Syllabus for

Applied Mathematics- III (EN/ET/EE/Mech)

Scheme (Theory: 4 hrs, Tutorial: 1hr.)

UNIT - I: LAPLACE TRANSFORM (15Hrs)

Definition, Properties, Evaluation of integrals by Laplace Transform, Inverse Laplace Transform and its Properties, Convolution theorem (statement only), Laplace Transform of Periodic Functions (statement only), Unit Step Function and Unit Impulse Function, Applications of Laplace Transform to solve Ordinary Differential Equations, Simultaneous Differential Equations, Integral Equations & Integro-Differential Equations.

UNIT – II: FOURIER SERIES & FOURIER TRANSFORM (08 Hrs)

Periodic functions and their Fourier Expansions, Even and Odd functions, Change of interval, Half Range Expansions.

Fourier Transform: Definition and Properties (excluding FFT), Fourier Integral Theorem, Relation with Laplace Transform, Applications of Fourier Transform to Solve Integral Equation.

UNIT – III: CALCULUS OF VARIATIONS(05 Hrs)

Functionals, Maxima and minima of functionals, Euler's equation(statement only), Functionals dependent on First & Second order derivatives, Isoperimetric Problems, Solution of Boundary Value problems by Rayleigh-Ritz method.

UNIT- IV: FUNCTIONS OF COMPLEX VARIABLE (12 Hrs)

Analytic function, Cauchy- Riemann Conditions, Harmonic Functions (excluding orthogonal system), Milne-Thomson Method, Cauchy Integral Theorem & Integral Formula (Statement only), Taylor's & Laurent's series (Statement only), Zeros and Singularities of Analytic function, Residue Theorem (Statement only), Contour integration (Evaluation of real definite integral around unit circle and semi-circle).

UNIT - V: PARTIAL DIFFERENTIAL EQUATIONS(08Hrs)

Partial Differential Equations of First Order First Degree i.e. Lagrange's form, Linear Homogeneous Equations of higher order with constant coefficients. Method of separations of variables, Simple Applications of Laplace Transform to solve Partial Differential Equations (One dimensional only).

UNIT –VI: MATRICES(12Hrs)

Linear and Orthogonal Transformations, Linear dependence of vectors, Characteristics equation, Eigen values and Eigen vectors, Statement and Verification of Cayley Hamilton Theorem [without proof], Reduction to Diagonal form, Reduction of Quadratic form to Canonical form by Orthogonal transformation, Sylvester's theorem [without proof], Solution of Second Order Linear Differential Equation with Constant Coefficients by Matrix method.

Text Books

1. Higher Engineering Mathematics by B.S. Grewal, 40th Edition, Khanna Publication
2. Advanced Engineering Mathematics by Erwin Kreysizig, 8th Edition, Wiley India
3. Applied Mathematics for Engineers & Physicist by L.R. Pipes and Harville,
4. Calculus of variation by Forrey

Reference Books

1. A Text Book of applied Mathematics, Volume II , by P.N. Wartikar & J.N. Wartikar, Poona Vidyarthi Griha Prakashan
2. Introductory methods of Numerical Analysis, by S.S. Sastry, PHI
3. Mathematics for Engineers by Chandrika Prasad
4. A text book of Engineering Mathematics by N. P. Bali & M. Goyal, Laxmi Publication.

B. E. Third Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

ELECTRONIC DEVICES AND CIRCUITS

Duration : 2 Hr.
College Assessment : 25 Marks
University Assessment : 25 Marks

Subject Code : BEENE302P / BEECE302P/ BEETE302P [0 – 2 – 0 – 1]

Objectives : To study basic concepts, DC circuits, AC circuits, semiconductors, Semiconductor devices, Power supply, Bipolar and Field effect transistor amplifiers, Frequency response of amplifier.

Outcome :
After completion of the practicals:
1.The students will get the basic concepts of different semiconductor components.
2. They will be able to understand the use of semiconductor devices in different electronic circuits.
3. They will be able to calculate different performance parameters of transistors.
4. They will be able to plot and study the characteristics of semiconductor devices.

List of Experiments :

1. To Plot V-I Characteristics of Si/Ge Diode.
2. To study Half Wave and Full Wave rectifier with and without Capacitor filter.
3. To study Input-output characteristics of Common Emitter Configuration.
4. To Determine the h-parameter of CE amplifiers.
5. To find Bandwidth of RC coupled Amplifier.
6. To Study RC Oscillator (RC-Phase Shift and Wien Bridge Oscillator).
7. To Study LC Oscillators (Colpitt's and Hartley Oscillator).
8. To study transistorized Astable Multivibrator.
9. To study Cross-over distortion in Class-B power amplifier.
10. To find the operating point of transistor.
11. To study transistor as an amplifier.
12. To study FET characteristics.

Note : Minimum 8 Practicals to be conducted.

B. E. Third Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

ELECTRONIC DEVICES AND CIRCUITS

Duration : 3 Hr.
College Assessment : 20 Marks
University Assessment : 80 Marks

Subject Code : BEENE302T / BEECE302T/ BEETE302T [4 – 0 – 1 – 5]

Objectives :

(1) To present a clear consistent picture of the internal physical behavior of many electronic devices so that their studies of electronic circuits and system will be meaningful.

(2) To develop the basic tools with which they can later learn about newly developed devices and applications.

Outcome :

1. This subject will give an overview of various semiconductor devices.

2. At the end of this course, the students will be able to analyze and design amplifier circuits, oscillators and filter circuits employing BJT, FET devices.

Unit I : Diodes and it's applications (08)

PN junction diode, Volt-amp characteristics, Temperature dependence, Transition and Diffusion capacitance of PN junction , Zener and Avalanche Breakdown, **Diode Rectifiers**: Half wave, Full wave and Bridge rectifiers, Types of Filters, Ripple factor , Voltage Doublers.

Unit II : BJT Biasing:
(10)

Introduction, Transistor, construction, transistor operations, BJT characteristics, load line, operating point, Necessity of BJT biasing, Transistor biasing methods, Stability factor, Thermal stabilization, Thermal runaway and Compensation circuits, Transistor as an Amplifier

Unit III : Transistor Small Signal Analysis & Negative feedback amplifier
((12)

h-parameter model, Analysis of Transistor Amplifier circuits using h-parameters, CB,CE and CC Amplifier configurations and performance factors.

Principle of Negative feedback in electronic circuits, Voltage series, Voltage shunt, Current series, Current shunt types of Negative feedback, Typical transistor circuits effects of Negative feedback on Input and Output impedance, Voltage and Current gains, Bandwidth, Noise and Distortion.

Unit IV :

(10)

Principle of Positive feedback, Concept of Stability in electronics circuits, Barkhausen criteria for oscillation, Principle of operation of RC Phase Shift, Wien Bridge, Colpitt's, Hartley, Crystal oscillators.

Principle of operation of Transistorized Astable, Bistable and Monostable multivibrator.

Unit V : Power Amplifiers:

(10)

Power dissipations in transistors, Harmonic distortion, Amplifiers Classification,(Class-A, Class-B, Class-C, Class-AB) Efficiency, Push-pull and complementary Push-pull amplifiers, Cross-over distortion.

Unit VI : Field Effect Transistor and MOSFET:

(10)

JFET and its characteristics, Pinch off voltage, Drain saturation current, JFET amplifiers, CS,CD,CG amplifiers ,their analysis using small signal JFET model ,Biasing the FET, The FET as VVR Overview of D-MOSFET, E-MOSFET, n MOSFET, pMOSFET .

Text Books

1. J. Millman and Halkias : "Electronic devices and circuits" , TMH Publications
2. Boylestad & Nashelsky : "Electronic Devices & Circuit Theory" , PHI publications.
3. Salivahanan, Suresh Kumar, Vallavaraj:"Electronic devices and circuits" , TMH Publications.

Reference Book

1. J. Millman and Halkias: "Integrated Electronics, Analog & Digital Circuits & Systems" TM– 2000.
2. Sedra & Smith: "Micro Electronic Circuits" Oxford University Press, 2000
3. Albert Malvino : " Electronics Principles", TMH Publications.
4. Floyd : "Electronic Devices", Pearson Publications.
5. Schilling & Beloove : " Electronics Circuits Discrete and Integrated", Mc.Graw Hill Publications.

B. E. Third Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

ELECTRONICS MEASUREMENT AND INSTRUMENTATION

Duration : 2 Hr.

College Assessment : 25 Marks

University Assessment : 25 Marks

Subject Code : BEENE303P/ BEECE303P/ BEETE303P **[0 – 2 – 0 – 1]**

Objectives : To learn basic measurement concepts and related instrumentation requirement as a vital ingredients of electronics Engineering.

Outcome :

After completion the practicals :

1. The students will be able to measure the resistance by various methods.
2. They will be able to use the various measuring instruments such as CRO, Function generator, Spectrum analyzer etc in effective manner.
3. They will be able to measure various physical parameters by using different techniques.

List of Experiments :

1- Measurement of Medium Resistance by using voltmeter ammeter method and Wheatstone bridge method.
2- Measurement of Low Resistance by using Kelvin Bridge Method.
3- Measurement of Unknown inductance by using Hay's Bridge / Maxwell Bridge Method
4- Measurement of Unknown Capacitance by using Schering Bridge Method.
5- To determine the frequency of unknown signal using Lissagious Pattern Method
6- To Determine DC Voltage, AC voltage and phase by using CRO.
7- Temp. Measurement & control using RTD / Thermocouple / Thermistor.
8- Displacement measurement using LVDT.
9- Level measurement using capacitive / resistive transducer

10- Flow measurement using optical transducer
11- Measurement of signal parameters using Digital Storage Oscilloscope.
12- Study of Data Acquisition system.
13- Feature extraction of Some standard signal using Spectrum Analyzer.

Note : Minimum 8 Practicals to be conducted.

B. E. Third Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

ELECTRONICS MEASUREMENT AND INSTRUMENTATION

Duration : 3 Hr.

College Assessment : 20 Marks

University Assessment : 80 Marks

Subject Code : BEENE303T/ BEECE303T/ BEETE303T **[4 – 0 – 0 – 4]**

Objectives The primary aim of this subject is to acquaint the students with the basic principles of measuring instruments and show how each of them can be exploited for the measurement of large number of variables.

Outcome : At the end of this course, students will be able to:

1. Explain basic concepts and definitions in measurement.
2. Explain the operation and design of electronic instruments for parameter measurement and operation of different Transducers
3. Explain the operation of oscilloscopes and the basic circuit blocks in the design of an oscilloscope.
4. Explain the circuitry and design of various function generators.

Unit I : Fundamentals of Electronic Measurement and Instrumentation : **(06)**

Necessity of electronic Measurement , Block diagram of electronic measurement system, Types of Measurements, Function of instruments and measurement systems, Applications of measurement system, Elements of measurement system, Types of instruments, Theory of errors, Accuracy and Precision, Types of errors, Statistical analysis , probability of errors, Limiting errors, Standards of measurement.

Unit II : Electromechanical Instruments :
(08)

Construction of Galvanometer, Suspension Galvanometer, Torque and deflection Galvanometer, PMMC mechanism, DC voltmeter; AC voltmeters; Peak, average and true rms

voltmeters; Digital Multimeters; Ammeters, Ohm-meters and their design' AC indicating instruments, Watt-hour meter; Power factor meter.

Unit III : AC and DC Bridges : **(10)**

DC Bridges : Wheatstone Bridge, Kelvin Bridge

AC Bridges and their applications : Maxwell's Bridge, Hay's Bridge, Schering Bridge, Desauty's Bridge, Wein Bridge, Detectors for AC bridges.

Unit IV : Transducers : **(08)**

Static and dynamic characteristics, Classification of transducers, Capacitive transducer, Inductive transducer, Resistive transducer, RVDT, Strain Gauge, RTD, Optical Transducers, Hall effect transducer, Piezoelectric transducers, Transducers for measurement of Pressure, Temperature, Level, Displacement, Flow.

Unit V : **Oscilloscope and Signal Generators** : **(08)**

CRO : Types, Dual trace, High frequency, sampling and storage oscilloscopes, Applications of CRO.

Signal Generators : Introduction, Sine-wave generator, standard signal generators, Audio frequency signal generation, RF generator, Pulse generator, Function generator.

Unit VI : Signal Analyzer and Data Acquisition System: **(08)**

Construction and operation of Signal analyzer, Wave analyzer, Harmonic Distortion analyzer, Spectrum analyzer and Logic analyzer; Signal conditioning and its necessity, process adopted in signal conditioning, Functions of Signal conditioning, AC/DC Conditioning systems, Data conversion: ADC, DAC, Generalized data acquisition system: single channel and multi-channel DAS.

Text Books:

1. A.D. Helfrick and W.D. Cooper : “Modern Electronic Instrumentation and Measurement Techniques”, PHI Publications.
2. A.K. Sawhney : “Electrical and Electronic Measurement and Instrumentation”, Dhanpat Rai & Sons Publications.
3. S.S. Kalsi : “Electronics Measurements”, Mc Graw Hill Publications.
4. B.H. Oliver and J.M Cage : “Electronics Measurement and Instrumentation”, Mc Graw Hill Publications

Reference Book :

1. Joseph J. Carr : “Elements of Electronic Instrumentation and Measurement”, Pearson Education Publications.
2. R.K. Rajput : “ Electrical And Electronic Measurement”, PHI Publications.
3. DVS Murthy : “ Transducers and Instrumentation”, PHI Publications.

B. E. Third Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

ELECTRONICS MEASUREMENT AND INSTRUMENTATION

Duration : 2 Hr.

College Assessment : 25 Marks

University Assessment : 25 Marks

Subject Code : BEENE303P/ BEECE303P/ BEETE303P **[0 – 2 – 0 – 1]**

Objectives : To learn basic measurement concepts and related instrumentation requirement as a vital ingredients of electronics Engineering.

Outcome :

After completion the practicals :

4. The students will be able to measure the resistance by various methods.
5. They will be able to use the various measuring instruments such as CRO, Function generator, Spectrum analyzer etc in effective manner.
6. They will be able to measure various physical parameters by using different techniques.

List of Experiments :

14- Measurement of Medium Resistance by using voltmeter ammeter method and Wheatstone bridge method.
15- Measurement of Low Resistance by using Kelvin Bridge Method.
16- Measurement of Unknown inductance by using Hay's Bridge / Maxwell Bridge Method
17- Measurement of Unknown Capacitance by using Schering Bridge Method.
18- To determine the frequency of unknown signal using Lissagious Pattern Method
19- To Determine DC Voltage, AC voltage and phase by using CRO.
20- Temp. Measurement & control using RTD / Thermocouple / Thermistor.
21- Displacement measurement using LVDT.
22- Level measurement using capacitive / resistive transducer

23- Flow measurement using optical transducer
24- Measurement of signal parameters using Digital Storage Oscilloscope.
25- Study of Data Acquisition system.
26- Feature extraction of Some standard signal using Spectrum Analyzer.

Note : Minimum 8 Practicals to be conducted.

B. E. Third Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

OBJECT ORIENTED PROGRAMMING & DATA STRUCTURE

Duration : 2 Hr.
College Assessment : 25 Marks
University Assessment : 25 Marks

Subject Code : BEENE304P/ BEECE304P/ BEETE304P [0 – 2 – 0 – 1]

Objectives :

1. To understand the concept of object oriented programming and develop skills in C++ Language.
2. Access how the choice of data structures and algorithm design methods impacts the performance of programs.
3. To Choose the appropriate data structure and algorithm design method for a specified application.
4. Write programs using 'C++ Language'.

Outcome :

On successful completion of practicals of this subject the student will be able to:
1.Implement the concept of object oriented programming in any programming language.
2.Explain the basic data structures and algorithms for manipulating them.
3. Implement these data structures and algorithms in the C++ language.
4. Integrate these data structures and algorithms in larger programs.
5. Code and test well-structured programs of moderate size using the C++ language.
6. Apply principles of good program design to the C++ language.

List of Experiments :

1) Write a C++ program to implement the concept of class and object.
   Given Data: - class student:-roll number, name and address
2) Write a C++ program to find the area of circle and rectangle by using default and parameterized constructer.
3) Write a C++ program using following inheritance path: Student -> Marks-> Result & to produce result of each student.
4) Write a C++ program, to implement operator overloading. Overload "+" operator so that two string can be concatenated.
5) Write a C++ program to implement a following sorting tech. to arrange elements in ascending order.
   1) Bubble sort 2) Insertion sort
6) Write a C++ program to implement a stack in which push, pop and display can be performed.
7) Write a C++ program to implement a queue in which insertions, deletions and display can be performed.

8) Write an interactive C++ program to create a singly linked list and perform following operation.

1) Create 2) Insert 3) Delete

9) Write a C++ program to construct a binary tree and perform following traversing techniques.

1) Preorder 2) Inorder 3) Postorder

10) Write a C++ program to construct a binary search Tree and perform following Operation.

1) Insert 2) Delete 3) Print leaf node

11) Write a C++ Program to implement quick sort.

12) Write a C++ Program to implement “this” keyword.

Note : Minimum 8 Practicals to be conducted

B. E. Third Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg.)

OBJECT ORIENTED PROGRAMMING & DATA STRUCTURE

Duration : 3 Hr.
College Assessment : 20 Marks
University Assessment : 80 Marks

Subject Code : BEENE304T/ BEECE304T/ BEETE304T [4 – 0 – 1 – 5]

Objectives :

1. To understand the concept of object oriented programming and develop skills in C++ Language.
2. Access how the choice of data structures and algorithm design methods impacts the performance of programs.
3. To Choose the appropriate data structure and algorithm design method for a specified application.
4. Write programs using 'C++ Language'.

Outcomes :

On successful completion of this subject the student will be able to:

1. Be able to implement the concept of object oriented programming in any programming language.
2. Explain the basic data structures and algorithms for manipulating them.
3. Implement these data structures and algorithms in the C++ language.
4. Integrate these data structures and algorithms in larger programs.
5. Code and test well-structured programs of moderate size using the C++ language.
6. Apply principles of good program design to the C++ language.

Unit I: Introduction to Object Oriented Programming (12)

Basic concepts of object oriented programming-Benefits of OOP's-Application OOP-Structure of C++ program-Basic Data type-Derived Data type-User defined data type-Operators in C++, Class Members, Access Control, Class Scope, Control Statements, Constructor and Destructor, parameter passing method, inline function, static class members, this pointer, friend function, Dynamic memory allocation and de allocation (new and delete), exception handling.

Unit II: Features of Object Oriented Programming (06)

Function Overloading, Generic Programming- Function and class templates, Defining operator overloading-overloading unary operator, overloading binary operator-rules for operator overloading.

Unit III: Inheritance

(10)

Inheritance- Inheritance basics, base and derived classes, inheritance types:-single inheritance, multilevel inheritance, multiple inheritance, hierarchal inheritance, hybrid inheritance, and virtual base class –run time polymorphism using virtual function, pure virtual function, and abstract classes.

Unit IV: Introduction to Data structure

(10)

Arrays-Introduction-Linear arrays-representation of linear arrays in memory, Sorting-selection sort, Insertion Sort, Bubble Sorting, Quick Sort, Merge Sort, radix sort, linear Search-Binary Search

Unit V: Introduction of Stack and Queue

(10)

Introduction of Stack and Queue, Dynamic memory allocation, Linked list-Introduction-Representation of singly Linked List in memory, Traversing a linked list, Searching a linked list, insertion and deletion in linked list, implementation of stack using linked representation, implementation of queue using linked representation

Unit VI: Trees and Terminology

(12)

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary trees, Binary search Tree Implementation ,Operations – Searching, Insertion and deletion in binary search trees., Threaded Binary trees, Traversing Threaded Binary trees.

Text Book:

1. E.Balagurusamy , "Object Oriented Programming with C++" , Tata McGraw Hill Publications.
2. Y.Langsam : "Data Strcture using C and C++ ", Pearson Education Publications
3. Horowitz and Sahani : "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., New Delhi.
4. A. M. Tenenbaum : "Data Structures using C & C++", PHI Publications.

Reference Books:

1. K.R.Venugopal,B.RajKumar,T.RaviShankar : " Mastering C++" , Tata McGraw Hill publication.
2. W.Savitch : "Problem solving with C++ The OOP", , Pearson education.
3. Herbert Scheldt : " C++, the Complete Reference" Tata McGraw Hill Publications.
4. Robert L. Kruse, Alexander J. Ryba : "Data Structures and Program Design in C++", PHI Publications.
5. Robert Lafore : "Object Oriented Programming in Microsoft C++", Galgotia Publications.

B. E. Third Semester

(Electronics / Electronics & Communication/ Electronics & Telecommunication Engg.)

NETWORK ANALYSIS AND SYNTHESIS

Duration : 3 Hr.

College Assessment : 20 Marks

University Assessment : 80 Marks

Subject Code : BEENE305T/ BEECE305T / BEETE305T [4 – 0 – 1 – 5]

Objectives :

- To make the students capable of analyzing any given electrical network.
- To make the students learn how to synthesize an electrical network from a given impedance /admittance function.

Outcomes

- Students will be able to analyze the various electrical and electronic networks using the techniques they learn.
- Students will be able to construct a circuit to suit the need.

Unit I: Basic Circuit Analysis and Simplification Techniques (10)

Source transformation and source shifting, Nodal and mesh analysis, Mutual inductances, Basic equilibrium equations, Matrix approach for complicated networks, Super mesh and super mode analysis, Duality.

Unit II: Network Theorems (12)

Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorems, Reciprocity Theorem , Compensation Theorem, Millers Theorem and its dual, Tellegen's Theorem as applied to ac circuits.

Unit III: Frequency Selective Networks (08)

Significance of Quality factor. **Series Resonance**: Impedance, Phase angle variations with frequency, Voltage and current variation with frequency, Bandwidth, Selectivity. Effect of Rg on BW & Selectivity. Magnification factor.

Parallel resonance: Resonant frequency and admittance variation with frequency, Bandwidth and selectivity. General case: Resistance present in both branches. Comparison and applications of series and parallel resonant circuits.

Unit IV: Filters and Attenuators (12)

Filters & Attenuators: Filter fundamentals, pass and stop band, constant k prototype, LPF, HPF, BPF, Band stop filter, m-derived filters, composite filter design. Attenuators: Definition and Units of attenuation, Bartlett's bisection theorem, lattice attenuator, symmetrical T, π and bridged attenuator, asymmetrical L-section attenuator, Ladder attenuator

Types of Transmission lines, Transmission Line Equation, Equivalent circuits, Primary and Secondary line constants

Unit V: Laplace Transform and Its Applications (08)

Introduction to complex frequency, Definition of Laplace Transform, Basic Properties of Laplace Transform, Inverse Laplace Transform Techniques, Laplace Transform of Basic R, L and C components, Synthesis of Few typical waveforms & their Laplace Transform, Transient response of simple electrical circuits such as RL & RC to standard inputs and evaluation of initial and final conditions.

Unit VI: Two Port Network Parameters and Functions (10)

Terminal characteristics of network: Z, Y, h, ABCD Parameters; Reciprocity and Symmetry conditions, Applications of the parameters. Network functions for one port and two port networks, Pole-zeros of network functions and network stability,

Text Books :

1. M.E. Van Valkenburg : Network Analysis, PHI
2. D. Roy Choudhary : Network and systems, New Age Publication
3. Linear Network Theory : Kelkar and Pandit, Pratibha Publications.

Reference Books:

1. Circuit Theory : Chakraborti , Dhanpat Rai
2. Engineering Circuit Analysis : Hayt W.H. & J.E. Kemmerly , TMH
3. Network analysis with Applications : William D Stanley, Pearson Education
4. Network analysis : G.K. Mittal, Khanna Publications

Applied Mathematics- IV (EN/ET)

Scheme (Theory: 4 hrs, Tutorial :1 hr)

UNIT – I: NUMERICAL METHODS (12 Hrs)

Error Analysis, Solution of Algebraic and Transcendental Equations: Method of False position Newton–Raphson method and their convergence, Solution of system of simultaneous linear equations: Gauss elimination method, Crout's method and Gauss Seidel method, Numerical solution of ordinary differential equation: Taylor's series method, Runge- Kutta 4^{th} order method. Euler's modified method. Milne's Predictor- Corrector method, Runge- Kutta method to solve Simultaneous first order differential equations, Largest Eigen value and Eigen vector by Iteration method.

UNIT – II: Z-TRANSFORM (08Hrs)

Definition , Convergence of Z-transform and Properties, Inverse Z-transform by Partial Fraction Method, Residue Method (Inversion Integral Method) and Power Series Expansion, Convolution of two sequences. Solutions of Difference Equations with Constant Coefficients by Z- transform.

UNIT - III: SPECIAL FUNCTIONS AND SERIES SOLUTION(12 Hrs)

Series Solution of Differential Equation by Frobanius method, Bessel's equation and Bessel's functions, Legendre's polynomials, Recurrence relations, Rodrigue's formula , Generating functions, Orthogonal properties of $J_n(x)$ and $P_n(x)$.

UNIT – IV: THEORY OF PROBABILITY (10 Hrs)

Axioms of Probability, Conditional Probability, Baye's Rule, Random variables: Discrete and Continuous random variables, Probability function and Distribution function, Joint distributions, Independent Random Variables, Conditional Distributions.

UNIT – V: MATHEMATICAL EXPECTATIONS (10 Hrs)

Definition Mathematical Expectation, Functions of Random Variables, Variance and Standard Deviation, Moments, Moment generating function, Covariance, Correlation Coefficient, Conditional Expectations, Other measures of central tendency and dispersion, Skewness and Kurtosis.

UNIT – VI: PROBABILITY DISTRIBUTIONS (08 Hrs)

Binomial distribution, Poisson distribution, Normal distribution, Relation between Binomial, Poisson and Normal distribution, Central Limit theorem, Exponential Distribution.

Text Books:

5. Higher Engineering Mathematics by B.S. Grewal, 40th Edition, Khanna Publication
6. Theory & Problems of Probability and Statistics by Murray R. Spiegel , Schaum Series, McGraw Hills
7. Advanced Engineering Mathematics by Erwin Kreysizig, 8th Edition, Wiley India

Reference Books

1. Introductory methods of Numerical Analysis by S.S. Sastry, PHI
2. A Text Book of applied Mathematics, Volume I & II by P.N. Wartikar & J.N. Wartikar, Poona Vidyarthi Griha Prakashan
3. Advanced Mathematics for Engineers by Chandrika Prasad,
4. Digital Signal Processing, by John Proakis and D.G. Manolakis, Pearson (for Z-Transform)
5. A text book of Engineering Mathematics by N. P. Bali & M. Goyal, Laxmi Publication.

B. E. Fourth Semester

(Electronics / Electronics & Communication/ Electronics & Telecommunication Engg.)

POWER DEVICES AND MACHINES

Duration : 3 Hr.

College Assessment : 20 Marks

University Assessment : 80 Marks

Subject Code : BEENE402T/ BEECE402T/ BEETE402T [4 – 0 – 1 – 5]

Objectives : To teach the basic concepts of power electronics. Also to study the important power devices and machines in detail along with basic applications of SCR as controlled rectifier. To get skill of developing and design related to power electronic circuits.

Outcomes :

After learning this subject, the students will

1. Understand the basics of different components used in Power Electronics.
2. Understand the working and characteristics of different power devices along with their applications in Electronic circuits.
3. Understand the concept of AC-DC converters, Choppers, Inverters which are widely used in industries.
4. Understand the different AC/DC machines and their speed control methods.

Unit I : Thyristors **(12)**

SCR : Construction, Operation, Transistor analogy, Static & dynamic Characteristics, Switching characteristics, SCR Ratings, Gate characteristics, Triggering requirements, Triggering techniques, Isolation Techniques, Pulse triggering, Burst triggering

TRIAC : Construction, Operation, steady stage characteristics, Triggering modes, Principle of DIAC, Phase control using TRIAC

Unit II : **Power Devices** **(10)**

IGBT : Construction, operation, Steady stage characteristics, Switching characteristics, Safe operating area, Need for gate/base drive circuits, Isolation techniques, Base drive circuits for Power BJT

Power MOSFET : Construction, operation, Static characteristics , Switching characteristics , forward and reverse bias operation, Gate drive circuits for Power MOSFET and IGBT.

GTO : Construction, Operation, Turn-off mechanism, Applications.

Unit III : **(10)**

Phase controlled Rectifiers (AC-DC Converters) : Single phase half Wave controlled, full wave controlled rectifiers with R and RL load, Bridge Configurations with R and RL load, Effect of Free-wheeling diode, Three phase full wave and half wave controlled with resistive load.

AC-AC Converters : Basic Principle, Operation , Single phase AC voltage controller for R and RL loads, Working of Three phase AC-AC controller with R Load.

Unit IV : Power Converters **(10)**

DC-DC converters (Chopper) : Working principle of chopper, Types of chopper : Step-Up & Step-Down chopper for RL Load, Class-A, class-B, Class-C, Class-D and Class-E chopper, Control Strategies

DC-AC Converters (Inverter) : Classification of inverter, Working Principle of single phase Half Bridge and Single Phase Full Bridge inverter for R and RL load, Three phase Bridge inverter for Resistive (Star) load.

Unit V : **(10)**

Three Phase Transformers : Construction, Different Connections : Star-Star, Delta-Delta, Star-Delta, Delta-Star, Open Delta Connection, Scott Connection, Parallel operation.

Three Phase Induction Motor : Principle of operation, Necessity of starters , DOL starter, Autotransformer starter, Star-Delta Starter, Speed control techniques of three-phase induction motor.

Unit VI : **(08)**

DC Motors : Principle of Operation, Types of Motor, Speed Control of Shunt Motor : Flux Control, Armature Control and voltage control method, Speed Control of Series : Flux Control, Rheostatic Control method

Universal Motor : Construction, Working ,characteristics and applications.

Text Books :

1. M.H. Rashid : “Power Electronic circuits devices and applications”, PHI Publications.
2. M.D. Singh & Khanchandani : “Power Electronics”, TMH Publications, New Delhi.
3. B.L. Theraja : “Electrical Technology” , Volume-2, S.Chand Publications

Reference:

1. P.C. Sen : “Modern Power Electronics”, S. Chand & Co, New Delhi.
2. P. Bhimra ,” Power Electronics”, Khanna publications
3. Nagrath Kothari : “Electrical Machines”, TMH Publications.

B. E. Fourth Semester

(Electronics / Electronics & Communication/ Electronics & Telecommunication Engg.)

POWER DEVICES AND MACHINES

Duration : 2 Hr.

College Assessment : 25 Marks

University Assessment : 25 Marks

Subject Code : BEENE402P/ BEECE402P/ BEETE402P **[0 – 2 – 0 – 1]**

Objectives : To teach the basic concepts of power electronics. Also to study the important power devices and machines in detail along with basic applications of SCR as controlled rectifier. To get skill of developing and design related to power electronic circuits.

Outcome :

After completion of practicals, the students will

1. Understand the working and nature of characteristics of different power components used in Power Devices.
2. Be able to calculate performance parameters for different devices.
3. Be able to perform different tests on Transformers and motors for calculating the losses, efficiency, regulation etc.
4. Understand the concept of starters used for starting AC/DC motors.
5. Understand different speed control methods for motors.

List of Experiments :

1. To study and plot V-I Characteristics of SCR.
2. To study and plot V-I Characteristics of TRIAC.
3. To study UJT as a relaxation oscillator.
4. To study and plot IGBT characteristics.
5. To study and plot characteristics of DC Chopper.
6. To study and plot characteristics of Single phase converter.
7. To study Series Inverter.
8. To perform O.C. and S.C. Test on Three Phase Transformer.
9. To study Load test on DC motor.
10. To study speed control of DC shunt motor.
11. To perform No-Load and Block Rotor test on Three Phase Induction Motor.
12. To study Starters of AC and DC motor.
13. To find slip of Three Phase Induction Motor.

Note : Minimum 8 practicals to be conducted.

B. E. Fourth Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

ELECTROMAGNETIC FIELDS

Duration : 3 Hr.

College Assessment : 20 Marks

University Assessment : 80 Marks

Subject Code : BEENE403T/ BEECE403T/ BEETE403T [4 – 0 – 1 – 5]

Objectives : To provide the students of Engineering with a clear and logical presentation of basic concepts and principles of electromagnetic.

Outcomes :

After the completion of this subjects, the students will

1. Understand the concepts of Electric, Magnetic and Electromagnetic fields required to understand the concepts of Electronic Communication.
2. Understand the different coordinate system for mathematical analysis of Electromagnetic Engineering.
3. Understand the different theorems and their use in Electromagnetic field.
4. Understand the use of waveguides for the transmission of electromagnetic waves at higher frequencies.
5. Understand the basic concepts of Radiation and Elements used for radiation along with the basic terminologies.

UNIT I : ELECTROSTATICS (12)

Introduction to Cartesian, Cylindrical and Spherical coordinate systems, Electric field intensity, flux density, Gauss's law, Divergence, Divergence Theorem, Electric potential and

potential gradient.

UNIT II: MAGNETOSTATICS: (10)

Current density and continuity equation, Biot-Savert's law, Ampere's circuital law and applications, Magnetic flux and Flux density, Scalar and Vector magnetic potentials.

UNIT III: MAXWELL S EQUATIONS AND BOUNDARY CONDITIONS: (08)

Maxwell's equations for steady fields. Maxwell's equations for time varying fields. Electric and magnetic boundary conditions.

UNIT IV :ELECTROMAGNETIC WAVES (10)

Electromagnetic wave equation, wave propagation in free space, in a perfect dielectric, and perfect conductor, skin effect, Poynting vector and Poynting theorem, reflection and refraction of uniform plane wave at normal incidence plane, reflection at oblique incident angle

UNIT V: WAVEGUIDES (10)

Introduction, wave equation in Cartesian coordinates, Rectangular waveguide, TE, TM, TEM waves in rectangular guides, wave impedance, losses in wave guide, introduction to circular waveguide.

UNIT VI: RADIATION (10)

Retarded potential, Electric and magnetic fields due to oscillating dipole (alternating current element), power radiated and radiation resistance, application to short monopole and dipole. Antenna Efficiency, Beam-width, Radiation Intensity, Directive Gain Power Gain & Front To Back Ratio. Advance topics on the subject

TEXT BOOKS:

1. W.H Hayt. and J.A. Buck : " Engineering Electromagnetics", McGraw Hill Publications.

2. Antenna & wave propogation, by K. D. Prasad, PHI Publication.

3. E.C. Jordan and K.C.Balamin : "Electromagnetic Waves and Radiating System", PHI Publications.

REFERENCE BOOKS:

1. Rao : "Elements of Engineering Electromagnetics", Pearson education

2. E J.D Krauss : "Electromagnetics" , Mc-Graw Hill Publications.

3. Fields and Waves in Communication Electronics (3rd edition), by S. Ramo and R. Whinnery, John Wiley and Sons.
4. R.S. Kshetrimayum: “Electromagnetic Field Theory”, CENGAGE Learning Publications.
5. John Reitz, F. Milford, R.W. Christy : “Foundations of Electromagnetic Theory”, Pearson Publications.

B. E. Fourth Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

DIGITAL CIRCUITS AND FUNDAMENTAL OF MICROPROCESSOR

Duration : 3 Hr.

College Assessment : 20 Marks

University Assessment : 80 Marks

Subject Code : BEENE404T / BEECE404T/ BEETE404T [4 – 0 – 1 – 5]

Objectives : To acquaint students with various basic digital gates used in digital system and develop logical circuits using Boolean gates, construction of various logic circuits using basic gates.

Outcomes : At the end of the course the student will be able to analyze, design, and evaluate digital circuits of medium complexity, that are based on SSIs, MSIs, and programmable logic devices.

Unit I: Combinational Circuits (08)

Standard representations for logic functions, k map representation of logic functions (SOP & POS forms), minimization of logical functions for min-terms and max-terms (upto 4 variables), don't care conditions, Design Examples: Arithmetic Circuits, BCD - to – 7 segment decoder, Code converters.

Unit II :Logic Circuit Design (12)

Adders and their use as substractor, look ahead carry, ALU, Digital Comparator, Parity generators/checkers, Static and dynamic hazards for combinational logic.

Multiplexers and their use in combinational logic designs, multiplexer trees, Demultiplexers, Encoders & Decoders .

Unit III: Sequential Logic Design (10)

1 Bit Memory Cell, Clocked SR, JK, MS J-K flip flop ,D and T flip-flops. Use of preset and clear terminals, Excitation Table for flip flops. Conversion of flip flops.

Unit IV : Application of Flip flops: (10)

Registers, Shift registers, Counters (ring counters, twisted ring counters),Sequence Generators, ripple counters, up/down counters, synchronous counters, lock out, Clock

Skew

Unit V: Digital Logic Families (08)

Classification of logic families , Characteristics of digital ICs-Speed of operation , power dissipation, figure of merit, fan in, fan out, Comparison table of Characteristics of TTL, CMOS, ECL, RTL, I^2L, DCTL.

Classification and characteristics of memories: RAM, ROM, EPROM, EEPROM, NVRAM, SRAM, DRAM, expanding memory size, Synchronous DRAM (SDRAM), Double Data Rate SDRAM, Synchronous SRAM, DDR and QDR SRAM, Content Addressable Memory

Programmable logic devices: Detail architecture, Study of PROM, PAL, PLA, Designing combinational circuits using PLDs.

Unit VI: Fundamental of Microprocessor (12)

Introduction to microprocessor, Architecture of 8085 microprocessor, Addressing modes, 8085 instruction set, Concept of assembly language programming, Interrupts.

Text Books:

1. Morris Mano : " An approach to digital Design", Pearson Publications.

2. Ramesh Gaonkar : " Microprocessor Architecture, Programming and Applications with the 8085", Penram International Publications.

3. W. Fletcher : "Engg. Approach to Digital Design", PHI Publications.

Reference Books

1. Wakerly Pearon : "Digital Design: Principles and Practices", Pearon Education Publications.

2. Mark Bach : "Complete Digital Design", Tata MCGraw Hill Publications

3. R.P. Jain : "Modern digital electronics" , TMH Publications.

B. E. Fourth Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

DIGITAL CIRCUITS AND FUNDAMENTAL OF MICROPROCESSOR

Duration : 2 Hr.

College Assessment : 25 Marks

University Assessment : 25 Marks

Subject Code : BEENE404P / BEECE404P/ BEETE404P [0 – 2 – 0 – 1]

Objectives : To learn the basic methods for the design of digital circuits and provide the fundamental concepts used in the design of digital systems.

Outcome :

After the completion of practicals, the students will

1. Understand the fundamental of basic gates and their use in combinational and sequential circuits.
2. Understand the use of digital components as a switching elements.
3. Be able to generate basic arithmetic and logical circuits required in microcomputer systems.

List of Experiments :

1. To verify the truth table of different Logic Gates.
2. To study and verify the NAND and NOR gates as a universal gates.
3. To implement any logic function using basic gates.
4. To study and verify truth table of Multiplexer and Demultiplexer.
5. To study and verify the truth table of Half adder and Full Adder.
6. To study and verify the truth table of different types of Flip-flops.
7. To study and verify truth table of Encoder and Decoder.
8. To study and implement ALU.
9. To study the functioning of Shift Register.
10. To study the functioning of Up/Down counter .
11. To study the architecture of 8085 microprocessor.
12. Write and execute an ALP for multiplication of two 8 bit numbers.
13. Write and execute an ALP to count number of 1's in 8 bit number.

Note : Minimum 8 Practicals to be conducted.

B. E. Fourth Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

SIGNALS AND SYSTEMS

Duration : 3 Hr.

College Assessment : 20 Marks

University Assessment : 80 Marks

Subject Code : BEENE405T/ BEECE405T/ BEETE405T [4 – 0 – 1 – 5]

Objectives :

The concept of this subject enable you to understand how signals, systems and inference combine in prototypical tasks of communication, control and signal processing.

Outcomes :

After completion of this subject, the students will

1. Get knowledge about different types of signals and systems used in communication Electronics.
2. Understand the concept of probability and its use in communication system.
3. Be able to embed the use of fourier series and fourier transform for feature extraction of different electronic signals.
4. Understand different coding schemes and able to apply selective coding scheme for the application needed.
5. Understand the different analog and digital modulation schemes

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UNIT-I: SIGNAL ANALYSIS (12)

Analysis of Signals, Representation of signals using a set of orthogonal signals, Fourier series representation of periodic signals. Fourier transform of periodic and non-periodic signals, Properties of Fourier Transform, convolution in time & frequency domain. Sampling theory for band limited signals.

UNIT-II: PROBABILITY & RANDOM PROCESS (12)

Probability, random variables and stochastic processes. Review of probability theory, random variables, probability density and distribution function, Random processes, periodic processes,

stationary processes. Auto correlation, cross correlation, applications to signal analysis,. Power density and spectral density function.

UNIT-III: LINE CODING (08)

Bandwidth and rate of pulse transmission, Inter symbol Interference, PSD of Digital signals, Line coding, RZ, NRZ, Polar, Manchester coding Schemes. Nyquists's first & second Criterion for zero ISI, Pulse shaping, tapped delay line filters and adaptive equalization.

UNIT-IV: MODULATION TECHNIQUES (10)

Introduction of Amplitude Modulation and Frequency modulation in brief, Elementary theory of SSB, DSB and noise calculation, noise calculation in SSBSC, DSB with carrier, Square law Demodulation, Envelope Demodulator, Noise in FM reception, Effect of Transmitter noise, FM threshold Effect

Quantization noise, types of Quantization –Uniform and Non-Uniform, A-Law and μ Law, Pulse Code Modulation , Delta modulation, Adaptive Delta modulation,

UNIT-V: DIGITAL CARRIER SYSTEM (08)

Digital Carrier Systems: Matched filter detection of binary signals, decision, threshold, error probability, Salient features of ASK, FSK & PSK system DPSK systems including M-ary Communication Systems.

UNIT-VI: INFORMATION THEORY AND CODING (10)

Information theory, channel capacity of discrete & continuous channels, Error control coding Hamming distance, Linear block codes, CRC, Convolution Codes.

Text Books:

1. B.P.Lathi : " Modern Digital & Analog Communication Systems" :.
2. Simon Haykin, Barry Wan Veen : "Signals and Systems", John Wiley and Sons Publications.
3. Oppenheim, Wilsky, Nawab : "Signals and Systems", Person Education Publications
4. A.B. Carlson : " Communication systems",

Reference Books:

1. Communication Systems: B.P. Lathi.
2. R.P. Singh, S.D. Sapre : "Communication Systems: Analog and Digital", McGraw Hill Publications.
3. Nagrath I.J., Sharan S.N., Ranjan R., Kumar S. : "Signals and Systems", Tata McGraw Hill Publications.

B.E. Fourth Semester

(Electronics/Electronics & Communication/ Electronics & Telecommunication Engg)

ENVIRONMENTAL STUDIES

Duration : 3 Hr.

College Assessment : Grade

University Assessment : 00 Marks

Subject Code : BEENE406T/ BEECE406T/ BEETE406T [3 – 0 – 0 – 0]

Objectives :

The goals of the Environmental Studies subject are to:

1) Increase understanding of how the world as a bio-physical system works, foster awareness of the earth's vital signs, and sharpen the ability of students to understand the nature and results of science.

2) Encourage a critical understanding of the various historical, political, economic, ethical, and religious forces that have shaped and continue to shape our world.

3) Nurture an ecological frame of mind which is willing and able to see things whole and thus resist the narrow specialization that can blind us to the connections between disciplines and bodies of knowledge.

4) Cultivate people who have sufficient knowledge, care, and practical competence to live in an ecologically responsible way.

5) Provide opportunities for students to explore the connections between environmental issues and different religious and philosophical traditions, and to encourage students who are Christian to reflect on their faith and its vision of shalom.

Outcome :

Through the course sequence in ESS, students will be able to:

1. Recognize major concepts in environmental sciences and demonstrate in-depth understanding of the environment.
2. Develop analytical skills, critical thinking, and demonstrate problem-solving skills using scientific techniques.

Unit I : Introduction **(2)**

Definition, Scope and importance, Need for public awareness – institutions in environment, people in environment.

Unit II : Natural Resources **(2)**

Renewable and non-renewable and associated problems; Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

Unit III : Ecosystems **(8)**

Concept of an ecosystem- Understanding ecosystems, ecosystem degradation, resource utilization. **Structure and functions of an ecosystem** – producers, consumers and decomposers.

Energy flow in the ecosystem- water, carbon, oxygen, nitrogen and energy cycles, integration of cycles in nature. **Ecological succession**; food chains, food webs and ecological pyramids; ecosystem types – characteristic features, structure and functions of forest, grassland, desert and aquatic ecosystems.

Unit IV : Bio-diversity
(10)

Introduction – Biodiversity at genetic, species and ecosystem levels
Bio-geographic classification of India
Value of biodiversity – Consumptive use value, productive use value, social, ethical, moral, aesthetic and optional value of biodiversity , Threats to bio-diversity nation; hotspots of biodiversity. **Threats to bio-diversity** – habitat loss, poaching of wildlife, man-wild life conflicts. Common endangered and endemic plant and animal species of India.
Insitu and Exsitu conservation of biodiversity.

Unit V : Pollution **(6)**

Definition; causes, effects and control measures of air, water, soil, marine, noise and thermal pollutions and nuclear hazards. **Solid waste management** – Causes, effects and control measures of urban and industrial waste. Role of individual and institutions in prevention of pollution.

Disaster management – Foods, earthquake, cyclone, landslides

Unit VI : Social Issues and the Environment
(12)

Unsustainable to sustainable development; Urban problems related to energy; water conservation, rainwater, harvesting, watershed management; problems and concerns of resettlement and rehabilitation of affected people.

Environmental ethics – issues and possible solutions – Resource consumption patterns and need for equitable utilization; equity disparity in Western and Eastern countries; Urban and rural equity issues; need for gender equity.

Preserving resources for future generations. The rights of animals; Ethical basis of environment education and awareness; conservation ethics and traditional value systems of India.

Climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocausts.

Wasteland Reclamation; Consumerism and Waste products.

Environment legislations – The Environment (Protection) Act; The water (Prevention and Control of pollution) Act; The Wildlife protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislations – environment impact assessment 9EIA), Citizens actions and action groups.

Public Awareness – Using an environmental calendar of activities, self initiation.

Unit VII : Human Population and the Environment
(10)

Global population grown, variation among nations, population explosion; Family Welfare programmes – methods of sterilization; Urbanization.

Environment and human health – Climate and health, infectious diseases, water related diseases, risk due to chemicals in food, cancer and environment.

Human rights – Equity, Nutrition and health rights, Intellectual property rights (IPRS), Community Biodiversity registers (CBRs)

Value education – environmental values, valuing nature, valuing cultures, social justice, human heritage, equitable use of resources, common property resources, ecological degradation.

HIF/AIDS; Woman and Child Welfare; Information technology in environment and human health

Text Books :

1. Erach Bharucha : “A Text Book of Environmental Studies”
2. M. N. Rao and HVN Rao : “ Air Pollution”
3. S.S. Dara : “Environmental Chemistry and Pollution Control”
4. Mahesh Rangarajan : “Environmental Issues in India”
5. D.L. Manjunath : “Environmental Studies”.

B. E. Fourth Semester

(Electronics / Electronics & Communication / Electronics & Telecommunication Engg)

SOFTWARE WORKSHOP

Duration : 2 Hr.
College Assessment : 25 Marks
University Assessment : 25 Marks

Subject Code : BEENE407P / BEECE407P/ BEETE407P [0 – 2 – 0 – 1]

Objectives :

1. To instill in students the ability to formulate and solve engineering problems in electric and electronic circuits involving both steady state and transient conditions using MATLAB and pSpice.
2. Learn to use the pSpice simulation software tool for the analysis of Electrical and Electronic
   Circuits.
3. Learn to insert simple instructions to MATLAB, to find the solution of a system of linear
   algebraic equations, with constant (real and complex) coefficients.

Outcome :

After the completion of the Practicals , the students will be able to:

1) Write MATLAB program for any given problem.
2) Plot various functions using different graphical techniques.
3) Make mathematical analysis for the given problem.
4) Get the complete expert hand on pSpice Software.
5) To draw, analyze and plot the electronic circuits using pSpice Software.

Practical based on following topics should be conducted

SECTION - A

1.Introduction to MATLAB

MATLAB environment, different windows in matlab, getting help, important commands, matlab
as scratchpad, different types of files in matlab, complex variables and operations, plot commands

2. Matrices & vectors

Matrix manipulation, matrix and array operations, arithmetic operators, relational operators, logical operators, solution of matrix equation Ax= B, Gauss elimination, inverse of matrix Eigen values and Eigen vectors, Determinant, least square solutions.

3. Branching statements, loops and programming design

If statements, for loops, while, switch, Break and continue, nesting loops, if else with logical arrays, function programming.

4. Symbolic manipulation
Calculus – limit, continuity, differential calculus, differential equation, integration, integral transforms & Taylor series.

SECTION – B

5. Signals manipulations
Plotting standard signals, continuous and discrete such as step, ramp, sine, Generating signals from combination of different, signals and manipulation of signals.

6. Introduction to PSpice
Introduction to PSpice, different windows in PSpice, tools, libraries, component properties, circuit designing in PSpice.

7. Device characteristics
Plotting characteristics of semiconductor devices – diode, bipolar junction transistor, field effect transistor, UJT and SCR

8. Circuit Simulation & Introduction to PCB designing
Simulation of following circuits: half wave & full wave rectifier, Zener shunt regulator, transistorized RC coupled amplifier, clipper and clamper Introduction to PCB design

TERM WORK: Minimum five experiments each from MATLAB & PSpice are conducted based on the following list.

LIST OF EXPERIMENTS
MATLAB
1. Introduction to MATLAB Environment
2. To study simple matrix and array manipulations using Matlab
3. Programming using MATLAB
4. Calculus using MATLAB
5. To plot signals: discrete and continuous using MATLAB
6. Function programming and MATLAB
7. Signal Manipulation using MATLAB

PSpice
1. Design and simulation of resistive circuit
2. Plotting of VI characteristics of diode
3. Plotting of VI characteristics of BJT/FET
4. Plotting of VI characteristics of UJT/SCR
5. Design and simulation of half wave & full wave rectifier
6. Design and simulation of clipper and clamper circuits
7. Simulation of frequency response of a transistorized RC coupled amplifier

References:-

1. Stephen Chapman : "Matlab programming for Engineers" Thomson Learning Publication
2. Rudra Pratap : "Getting started with MATLAB" Oxford University press Publications.
3. Robert Strum and Donald Kirk : "Contemporary linear systems using MATLAB" Thomson Learning Publications.
4. Duane Hanselman & Bruce Little field : "Mastering MATLAB" Pearson Publications
5. Brain R. Hunt, Ronald L. Lipsman & Jonathan M. Rosenberg : "A guide to MATLAB" Cambridge University Press
6. Martin Golubitsky, Michael Dellnitz : "Linear Algebra and differential Equations using MATLAB" , International Thomson Publications.
7. Muhammad Rashid : "SPICE for Circuits and Electronics using PSpice", PHI Edition
8. Robert Boylestad & Nashelsky : "Electronic Devices & Circuit theory" PHI publications