5. Layout design of CMOS 1:2 decoder
6. Layout design of any combinational logic
7. Layout design of any sequential logic
8. Layout design of CMOS mixed design logic
9. Layout design of CMOS comparator
10. Design and implementation of 4-bit adder using VHDL
11. Design and implementation of 8-bit adder using VHDL
12. Design and simulation of sequential circuit using VHDL
13. Design and simulation of sequential circuit using verilog
14. Design and simulation of fsm circuit using verilog
15. Design and simulation of counter using verilog
16. Design and simulation of arithmetic function using verilog
17. Design and simulation of busses using VHDL

LIST OF EQUIPMENTS/MACHINE REQUIRED:

PCs with PIV/128 MB RAM/40 GB HD, VHDL, VERILOG, Any Device Simulator.

MATS UNIVERSITY

Semester	:	8th BE Course
Branch	:	Electronics & Communication Engineering
Subject	:	Major Project
Code	:	BE837

- The students are expected to take up a Project under the guidance of a faculty from the Institute. This may be an extension of the Minor project undertaken in VII semester or a new one.
- The topic of the project should be justified for the degree of BE (Electronics & Telecommunication)
- The project selected should ensure the satisfaction of the urgent need to establish a direct link between education, Industrial application, national development and productivities.
- The students may be asked to work individually or in a group having not more than FOUR students.
- The student/group of student should collect all necessary information from literature on selected topic/project.
- It should include the scope of project, identification of necessary data, source of data, development of design method and identification, methodology, software analysis (if any).
- Students should deliver a seminar on the selected Project/topic.
- The students are expected to submit the report in standard format approved by the University in partial fulfillment of the requirement for the degree of B.E. (Electronics & Telecommunication).
- There will be an external viva-voce at the end of the semester and the students are to demonstrate the project at the time of viva-voce.
- The project report should contain the following:
    - A cover page mentioning the project title, names of the students, Affiliated Institute/College, Session, Batch and the name of the University.
    - A bonafide certificate to be issued by the Head of the Institute.
    - A forwarding certificate from the Head of the Department.
    - A completion certificate from the Project guide.
    - A certificate of Approval from both Internal and External Examiner.
    - Acknowledgement from the students
    - Abstract
    - Contents
    - Description of the Project (to be divided in chapters)
    - Conclusion
    - Bibliography
    - A CD containing the Software/Program used in the project.