

**SYLLABUS
PRESCRIBED FOR
FOUR YEAR B.E. DEGREE COURSE IN
ELECTRICAL ENGINEERING
(ELECTRONICS & POWER) /
ELECTRICAL & ELECTRONICS ENGINEERING /
ELECTRICAL ENGINEERING
(ELECTRICAL & POWER) /
ELECTRICAL ENGINEERING
SEMESTER PATTERN
(CREDIT GRADE SYSTEM)
THIRD & FOURTH SEMESTER**

SEMESTER : THIRD

BRANCH ABBREVIATIONS :-

EP : Electrical Engg. (Electronics & Power)

EX : Electrical & Electronics Engg.

EL : Electrical Engg. (Electronics & Power)

EE : Electrical Engg.

3 EP01/3EX01/3EL01/3EE 01

MATHEMATICS-III

SECTION-A

UNIT-I: Ordinary differential equations:- Completer solution, Operator D, Rules for finding complementary function, the inverse operator, Rules for finding the particular integral, Method of variations of parameters, Cauchy's and Legendre's linear differential equations. Simultaneous linear differential equations with constant co-efficient, Applications to electrical circuits.

UNIT-II : Laplace transforms: definition, standard forms, properties of Laplace transform, inverse Laplace transform, initial and final value theorem, Convolution theorem, Laplace transform of impulse function, Unit step function, Laplace transforms of periodic function.

UNIT-III : a) Application of L.T. to linear differential equations with constant coefficients & Simultaneous linear differential equations.

b) Fourier transforms- Definition, standard forms, inverse Fourier transform, Properties of Fourier transforms, Convolution theorem, Fourier sine and Fourier cosine transforms and integrals.

SECTION-B

UNIT-IV : a) Difference equation:- solution of difference equations of first order, Solution of difference equations of higher order with constant co-efficients.

b) Z-transform: Definition, standard forms, Z-transform of impulse function, Unit step functions, Properties of Z-transforms (Linearity, shifting, multiplication by k, change of scale), initial and final values, inverse Z-transforms (by direct division and partial fraction), Solution of difference equation by Z-transforms.

UNIT-V : Vector calculus: Scalar and vector point functions, Differentiation of vectors, Curves in space, Gradient of a scalar point function, and their physical meaning, expansion formulae (without proof).

UNIT-VI : Line, surface, volume integrals, irrotational and solenoidal vector fields, Stoke's and Divergence theorem (without proof).

BOOKS RECOMMENDED:-

- 1) Advanced Engineering Mathematics, 3 edi – Potter, Oxford University Press, 2008
- 2) Mathematical Techniques – Jordan and Smith 4/e – Oxford University Press, 2008
- 3) A Mathematical Companion for Science and Engineering Students – Brettenbach, Oxford University Press, 2008
- 4) Elements of Applied Mathematics by P.N.Wartikar and J.N.Wartikar
- 5) Advancing Engg. Mathematics by E.K.Kreyzig.

3 EP02/3EX02/3EL02/3EE 02

NETWORK ANALYSIS

SECTION-A

Unit I : a) Terminal Element Relationships: V-I relationship for Inductance and Capacitance- Constant Flux Linkage Theorem and Constant Charge Theorem- v-i relationship for Independent Voltage and Current Sources - v-i relationship for dependent voltage and current sources- Source Functions: unit impulse, unit step, unit ramp and inter relationship, sinusoidal input, generalized exponential input.

b) Basic Nodal and mesh Analysis: Introduction, Nodal analysis, the super node, mesh analysis, the super mesh, nodal vs mesh analysis

Unit II : Network Theorems : Linearity and superposition, source transformations, Thevinin's theorem, Norton's theorem, Maximum power transfer theorem, Delta-wye transformations Reciprocity theorem, Milliman's theorem, Substitution theorem, Compensation theorem, Tellegen's theorems

Unit III : Time Domain Analysis of Circuits: Linear Differential Equations for Series RC, Parallel RC, Series RL, Parallel RL, Series RLC, Parallel RLC and Coupled Circuits-Complete Solution for step/impulse/sinusoid voltage/current inputs-Natural Response-Transient Response-Time Constant-Rise and Fall times-Concept of d.c steady state and sinusoidal steady state-Frequency Response of simple circuits from steady state solution-Solution of two mesh circuits by differential equation method-Determination of initial conditions.

SECTION-B

Unit IV : a) Review of Laplace Transforms: Laplace Transform-Transform Pairs-Gate Functions-Shifting Theorem-Solution of Differential Equations by Laplace Transforms-Initial and Final Value Theorems-Laplace Transforms of periodic signals-Inversion of transforms by partial fractions-Convolution Theorem and Convolution Integral. *(Review to be done by students. No class hour will be spent for this review.)*

b) Transformation of a Circuit into s-domain: Transformed equivalent of inductance, capacitance and mutual inductance -Impedance and admittance in the transform domain - Node Analysis and Mesh Analysis of the transformed circuit - Nodal Admittance Matrix and Mesh Impedance Matrix in the s-domain - Solution of transformed circuits including mutually coupled circuits-Input and transfer immittance functions - Transfer functions - Impulse response and Transfer function - Poles and Zeros - Pole Zero plots,

Unit V : a) Sinusoidal Steady State analysis: Introduction, characteristics of sinusoids, forced response to sinusoidal functions, the complex forcing function, The phasor, phasor relationships for R L C, impedance and admittance , sinusoidal steady state analysis with phasors.

b) Fourier Series: Fourier Series representation of non-sinusoidal periodic waveforms - Fourier Coefficients-Determination of Coefficients-Waveform Symmetry-Exponential Fourier Series-Discrete Amplitude and Phase Spectra-Steady State Solution of Circuits with non-sinusoidal periodic inputs by Fourier Series

Unit VI : Two Port Networks: two port networks-characterizations in terms of impedance, admittance, hybrid and transmission parameters-inter relationships among parameter sets-Reciprocity Theorem-Interconnection of Two port networks: Series, Parallel and Cascade - Network Functions-Pole Zero plots and steady state response from pole-zero plots.

Books Recommended :-

- 1) Engineering Circuit Analysis 6/e By Hayt & Kemmerly TataMcgraw Hill 2004
- 2) Network Analysis, By M.E. Van Valkenberg PHI 2005
- 3) Electrical Linear Circuits – David Bell Oxford University Press 2008
- 4) Linear Circuit Analysis 2/e – DeCarlo and Lin Oxford University Press 2009
- 5) Network Analysis, P.Ramesh babu, SCITECH Publications,Chennai 2009
- 6) Circuit and Network Analysis By Sudhakar Shyammohan Tata Mc Graw Hill 2005
- 7) Circuits & Networks – Analysis, Design & Synthesis by M.S.Sukhija, T.K.Nagasarkar, Oxford University Press, 2010

3 EP03/3EX03/3EL03/3EE 03 ENERGY RESOURCES AND GENERATION

SECTION A

Unit I : Thermal and Hydro Power plant: Selection of site, working of various parts: Economizer, air preheater, condenser, cooling tower, coal handling system, ash handling system, Classification of hydro power plant according to available head, nature of load, functions of different components and their working.

Unit II : Nuclear and Diesel Power plant: Methods of producing nuclear reactions, functions of different components of nuclear plant, functions of different components of diesel plant

Unit III : Solar Energy and its measurement: Solar constants, solar radiation at earth's surface, solar radiation geometry, solar radiation measurement, estimation of average solar radiation, solar radiation on tilted surface, principle of solar energy conversion in to heat, flat plate collectors, energy balance equation and collector efficiency

SECTION B

Unit IV : a) Fuel cells: Chemistry applied to fuel cells, principle and operation ,classification and types of fuel cells, performance characteristics of fuel cells, classification of fuel cells system

b) Wind Energy: Basic principle of wind energy conversion, wind data and energy estimation, selection of site, basic components of wind energy conversion system (WECS), classification of WEC systems, generating system, energy storage, application of wind energy.

Unit V : Ocean and tidal energy: Ocean energy resources, ocean energy routes, ocean thermal energy conversion, progressive wave, wave data collection, Basic principle of tidal power, components of tidal power plants, operation methods of utilization of tidal energy, estimation of power and energy in simple single basin tidal system

Unit VI : Other non- conventional energy resources: Operating principle of energy from biomass, energy from biogas, geothermal energy, MHD power generation, energy from urban and rural waste, mini and micro hydroelectric power generation, principle and operation of fuel cells, classification and types of fuel cells, performance characteristics of fuel cells.

Books Recommended :-

- 1) Energy Science, Principles Technologies & Impacts, John Andrews & Nick Jelley, Oxford University Press, 2009
- 2) Renewable Energy – Power for Sustainable Future, Godfrey Boyle, Oxford University Press, 2004
- 3) Conventional Energy Technology By S.B.Pandya, Tata Mc GrawHill, 2005
- 4) Non Conventional Energy Resources By G.D.Rai, Khanna Publishers, 2001
- 5) Energy and Atmosphere By I.M.Campbell, Wiley, New York, 2006
- 6) Solar Energy By S.P.Sukhatme, Tata Mc-GrawHill, 2006
- 7) Conventional Energy Resources By B.H.Khan, Tata Mc GraWHill, 2003.

3 EP04/3EX04/3EL04/3EE 04 ELECTRONIC DEVICES AND CIRCUITS

SECTION-A

UNIT-I : P-N Junction diode theory, Rectifiers - Half wave, full wave and bridge rectifier. Filters-C, LC and their analysis, Zener diode and its applications.

UNIT-II : Theory and Analysis of Bipolar Junction transistor, 'H' Parameter, methods of biasing, their needs, 'Q' and stability factors, compensation techniques.

UNIT-III Study of typical transistor amplifier circuits

- i) Emitter follower,
- ii) Darlington emitter follower.
- iii) Bootstrap emitter follower,
- iv) RC coupled amplifier,
- v) Transformer coupled amplifier,
- vi) Cascaded amplifier,
- vii) Direct coupled amplifier,
- viii) Cascade stage.

SECTION-B

UNIT-IV : Class 'A' 'B' 'AB' and 'C' amplifiers, configuration of audio amplifiers, Calculations of power gain, efficiency, dissipation and distortion, oscillators, their criteria, Hartley, Colpitt and R-C oscillators, Crystal oscillator.

UNIT-V : Theory, construction and applications of Schottky diode, Tunnel diode, Varactor diode, Selenium diode, LED, Photo diode, PIN diode, photo-transistor.

UNIT-VI : FETs (JFET & MOSFET) : Types, Characteristics and parameters (g_m & r_{ds}), Applications of FET amplifiers, UJT: Characteristics, working, UJT as relaxation oscillator.

BOOKS RECOMMENDED:

- 1) Millman's Electronic Devices & Circuits by J. Millman, C. Halkias, Satyabrata Jit TMH 3rd ed, 2nd reprint 2011
- 2) Electronic Devices and Circuits 5/e – David Bell Oxford University Press
- 3) Microelectronic Circuits 5/3 – Sedra and Smith Oxford University Press
- 4) Boylestad R. and "Electronics Devices & Circuits", Prentice Hall of India Private Limited, New Delhi (Fifth Edition), 1993.

3 EP05/3EX05/3EL05/3EE 05 ELECTRICAL MEASUREMENT AND INSTRUMENTATION

SECTION A

Unit I : Measuring Instruments: Classification, deflecting, controlling, damping, braking torques. Basic principles of operation of Ammeter & Voltmeter: PMMC, MI, Electro dynamic, Electrostatic: construction, Principle of operation, torque equation, Scale shape, errors, merits & demerits of each type.

Unit II : Watt meters & Energy meters: Electro dynamic & Induction type: construction, theory of operation, torque equation, errors & demerits, Electronic energy meter. Analysis of three phase balanced load, Blondel's Theorem, Measurement of active & reactive power & energy in single phase & three phase circuits.

Unit III : a) Instrument Transformer: Need of extension of range: extension using shunt & multipliers Instrument transformers: CT & PT, Theory & construction, Phasor diagram, Ratio & Phase angle error, causes of error, applications Hall effect sensors for voltage and current measurement.

b) Special Measuring Instruments :- Maximum demand indicator, Trivector meter, Frequency meter, P.F. meter, Phase sequence indicator, Synchronoscope, stroboscope, potentiometers.

SECTION B

Unit IV : Measurement of circuit parameters: Different methods of measurement of low, medium & high value of resistance, sensitivity & accuracy of different methods.

AC & DC bridges : Wheatstone, Kelvin, Maxwell, Wein, Hay, Desauty, Anderson, Schering

Unit V : Generalized instrumentation system, characteristics of measurement & instrumentation system Transducers : Definition, classification, specification, selection & loading effect, Displacement, Velocity, force, & Torque transducers, Resistive, Inductive, capacitive, Strain gauge, Piezoelectric, current & voltage transducers.

Unit VI : Transducers for pressure & temperature: Manometer, Elastic members (Bellows, Bourdon tube, Diaphragm), RTD, Thermocouple, Thermister, Infrared & Crystal

Cathode ray oscilloscope: Time, frequency & phase angle measurement using CRO. Spectrum & Wave analyzer.

Books Recommended

- 1) Electronic Measurement & Instrumentation by Oliver – cage, TMH 4th reprint 2010
- 2) Electronic Instrumentation by H.S Kalsi, TMH 3rd edition, 2nd reprint 2011
- 3) Instrumentation for scientists and Engineers – Turner Oxford University Press 2008
- 4) Electronic Instrumentation & Measurement, David Bell Oxford University Press 2nd Ed
- 5) A course in Electrical, Electronics measurement and Instrumentation, By A.K.Sawhney Dhanpat Rai & sons 2006

- 6) Electrical measurement and measuring Instruments By Golding Wheeler Publishing 2003
 7) Electronic measurement and measuring Instruments By Co.

3 EP06/3EX06/3EL06/3EE 06 NETWORK ANALYSIS LAB

Any TEN experiments based on contents of 3 EP02/3EX02/3EL02/3EE 02 NETWORK ANALYSIS

3 EP07/3EX07/3EL07/3EE 07 ELECTRONIC DEVICES AND CIRCUITS LAB

**Any TEN experiments based on contents of 3 EP04/3EX04/3EL04/3EE 04
 ELECTRONIC DEVICES AND CIRCUITS**

3 EP08/3EX08/3EL08/3EE 08 ELECTRICAL MEASUREMENT AND INSTRUMENTATION LAB

**Any TEN experiments based on contents of 3 EP05/3EX05/3EL05/3EE 05 ELECTRICAL
 MEASUREMENT AND INSTRUMENTATION**

SEMESTER : FOURTH

4EP01/4EX01/4EL01/4EE 01

**ELECTRICAL MACHINES-I
 SECTION A**

Unit I: D.C. Machines

Construction, principle of operation, Emf equation, torque equation. Armature winding – Lap, wave, single layer, double layer. Armature reaction and commutation, method of improving commutation.

Unit II: D.C. Generators.

Types, characteristics and applications of d.c. shunt, series and compound generators. Parallel operation of d.c. shunt, series and compound generators. Introduction for conducting and reporting the test on d.c. machines as per Indian standard.

Unit III: D.C. Motors

Characteristics, applications of d.c. shunt, series and compound motors, starting and speed control, losses, efficiency and testing.

SECTION-B

Unit IV: Single phase Transformer.

Heat run test, separation of core losses in to its component, parallel operation, equivalent circuit. Autotransformer - construction, working, merits, demerits and application. Introduction for conducting and reporting the test on transformer as per Indian standard.

Unit V: Three phase Transformer:

Construction, working, types, connections, applications, testing, parallel operation, open delta, power transformer, distribution transformer construction.

Unit VI: Three phase to single phase, two phase, six phase, twelve phase conversion. Three-winding transformer and tap changing transformer. Wave forms of no-load current and inrush current phenomenon.

Books Recommended

Electrical Machines by D.P.Kothari, I.J.nagrath TMH 4th edition, 2nd reprint 2011
 ELECTRIC MACHINERY and Transformer, 3E – Bhag S Guru Oxford University Press
 Advance Electrical Technology By H.Cooton. 1999
 Substation Equipment By Satnam and Gupta 2003 .

4EP02/4EX02/4EL02/4EE 02

**ELECTROMAGNETIC THEORY
 SECTION A**

SECTION-A

Unit I : Review of Vector Analysis :cartesian, cylindrical and spherical co-ordinate systems, vector algebra and vector calculus. Line integral and multiple integrals. Gauss theorem.

Unit II : Electrostatics : Coulomb's law, electric field, Gauss flux theorem in integral and differential form. Electrostatics potential, Poisson and Laplace equations.

Unit III: Electrostatics fields in dielectrics : electric dipole, polarization. P and D vectors, boundary conditions. Capacitance and electrical energy.

SECTION-B

Unit IV: Magnetic fields : Biot-Stewart law, Ampere's law in integral and differential form. Continuity equation, time of relaxation. Vector and Scaler magnetic potential, electric current, J vector.

Unit V : Magnetic fields in materials : magnetic dipole equivalent volume and plane section curve. H vector, magnetization vector M, boundary conditions between magnetic materials, inductance, Electromagnetic Energy.

Unit VI: Maxwell equations and wave equations : Displacement current, time varying fields and Maxwell's equations, plane uniform magnetic waves. Depth of penetration Poynting vector.

Books Recommended

- 1) Engineering Electromagnetics by W.H.Hayt, J.A.Buck, TMH 7th edition 2010
- 2) Foundation of Electromagnetic Theory, John Reitz, F.J.Milford, R.W.Christy, Pearson education, 4th edition 2010
- 3) Elements of Engineering Electromagnetics, Nannapaneni Narayana Rao, Pearson education, 2006
- 4) Principles of Electromagnetics 4/e Mathew Sadiku Oxford University Press
- 5) Field Theory, D. Ganesh rao, C.K.Narayanapa PEARSON education ,2010

4EP03/4EL03/4EE 03

ANALOG AND DIGITAL CIRCUITS

SECTION-A

Unit I : Introduction to IC's : Characteristics of IC components, Operation amplifier; Block schematic internal circuits, Level shifting, overload protection, study of IC 741 op-amp, Measurement of op-amp parameter.

Unit II : Linear and Non-linear Application of Op-amp:- Inverting and noninverting amplifiers, voltage follower, integrator, differentiator differential amplifier, Sinusoidal RC-phaseshift and Wein bridge oscillators, clipping, clamping and comparator circuits using op-amps. Astable, bistable and monostable multi vibrator using op-amps.

Unit III : Other linear IC's : Block schematic of regulator IC 723, and its applications, study of 78 **, 79 ** and its applications, SMPS, Block schematic of timer IC 555 and its applications as a timer, astable, mono stable, bistable multivibrator and other applications, Operation of phase lock loop system and IC 565 PLL, its application.

SECTION-B

Unit IV : Basic Logic Circuits : Logic gate characteristics, NMOS inverter, propagation delay, NMOS logic gate, CMOS inverter, CMOS logic gates, BJT inverter, TTL, NAND gate, TTL output, state TTL logic families, ECL circuits, composition logic families.

Unit V : Combinational Digital Circuits: Standard gate assemblies, Binary adder, Arithmetic functions, Digital comparator, Parity check generator, Decoder / demultiplexer, Data selector / multiplexer, Encoder, ROM, Two dimensional addressing of ROM, ROM applications, PROM, EPROM, PAL AND PLAS.

Unit VI : Sequential Circuits and Systems: Bistable Latch, Flip-Flop clocked SR,J-K, T, D type shift Registers, counter. Design using flip-flops, Ripple and synchronous types, application of counters, Dynamic MOS shift registers, RAM, Bipolar RAM Cells.

BOOKS:-

1. Millman, Microelectronics, 2nd Ed., McGraw Hill.
2. Gayakwad, Op-Amp & LLG, 2nd Ed.
3. Malvino & Leach, Digital Principles & Applications, 4th Ed., McGraw Hill.
4. K.B.Botkar, Integrated Electronics (Khanna Publishers.)

4EP04/4EL04/4EE 04

MATHEMATICS-IV

SECTION-A

Unit I : a) Complex variables : analytic functions, Cauchy-Riemann conditions. Harmonic function, Harmonic conjugate functions, Milne's method.
b) Conformal mapping : mapping by elementary functions of the type $W=z+c$, $W=cz$, $W=1/z$, $W=z^2$, $W=e^z$, $W=z+1/z$ and bilinear transformation.

Unit II : Complex Integral : singular points, Taylor's series, Laurent's series, Cauchy's integral theorem and Cauchy's integral formula.
Residue : Cauchy's residue theorem. Contour integrals. Integration forms : $\int f(x) dx$, $\int (\sin x, \cos x) dx$

Unit III: Partial differential equations : first order and first degree p.d. equation type.
(i) $f(p, q) = 0$, (ii) $f(p, q, z) = 0$, (iii) $f(p, q, x, y) = 0$ (iv) $f(p, q, x, y, z) = 0$ etc.
Lagrange's form $Pp + Qq = R$. Clairinet's form $Z = px + qv + f(p, q)$.
Equation reducible to standard form. Homogeneous P.D.E. of nth order.
(10 Hrs.)

SECTION-B

Unit IV: Special functions : solution of Legendre's and Bessel's equations by Frobenius method, Bessel's function 1st kind generating function, recurrence relating values of $J_{1/2(x)}$, $J_{-1/2(x)}$, $J_{3/2(x)}$ etc. Legendre's function of 1st kind : generating function, Rodrigues function, recurrence relation, Legendre's polynomials and orthogonal properties.

Unit V : Statistics & Probability : Axioms, conditional probability, Bay's theorem, mathematical expectations, probability distributions : Binomial, Poisson and Normal.

Unit VI: a) Curve fittings by method of Least Squares. Correlation and regression.
b) Matrix differential equation : solution and integrated solution, Sylvester's theorem, solution of differential equations by matrix method and Peano Baker method.

BOOKS RECOMMENDED :

- 1) Pipes : Mathematics for Engineers and Physicist.
- 2) P.N. Wartikar and J.N. Wartikar : A Text Book of Applied Mathematics.
- 3) B.S. Grewal : Advance Engineering Mathematics.
- 4) S.G. Gupta : Statistical Methods.
- 5) Speigal : Statistics (Schaum's series)
- 6) Speigal : Complexva (Schaum's series)

4EP05/4EX05/4EL05/4EE 05 NUMERICAL METHODS AND COMPUTER PROGRAMMING

SECTION A

Unit I : Solution of Algebraic & Transcendental equations : Floating point number representation, errors, accuracy, stability of algorithms. Bracketing methods : bisection method and False Position method.
Open methods : Newton-Raphson method, Secant method and Successive Approximation method.
Comparison of different iterative methods. Implementation of these methods in C.

Unit II : Solution of Simultaneous Algebraic equations : Iterative methods : Jacobi's method and Gauss-Seidel method. Direct methods : Gaussian elimination method & Matrix Inverse method. Finding Eigen values of a matrix, determination of largest Eigen value. Implementation of these methods in C.

Unit III : Interpolation : Evenly spaced points : formation of forward & backward difference table, Newton's forward & backward difference interpolation formulae. Unevenly spaced points : divided difference table and Newton's divided difference interpolation formula, Lagrange's method. Interpolation with Cubic splines. Implementation of these methods in C.

SECTION-B

Unit IV : Numerical Differentiation and Integration : Numerical differentiation : Taylor's series method, Richardson extrapolation method, numerical differentiation using interpolation polynomial (first & second derivative near the beginning & end of the table). Numerical Integration : Trapezoidal Rule, Simpson's Rules, Romberg method, Gaussian quadrature method. Implementation of these methods in C.

Unit V : Solution of ordinary differential equations : Initial value problem : Taylor's series method, Runge-Kutta methods - second & fourth order, Euler's method, Euler's modified method. Solution of simultaneous & higher order differential equations using Runge-Kutta fourth order method. Stiff differential equations and their solutions. Boundary value problem : Finite difference method and Cubic spline method.
Implementation of these methods in C.

Unit VI : Principles of Object Oriented Programming : OOP paradigm, basic concepts of OOP, benefits of OOP, basic data types, user defined data types, derived data types, operators and control statements.

BOOKS RECOMMENDED

- 1) Numerical Methods with Programs in C by T. Veerarajan, T. Ramachandran TMH 2nd edition, 6th reprint 2011
- 2) Numerical Methods - Principles, Analysis & Algorithms Pal, Oxford University Press, 2008
- 3) Numerical Methods for Engineers and Scientists – Guha Oxford University Press 2008
- 4) Computer Fundamentals and Programming in C – Dey and Ghosh Oxford University Press 2008
- 5) Chapra S.S. & Canale R.P. : Numerical Methods for Engineers, 4th edition, McGraw Hill.
- 6) Balguruswami E. : Object Oriented Programming with C++, Tata McGraw Hill, New Delhi.
- 7) Nakamura S. : Applied Numerical Methods in C, Prentice Hall.
- 8) Faires & Burden : Numerical Methods, 7th edition, Thomson Learning.

4EP06/4EX06/4EL06/4EE 06 ELECTRICAL MACHINES I LAB

Any TEN experiments based on contents of 4EP01/4EX01/4EL01/4EE 01 ELECTRICAL MACHINES-I

4EP07/4EL07/4EE 07 ANALOG AND DIGITAL CIRCUITS LAB

Any TEN experiments based on contents of 4EP03/4EL03/4EE 03 ANALOG AND DIGITAL CIRCUITS

4EP08/4EX08/4EL08/4EE 08 NUMERICAL METHODS AND COMPUTER PROGRAMMING

Any TEN experiments based on contents of 4EP05/4EX05/4EL05/4EE 05 NUMERICAL METHODS AND COMPUTER PROGRAMMING

**SYLLABUS
PRESCRIBED FOR
FOUR YEAR B.E. DEGREE COURSE IN
ELECTRICAL & ELECTRONICS ENGINEERING
SEMESTER PATTERN
(CREDIT GRADE SYSTEM)**

SEMESTER : FOURTH

BRANCH ABBREVIATIONS :-

EX : Electrical & Electronics Engg.

4EX03

**LINEAR INTEGRATED CIRCUITS
SECTION A**

Unit I : Op-amp Fundamentals: Differential amplifiers, ac and dc analysis of differential amplifiers, review of operation amplifier- block diagram representation, basic configurations, ideal op-amp, negative feedback, non – ideal closed loop characteristics.

Unit II : Basic op-amp Circuits: voltage follower, sign changer, adder, subtractor etc, I to V and V to I converters, current amplifiers, difference amplifiers, instrumentation amplifiers and their applications, transducer bridge amplifier.

Unit III : Op-amp Parameters: Input bias and offset current, input offset voltage, input offset error compensation, slew rate, common mode rejection ratio etc, frequency response, input and output impedance, operation limits, compensated and uncompensated op-amps, compensation techniques.

SECTION B

Unit IV : Non-linear Circuit Applications: Voltage comparator and its applications, Schmitt trigger and its application, precision rectifiers, limiters, analog switches, peak detectors, sample and hold circuits, integrator and differentiator, log/antilog amplifiers, practical log/antilog circuits, analog multipliers, opamp as phase detector, op-amp electronic thermometers.

Unit V : Active Filters: Classification, transfer function, butter worth filters. low pass, high pass, band pass, band stop, notch and all pass.

Unit VI : a) Timer: IC 555, functional diagram, monostable and astable multivibrator.

b) Voltage regulators: Series op-amp regulators, IC voltage regulators, switching regulators etc, IC 723.

Text Books

- 1) Op-amps and Linear Integrated Circuits Technology, R.A.Gaikwad, PHI publication, 1999
- 2) Design of Operational Amplifier and Analog Integrated Circuits, S.Franco TMH Publication, 2002

References

- 1) Linear Integrated Circuits, D.Roy Chaudhari, New Age International Publisher, 2005
- 2) Operational Amplifiers & Linear ICs by David A.Bell, Oxford University Press, 2011

4EX04

SIGNALS AND SYSTEMS

SECTION A

Unit I : Introduction to Signals and Systems: Signals and Systems, Classification of Signals Classification of Systems, Systems Modeling Some Ideal Signals, Energy and Power Signals Frequency Response, Discrimination of Continuous-Time Signals Topological Models, Analysis of Continuous-Time Systems Time Domain and Frequency Domain, Properties of Elementary Signals Linear Convolution Integral, Response of Continuous-Time Systems.

Unit II : Fourier series and Its Properties Fourier Transform Properties of Fourier Transform, Tables of Fourier Transform Pairs Fourier Transform of Periodic Signals, Ideal Low-Pass Filter Frequency-Domain Analysis of Systems Fourier analysis of Sampled Signals

Unit III : Analysis of LTI Discrete-Time Systems: Time Domain and Frequency Domain, Properties of Discrete-Time Sequences Linear Convolution, Discrete-Time System Response.

SECTION B

Unit IV : Sampling: Representation of a continuous-Time Signal by its Samples; The Sampling Theorem; Reconstruction of Signals from its Samples using Interpolation; Effect of Under Sampling (Frequency Domain Aliasing); Discrete Time processing of Continuous-Time Signals

Unit V : The Z Transform: The Z Transform; The Region of Convergence for the Z- Transform; Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot; Properties of Z-Transform; Analysis and Characterization of Discrete-Time LTI Systems using Z-Transform; System Transfer Function; Block Diagram Representation; The Unilateral Z-Transform; Solution of Difference Equation using the Unilateral Z-Transform.

Unit VI : Discrete Fourier Transform and Fast Fourier Transform Representation of Discrete-Time aperiodic signals and the Discrete-Time Fourier Transform; Fourier Transform for Periodic Signals; Properties of the Discrete-Time Fourier Transform; Discrete-Time LTI Systems and Discrete-Time Fourier Transform. Fast Fourier Transform (FFT)

Books Recommended

- 1) Principles of Linear Systems and Signals, 2e (international version) – Lathi B. P. Oxford University Press
- 2) Signals & Systems, Smarajit Ghosh, PEARSON education, 2006
- 3) Signals & Systems, D Ganesh rao, Satish Tunga, PEARSON education 2010
- 4) Principles of Signal Processing & Linear Systems (international version) Lathi B P . Oxford University Press
- 5) Signals And Systems , S.Haykin, 2nd Edition, John Wiley And Sons 1999
- 6) Analog And Digital Signal Processing , Ambardar A, 2/3; Thomson Learning -2005
- 7) Signals and systems, Oppenheim and Schaffer Prentice Hall India Of India 2nd Edition 1997

4EX07 LINEAR INTEGRATED CIRCUITS LAB.

Any TEN experiments based on contents of 4EX03 LINEAR INTEGRATED CIRCUITS

Environmental Studies
