Applied Mathematics- IV (EN/ET)
Scheme (Theory: 4 hrs, Tutorial :1hr)

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 4th 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) andPower Series Expansion, Convolution of two sequences. Solutions ofDifference 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
andBessel‟s functions, Legendre‟s polynomials, Recurrence relations,Rodrigue‟s formula , Generating functions, Orthogonal properties of Jn(x) andPn(x).

UNIT – IV: THEORY OF PROBABILITY (10 Hrs)

Axioms of Probability, Conditional Probability, Baye‟s Rule, Randomvariables: Discrete and Continuous random variables, Probability function andDistribution 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, Relationbetween Binomial, Poisson and Normal distribution, Central Limit theorem,Exponential Distribution.

Text Books:

1. Higher Engineering Mathematics by B.S. Grewal, 40th Edition, Khanna Publication
2. Theory & Problems of Probability and Statistics by Murray R. Spiegel , Schaum Series, McGraw Hills
3. 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 VidyarthiGrihaPrakashan
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 operatingarea, 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 : Phase controlled Rectifiers (AC-DC Converters)(10) :

Single phase half Wave controlled, full wavecontrolled rectifiers with R and RL load, Bridge Configurations with R and RL load, Effect of Freewheeling 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 DC-DC converters (Chopper)(10):

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 :**Three Phase Transformers (10)**:

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, Auto transformer starter, Star-Delta Starter, Speed control techniques of three-phase inductionmotor.

Unit VI : DC Motors (08):

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. NagrathKothari : “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, fluxdensity, 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", PHIPublications.

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, I2L, 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

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, Powerdensity 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 skillsusing 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. ErachBharucha : “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, matlabas 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. RudraPratap : “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