Course structure

B. Tech. Second year (Electrical Engineering)

Semester III

S. No.	Course Code	NAME OF THE SUBJECT	PERIODS			Credit
			L	T	P	
1	EAS-301 Engg Mathematics-III	Applied Sciences	3	1	0	4
2	EME-309 Thermal & Hydraulic Machines and Fluid Mechanics	Engg. Subject (from other dept.)	3	1	0	4
3	EEE 301 Electromechanical Energy Conversion-I (EMEC-I)	Departmental Subject (Core)	3	1	0	4
4	EEE 302 Basic System Analysis	Departmental Subject (Core)	3	1	0	4
5	EHU-301	Industrial Sociology	2	0	0	2
6	EEE-303 Elect Meas& Measuring Instruments	Departmental Subject (Core)	2	1	0	3
7	AUC-001	*Cyber Security*	2	0	0	
8	EME 359 Thermal Lab	Engg. Subject (from other dept.)	0	0	3	1
9	EEE 351 EMEC-I Lab	Departmental Subject (Core)	0	0	3	1
10	EEE-352 Numerical Techniques Lab.	Departmental Subject (Core)	0	0	2	1
11	EEE 353 EMMI Lab	Departmental Subject (Core)	0	0	2	1
	GP 301	General Proficiency				
		Total	18	5	10	25

Semester IV

S. No.	Course Code	NAME OF THE SUBJECT	PERIODS			Credit
			L	T	P	
1	EOE-041-EOE-048	Science Based Elective	3	1	0	4
2	EEC 409 Analog & Digital Electronics	Engg. Subject (from other dept.)	3	1	0	4
3	EEE-401 Electromechanical Energy Conversion-II	Departmental Subject (Core)	3	1	0	4
4	EEE-402 Network Analysis and Synthesis	Departmental Subject (Core)	3	1	0	4
5	EHU-401	Industrial Psychology	2	0	0	2
6	EEE-403 Electrical & Electronics Engineering Materials	Departmental Subject (Core)	2	1	0	3
7	AUC-002	*Human Values & Professional Ethics*	2	0	0	-
8	EEC-459 Analog & Digital Electronics Lab.	Engg. Subject (from other dept.)	0	0	3	1
9	EEE-451 Electromechanical Energy Conversion-II Lab.	Departmental Subject (Core)	0	0	3	1
10	EEE-452 Network Lab	Departmental Subject (Core)	0	0	2	1
11	EEE-453 Electrical Simulation Lab	Departmental Subject (Core)	0	0	2	1
	GP 401	General Proficiency				
		Total	18	5	10	25

SCIENCE BASED OPEN ELECTIVE

EOE-031: Introduction to Soft Computing (Neural Networks, Fuzzy Logic and Genetic algorithm)
EOE-032: Nano Sciences
EOE-033: Laser Systems and Applications
EOE-034: Space Sciences
EOE-035: Polymer Science & Technology
EOE-036: Nuclear Science
EOE-037: Material Science
EOE-038: Discrete Mathematics

**Cyber Security will be offered as a compulsory audit course as directed by the UGC.

EAS-301: ENGINEERING MATHEMATICS–III

Unit-I: Function of Complex variable **8**

Analytic function, C-R equations, Harmonic Functions, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions, Taylor's and Laurent's series, Singularities, Zeroes and Poles, Residue theorem, Evaluation of real integrals of the type $\int_0^{2\pi} f(cos\theta,\ sin\,\theta)d\theta$ and $\int_{-\infty}^{\infty} f(x)dx$.

Unit–II: Integral Transforms **8**

Fourier integral, Complex Fourier transform, Inverse Transforms, Convolution Theorems, Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat transfer equations, wave equations and Laplace equations. Z-transform and its application to solve difference equations

Unit–III:Statistical Techniques - Moments, Moment generating functions, Central Tendency, depression Skewness, Kurtosis, Curve fitting, Method of leastsquares, Fitting of straight lines, Polynomials, Exponential curves, Correlation, Linear, non–linear and multiple regression analysis, Problems, Bayes Theorem, random Variables Binomial, Poisson and Normal distributions, Tests of significations: Chi-square test, t-test.

Unit–IV: Numerical Techniques–I **8**

Zeroes of transcendental and polynomial equations using Bisection method, Regula-falsi method
and Newton-Raphson method, Rate of convergence of above methods. Interpolation: Finite differences, Newton's forward and backward interpolation, Lagrange's and Newton's divided difference formula for unequal intervals.

Unit–V: Numerical Techniques–II **8**

Solution of system of linear equations, Matrix Decomposition methods, Jacobi method, Gauss-Seidal method. Numerical differentiation, Numerical integration, Trapezoidal rule, Simpson's one third and three-eight rules, Solution of ordinary differential equations (first order, second order and simultaneous) by Euler's, Picard's and fourth-order Runge-Kutta methods.

Test Books:-

1. Peter V. O'Neil, Advance Engineering Mathematics Thomson (Cengage) Learning, 2007.
2. Jain, Iyenger Jain, Numerical Methods for Scientific and Engineering Computation, New Age International, New Delhi

3. J.N. Kapur, Mathematical Statistics, S. Chand & company Ltd.
4.B.S.Grewal,Higher Engineering Mathematics, Khanna Publishers

Reference Books:-

1. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House,.
2. Chandrika Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya, 1996.
3. S.S.Sastry,Introductory Methods of Numerical Analysis, PHI Learning Private Limited, New Delhi
4. E. Balagurusamy, Numerical Methods, Tata McGraw-Hill Publishing Company Limited, New Delhi
5. T. Veerajan& T. Ramchandrandran, Theory & Problems in Numerical Methods, TMH, New Delhi

EME-309:THERMAL AND HYDRAULIC MACHINES AND FLUID MECHANICS

LTP310

UNIT-I

Thermodynamic equilibrium, cyclic process, enthalpy, Zero, first and second laws of thermo-dynamics, carnot cycle, concept ofentropy, properties of steam, processes involving steam in closedand open systems, EnthalpyVapour Pressure Cycles:Rankine cycle, reheat cycle, Regenerative cycle

.

UNIT-II

Steam Turbine:Classification, impulse and reaction turbines their velocity diagrams and related calculations, work-done and efficiencies, re-heatfactor, staging, bleeding and governing of turbines.

Gas Turbine:Classification, Brayton cycle, working principle of gas turbine, gas turbine cycle with intercooling,reheat and regeneration, stageand polytrophic efficiencies.

UNIT-III

Compressors:Classification, single and multistage reciprocating compressors, isothermal and volumetricefficiencies, centrifugal and axial flow compressors, surging, choking and stalling.

I.C. Engines:Otto, Diesel .and Dual cycles, introduction to 2-stroke and 4-strokeSI and CI engines, indicatordiagram and power measurement.

UNIT-IV

Impact of Jet:Introduction to hydrodynamic thrust of jet on a fixed and moving surface (flatand curve), effect ofinclination of jet with the surface.

Hydraulic Turbines:Classification, heads and efficiencies, construction, working, work done and efficiency of impulse andreaction turbines.

UNIT-V

Centrifugal Pump:Classification, construction, working, work-done, efficiencies, cavitation and priming; jet pump

Reciprocating Pump:Classification,construction, working, work-done, slip and coefficient of discharge.

Text Books:

1.Onkar Singh “Applied Thermodynamics” New Age International, 2006
2.R.K.Rajput “ A Text Book of Hydraulic Machines” S. Chand & Co.,2008.

Reference Books:

3.P.L.Ballany “Thermal Engineering “ Khanna Publishers, 2003
4.R.K.Bansal “A Text Book of Fluid Mechanicsand Hydraulic Machines” Laxmi Publications,

2006

EEE – 301: ELECTRO-MECHANICAL ENERGY CONVERSION –I

L T P 3 1 0

Unit – I

Principles of Electro-mechanical Energy Conversion - Introduction, Flow of Energy in Electromechanical Devices, Energy in magnetic systems(defining energy & Co-energy) , SinglyExcited Systems; determination of mechanical force, mechanical energy, torque equation , Doublyexcited Systems; Energy stored in magnetic field, electromagnetic torque , Generated emf inmachines; torque in machines with cylindrical air gap

Unit – 2

D.C. Machines:-Construction of DC Machines, Armature winding, Emf and torque equation Armature Reaction ,Commutation , Interpoles and Compensating Windings, Performance Characteristics of D.C. generators.

Unit –3

D.C. Machines (Contd.):- Performance Characteristics of D.C. motors ,Starting of D.C. motors point and 4 point starters , Speed control of D.C. motors: Field Control , armature control and Voltage Control (Ward Lenonard method); Efficiency and Testing of D.C. machines (Hopkinson's and Swinburn's Test).

Unit –4.

Single Phase Transformer: Phasor diagram, efficiency and voltage regulation, all day efficiency.

Testing of Transformers: O.C. and S.C. tests, Sumpner;s test, polarity test.

Auto Transformer: Single phase and three phase auto transformers, volt-amp, relation, efficiency, merits & demerits and applications.

Unit –5

Three Phase Transformers: Construction, three phase transformer phasor groups and their connections, open delta connection, three phase to 2 phase, 6 phase or 12 phase connections, and their applications, parallel operation and load sharing of single phase and three phase transformers, excitation phenomenon and harmonics in transformers, three winding transformers.

Text Books:

1 I.J. Nagrath&D.P.Kothari," Electrical Machines", Tata McGraw Hill
2 Husain Ashfaq ," Electrical Machines", DhanpatRai& Sons
3 A.E. Fitggerald, C.KingsleyJr and Umans,"Electric Machinery" 6th Edition McGraw Hill, International Student Edition.
4 B.R. Gupta &VandanaSinghal, "Fundamentals of Electrical Machines, New Age International.

Reference Books:

5 Irving L.Kosow, "Electric Machine and Tranformers", Prentice Hall of India.
6 M.G. Say, "The Performance and Design of AC machines", Pit man & Sons.
7 Bhag S. Guru and Huseyin R. Hizirogulu, "Electric Machinery and Transformers" Oxford University Press, 2001.

EEE-302: BASIC SYSTEM ANALYSIS

L T P 3 1 0

UNIT I

Introduction to continuous time signals and systems: Basic continuous time signals, unit step,unit ramp, unit impulse and periodic signals with their mathematical representation and characteristics. Introduction to various types of systems.

Analogous System: Linear mechanical elements, force-voltage and force-current analogy, modeling of mechanical and electro-mechanical systems: Analysis of first and second order linearsystems by classical method

.

UNIT II

Fourier Transform Analysis : Exponential form and Trigonometric form of Fourier series, Fourier symmetry, Fourier Integral and Fourier Transform. Transform of common functions andperiodic wave forms: Applications of Fourier Transform to network analysis.

UNIT III

Laplace Transform Analysis : Review of Laplace Transform , Laplace Transform of periodicfunctions, Initial and Final Value Theorems, Inverse Laplace Transform , ConvolutionTheorem,Superposition Integral , Application of Laplace Transform to analysis of networks, waveformsynthesis and Laplace Transform of complex waveforms.

UNIT IV

State – Variable analysis : Introduction, State Space representation of linear systems, Transfer
Function and state Variables , State Transition Matrix, Solution of state equations for homogeneous and non-homogeneous systems , Applications of State-Variable technique to theanalysis of linear systems

UNIT V

Z-Transform Analysis : Concept of Z-Transform, Z-Transform of common functions, Inverse ZTransform,Initial and Final Value theorems , Applications to solution of difference equations,Pulse Transfer Function.

Text Books:

1. David K.Cheng; "Analysis of Linear System", Narosa Publishing Co.
2. ME Van-Valkenberg; " Network Analysis", Prentice Hall of India
3. C.L.Wadhwa, "Network Analysis and Synthesis", New Age International Publishers,2007.
4. SamarajitGhosh, "Network Theory: Analysis and Synthesis" Prentice Hall of India, 2008

Reference Books:

5. ChoudharyD.Roy, "Network & Systems", Wiley Eastern Ltd.
6. Donald E.Scott, "Introduction to circuit Analysis" Mc. Graw Hill
7. B.P. Lathi, "Linear Systems & Signals" Oxford University Press, 2008.
8. I.J. Nagrath, S.N. Saran, R. Ranjan and S.Kumar, "Singnals and Systems, "Tata Mc. Graw Hill, 2001.
9. Taan S. Elali&Mohd. A. Karim, "Continuous Signals and Systems with MATLAB" 2nd Edition, CRC Press.

EEE-303: ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS

L T P 3 1 0

UNIT I

(1) Philosophy Of Measurement: Methods of Measurement, Measurement System**,** Classification of instrument system, Characteristics of instruments & measurement system**,** Errors in measurement & its analysis, Standards.

(2) Analog Measurement of Electrical Quantities : Electrodynamic ,Thermocouple, Electrostatic & Rectifier type Ammeters & Voltmeters , Electrodynamic Wattmeter, Three Phase Wattmeter,Power in three phase system , errors & remedies in wattmeter and energy meter.

UNIT II

Instrument Transformer and their applications in the extension of instrument range, Introduction to measurement of speed , frequency and power factor.

UNIT III

Measurement of Parameters: Different methods of measuring low, medium and high resistances**,** measurement of inductance & capacitance with the help of AC Bridges, Q Meter.

UNIT IV

(1) AC Potentiometer: Polar type & Co-ordinate type AC potentiometers , application of AC Potentiometers in electrical measurement

(2) Magnetic Measurement: Ballistic Galvanometer ,**f**lux meter **,** determination of hysteresis loop,measurement of iron losses**.**

UNIT V

(1) Digital Measurement of Electrical Quantities: Concept of digital measurement, block diagram ,Study of digital voltmeter, frequency meter Power Analyzer and Harmonics Analyzer; Electronic Multimeter

(2)Cathode Ray Oscilloscope : Basic CRO circuit (Block Diagram),Cathode ray tube (CRT) & its components **, a**pplication of CRO in measurement ,Lissajous Pattern.; Dual Trace & Dual Beam Oscilloscopes.

Text Book:

1. E.W. Golding & F.C. Widdis, "Electrical Measurement &Measuring Instrument", A.W. Wheeler& Co. Pvt. Ltd. India.
2. A.K. Sawhney,"Electrical & Electronic Measurement & Instrument", DhanpatRai& Sons , India .

Reference Books:

3. Forest K. Harries,"ElectricalMeasurement",Willey Eastern Pvt. Ltd. India .
4. M.B. Stout ,"Basic Electrical Measurement" Prentice hall of India,India.
5. W.D.Cooper," Electronic Instrument & Measurement Technique " Prentice Hall International.
6. RajendraPrashad ,"Electrical Measurement &Measuring Instrument" Khanna Publisher.
7. J.B. Gupta, "Electrical Measurements and Measuring Instruments", S.K. Kataria& Sons.

EHU-301 : Industrial Sociology **L T P 2 0 0**

Unit-I
Industrial Sociology :Nature and Scope of Industrial Sociology- Development of Industrial Sociology.
Work Stress & its Management

Unit-II
Rise and Development of Industry :Early Industrialism – Types of Productive Systems – The Manorial or Feudal system – The guild system – The domestic or putting-out system – and the factory system – Characteristics of the factory system – causes and Consequences of industrialization.

Unit-III
Industrialization in India.Industrial Poling Resolutions – 1956.

Unit-IV
Contemporary Issues :Grievances and Grievance handling Procedure.
Industrial Disputes : courses, strikes & lockouts, Industrial Relations Machinery Bi-partite & Tri-partite Agreement, Labour courts & Industrial Tribunals, Code of Discipline, Standing order.

References :
1. GISBERT PASCAL, Fundamentals of Industrial sociology, Tata McGraw Hill Publishing Co., New Delhi, 1972.
2. SCHNEIDER ENGNO V., Industrial Sociology 2nd Edition, McGraw Hill Publishing Co., New Delhi, 1979.
3. Mamoria C.B. and Mamoria S., Dynamics of industrial relations in India.
4. Sinha G.P. and P.R.N. Sinha, Industrial Relations and Labour Legislations, New Delhi, Oxford and IBH Publishing Co., 1977.

AUC 001: Cyber security

UNIT-1
Introduction to information systems, Types of information Systems, Development of In formation Systems, Introduction to information security, Need for Information security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis.

UNIT-2
Application security (Database, E-mail and Internet), Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control.
Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail viruses, Macro viruses, Malicious Software, Network and Denial of Services Attack, Security Threats to E-Commerce- Electronic Payment System, e-Cash, Credit/Debit Cards. Digital Signature, public Key Cryptography.

UNIT-3
Developing Secure Information Systems, Application Development Security, Informatio n Security Governance & Risk Management, Security Architecture & Design Security Issues

in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets, Access Control, CCTV and intrusion Detection Systems, Backup Security Measures.

UNIT-4

Security Policies, Why Policies should be developed, WWW policies, Email Security policies, Policy Review Process-Corporate policies-Sample Security Policies, Publishing and Notification Requirement of the Policies.

Information Security Standards-ISO, IT Act, Copyright Act, Patent Law, IPR. Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License, Semiconductor Law and Patent Law.

References :

1. Charles P. Pfleeger, Shari LawerancePfleeger, "Analysing Computer Security ", Pearson Education India.
2. V.K. Pachghare, "Cryptography and information Security", PHI Learning Private Limited, Delhi India.
3.Dr. Surya PrakashTripathi, RitendraGoyal, Praveen kumarShukla ,"Introduction to Information Security and Cyber Law" Willey Dreamtech Press.
4. Schou, Shoemaker, " Information Assurance for the Enterprise", Tata McGraw Hill.
5. CHANDER, HARISH," Cyber Laws And It Protection " , PHI Learning Private Limited ,Delhi ,India

EME-359 : Thermal Lab

L : T : P::0:0:3

Experiments : Minimum 10 experiments out of following:

1.Study and working of Two stroke petrol Engine
2.Study and working of Four stroke petrol Engine
3.Study and workingof two stroke Diesel Engine
4.Study and working of four stroke Diesel Engine.
5.Study of compounding of steam turbine
6.Study of Impulse & Reaction turbine
7.Impact of Jet experiment.
8.Turbine experiment on Pelton wheel.
9.Turbine experiment on Francis turbine.
10.Turbine experiment on Kaplan turbine.
11.Experiment on Reciprocating pump.
12.Experiment on centrifugal pump

EEE-351 ELECTROMECHANICAL ENERGY CONVERSION- I LAB

L T P 0 0 3

Note : Minimum eight experiments are to be performed from the following list :

1 To obtain magnetization characteristics of a d.c. shunt generator
2 To obtain load characteristics of a d.c. shunt generator and compound generator (a) Cumulatively compounded (b) Differentially compounded
3 To obtain efficiency of a dc shunt machine using Swinburn's test
[20]
4 To perform Hopkinson's test and determine losses and efficiency of DC machine
5 To obtain speed-torque characteristics of a dc shunt motor

6 To obtain speed control of dc shunt motor using (a) armature resistance control (b) field control
7 To obtain speed control of dc separately excited motor using Conventional Ward-Leonard/ Static Ward –Leonard method.
8 To study polarity and ratio test of single phase and 3-phase transformers
9 To obtain equivalent circuit, efficiency and voltage regulation of a single phase transformer using C.C. and S.C. tests.
10 To obtain efficiency and voltage regulation of a single phase transformer by Sumpner's test.
11 To obtain 3-phase to 2-phase conversion by Scott connection.
12 To determine excitation phenomenon (B.H. loop) of single phase transformer using C.R.O.

EEE-352: NUMERICAL TECHNIQUE LAB

L T P 0 0 2

Note: Minimum seven experiments out of the following list:
MATLAB Based Experiments
1. Solution of linear equations for under damped and over damped cases.
2. Determination of eigen values and eigenvectors of a square matrix.
3. Determination of roots of a polynomial.
4. Determination of polynomial using method of least square curve fitting.
5. Determination of polynomial fit, analyzing residuals, exponential fit and error bounds from the given data.
6. Solution of differential equations using 4^{th} order Runge-Kutta method.
7. Solution of differential equation using revised Euler method.
8. Solution of difference equations.
9. Determination of time response of an R-L-C circuit.
10. College may add any three experiments in the above list.

Text/Reference Books:
1. AlmosGilat, "MATLAB: An Introduction with Applications" Wiley India Ltd., 2004.
2. R.P. Singh, "Getting Started with MATLAB" Oxford University Press.

EEE-353: ELECTRICAL MEASUREMENT LAB

L T P 0 0 3

Note: Minimum of nine experiments from the following:
1. Calibration of ac voltmeter and ac ammeter
2. Measurement of form factor of a rectified sine wave and determine source of error if r.m.s.value is measured by a multi-meter
3. Measurement of phase difference and frequency of a sinusoidal ac voltage using C.R.O.
4. Measurement of power and power factor of a single phase inductive load and to study effect of capacitance connected across the load on the power factor
5. Measurement of low resistance by Kelvin's double bridge
6. Measurement of voltage, current and resistance using dc potentiometer
7. Measurement of inductance by Maxwell's bridge
8. Measurement of inductance by Hay's bridge

9. Measurement of inductance by Anderson's bridge
10. Measurement of capacitance by Owen's bridge
11. Measurement of capacitance by De Sautybridge
12. Measurement of capacitance by Schering bridge
13. Study of Frequency and differential time counter
14. College may add any two experiments in the above list

EEC-409 : ANALOG AND DIGITAL ELECTRONICS LT P 3 1 0

ANALOG ELECTRONICS:

UNIT-I:
Special Diodes-LED, Varactor diode, Photo diode, Schottky diode, Tunnel diode;their characteristics andapplications.Transistors as a switch.

UNIT-II
Frequency Response:Amplifier transfer function, low and high frequency response of common emitter and commonsource amplifiers.
Feedback:General feedback structure; properties of negative feedback; series-series, series-shunt, shunt-series and shunt-shunt feedback amplifiers.

UNIT-III:
Basic principle of sinusoidal oscillator, R-C Phase Shift and Wein Bridge oscillators, tunedoscillators- Collpits and Hartley; Crystal oscillator

DIGITAL ELECTRONICS:

UNIT-IV
Combinational Logic Circuits:Multiplexers/Demultiplexures, Encoders/Decoders.
Sequential Logic Circuits:latches, flip-flops- S-R, T, D, J-K.
Shift Registers: Basic principle, serial and parallel data transfer, shift left/right registers,universal shift register. Counters:Mode N Counters, ripplecounters, synchronous counters, ring/Johnson counters

UNIT-V
OP-AMP applications- Astable, Monostable and Bistablemultivibrators, Schmitt trigger, IC-555 Timer, A/D and D/A converters.
Voltage Regulators:Series, shunt and switching regulators, op-amp based configurations.
Memories:Introduction to ROM, RAM; Sequential Memory, Memory organization.

Text Books:

1.A.S. Sedra and K.C. Smith "MicroelectronicsCircuits" Oxford University Press (India)
2.Malvino& Leach, "Digital Principles and applications" Tata Mc. Graw Hill
3.R.A. Gayakwad "Op amps and Linear Integrated Circuits" Prentice Hall of India.
4.Balbir Kumar and ShailB.Jain, "Electronic Devices and Circuits" Prentice Hall of India,2007
Reference Books:
1.Taub& Schilling "Digital Electronics"- Tata McGraw Hill
2.Anil K. Maini, "Digital Electronics: Principles and Integrated circuits" Wiley India Ltd, 2008.
3.Millman, J. and Grabel A, "Microelectronics" McGraw Hill
4.Anand Kumar, "Switching Theory and Logic Design" Prentice Hall of India, 2008.
5.Aloke. K. Dutta, "Semiconductor Devices and circuits", Oxford University Press, 2008.

EEE-401: ELECTRO-MECHANICAL ENERGY CONVERSION – II

L T P

3 1 0

UNIT-I

Synchronous Machine IConstructional features, Armaturewinding, EMF Equation, Winding coeffi cients, equivalent circuit andphasor diagram, Armature reaction, O. C. & S.C. tests, Voltage Regulation using SynchronousImpedance Method, MMF Method, Potier's Triangle Method, Parallel Operation of synchronousgenerators, operation on infinite bus, synchronizing powerand torque co-efficient

UNIT-II

Synchronous Machine II:Two Reaction Theory, Power flow equations of cylindrical and salient pole machines, operatingcharacteristics

Synchronous Motor:Starting methods, Effect of varying field current at different loads, V-Curves, Hunting & damping,synchronous condenser

UNIT-III:

Three phase Induction Machine – I: Constructional features, Rotating magnetic field, Principle of operation Phasor diagram, equivalentcircuit, torque and power equations, Torque- slipcharacteristics, no load & blocked rotor tests,efficiency, Induction generator & its applications.

UNIT-IV

Three phase Induction Machine- IIStarting, Deep bar and double cage rotors, Cogging &Crawling, Speed Control (with and without emfinjection in rotor circuit.)

UNIT-V

Single phase Induction Motor:Double revolving field theory,Equivalent circuit, No load and blocked rotor tests,Starting methods, repulsion motor

AC Commutator Motors:Universal motor, Single phase a.c. series compensated motor, stepper motors

Text Books:

1.D.P.Kothari&I.J.Nagrath, "Electric Machines", Tata McGraw Hill
2.AshfaqHussain"Electric Machines" DhanpatRai& Company
3.Fitzerald,A.E.,Kingsley and S.D.Umans"Electric Machinery", MC Graw Hill.

Reference Books:

4.P.S.Bimbhra, "Electrical Machinery", Khanna Publisher
5.P.S. Bimbhra, " Generalized Theory ofElectrical Machines", Khanna Publishers
6.M.G.Say, "Alternating Current Machines",Pitman& Sons

EEE-402:NETWORK ANALYSIS AND SYNTHESIS

L T P
3 1 0

Unit – I

Graph Theory : Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Nodal methods of analysis

Unit – II:

Network Theorems (Applications to ac networks): Super-position theorem, Thevenin'stheorem,Norton's theorem, maximum power transfer theorem, Reciprocity theorem. Millman'stheorem,compensation theorem, Tellegen's theorem.

Unit – III

Network Functions :

Concept of Complex frequency , Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot.

Unit – IV

Two Port Networks:

Characterization of LTI two port networks ZY, ABCD and h parameters, reciprocity and symmetry.Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks. T & Π Representation.

Unit – V

(a) Network Synthesis :

Positive real function; definition and properties; properties of LC, RC and RL driving point functions,synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms.

(b) Filters

Image parameters and characteristics impedance, passive and active filter fundamentals, low pass,highpass, (constant K type) filters, and introduction to active filters.

Text Books:

1 M.E. Van Valkenburg, "Network Analysis", Prentice Hall of India
2 A.Chakrabarti, "Circuit Theory" DhanpatRai& Co.
3 C.L Wadhwa, "Network Analysis and Synthesis" New Age International Publishers, 2007.
4 D.RoyChoudhary, "Networks and Systems" Wiley Eastern Ltd.
5 Donald E. Scott: "An Introduction to Circuit analysis: A System Approach" McGraw Hill

Reference Books:

6 M.E. Van Valkenburg, "An Introduction to Modern Network Synthesis",Wiley Eastern Ltd.
7 N.C. Jagan and C. Lakshminarayana, "Newwork Analysis" B.S. Publications, 2008.
8 K.S. Suresh Kumar, "Electric Circuits and Networks" Pearson Education, 2009.
9 A Ramakalyan, "Linear Circuits: Analysis and Synthesis" Oxford University Press, 2005.

EEE-403: ELECTRICAL & ELECTRONICS ENGINEERING MATERIALS

L T P 2 1 0

UNIT – I

1 Crystal Structure of Materials:

A. Bonds in solids, crystal structure, co-ordination number, atomic packing factor, Miller Indices, Bragg's law and x-ray diffraction, structural Imperfections, crystal growth

B. Energy bands in solids, classification of materials using energy band.

UNIT – II

2 Conductivity of Metals:

Electron theory of metals, factors affecting electrical resistance of materials, thermal conductivity of metals, heat developed in current carrying conductors, thermoelectric effect, superconductivity and super conducting materials, Properties and applications of electrical conducting and insulating materials, mechanical properties of metals

UNIT – III

3 Mechanism of Conduction in semiconductor materials:

Types of semiconductors, current carriers in semiconductors, Half effect, Drift and Diffusion currents, continuity equation, P-N junction diode, junction transistor, FET & IGFET, properties of semiconducting materials

UNIT – IV

4 Magnetic Properties of Material:

Origin of permanent magnetic dipoles in matters, Classification Diamagnetism, Paramagnetism, Ferromagnetism,AntiferromagnetismandFerrimagnetism, magnetostriction, properties of magnetic materials, soft and hard magnetic materials, permanent magnetic materials

Text Books :

1 A.J. Dekker,"Electrical Engineering Materials" Prentice Hall of India
2 R.K. Rajput," Electrical Engg.Materials," Laxmi Publications.
3 C.S. Indulkar&S.Triruvagdan "An Introduction to Electrical Engg. Materials, S.Chand& Co.

References :

4 Solymar, "Electrical Properties of Materials" Oxford University Press.
5. Ian P. Hones," Material Science for Electrical and Electronic Engineering," Oxford University Press.
8 G.P. Chhalotra& B.K. Bhat, "Electrical Engineering Materials" Khanna Publishers.
9 T. K. Basak, "Electrical Engineering Materials" New age International.

EHU-401: Industrial Psychology LTP 200

Unit-I

Introduction to Industrial Psychology – Definitions & Scope.
Major influences on industrial Psychology- Scientific management and human relations schools Hawthorne Experiments

Unit-II

Individual in Workplace Motivation and Job satisfaction , stress management. Organizational culture, Leadership & group dynamics.

Unit-III

Work Environment & Engineering Psychology-fatigue. Boredom, accidents and safety.Job Analysis, Recruitment and Selection – Reliability & Validity of recruitment tests.

Unit –IV

Performance Management : Training & Development.

References :

1. Miner J.B. (1992) Industrial/Organizational Psychology. N Y : McGraw Hill.
2. Blum & Naylor (1982) Industrial Psychology. Its Theoretical & Social Foundations CBS Publication.
3. Aamodt, M.G. (2007) Industrial/Organizational Psychology : An Applied Approach (5^{th} edition) Wadsworth/Thompson : Belmont, C.A.
4. Aswathappa K. (2008). Human Resource Management (fifth edition) New Delhi : Tata McGraw Hill

EEC-459 ANALOG AND DIGITAL ELECTRONICS LAB

L T P

0 0 2

ANALOG ELECTRONICS:

Note: Select at least any four out of the following:

1.To Plot V-I characteristics of junction diode and zener diode.

2.To draw wave shape of the electrical signal at input and output points of the half wave, full wave and bridge rectifiers.

3.To Plot input / output characteristics for common base transistor.

4.To Plot input /output characteristics of FET and determine FETparameters at a givenoperating point.

5.To determine voltage gain, current gain, input impedance and output impedance of commonemitter amplifier.

6.To determine voltage gain, current gain, input impedance and output impedance and frequency response of R-C coupled common emitter amplifier

7.To design R-C Phase shift / Wein Bridge oscillator and verify experimentally the frequency of oscillation.

8.Tostudy transistor as a switch and determine load voltage and load current when the transistor is ON.

ANALOG IC & DIGITAL ELECTRONICS:

Note: Select at least any four out of the following:

9.To study application of Operational Amplifier as summer integrator and voltage comparator.

10.To study operation of Op-Amp based astable and monostablemultivibrators.

11.To study operation IC 555 based astable and monostablemultibrators.

12.To study operation of (a) multiplexer using IC 74150 (b) demultiplexer using IC 74138.

13.To study operation of Adder / Subtractor using 4 bit / 8 bit IC 7483.

14.To study operation of (a) J K Master–slave flip–flop using IC 7476 (b) Modulo N counter using programmablecounter IC74190.

15.To verify experimentally output of A/D and D/A converters.

16.To study regulation of unregulated power supply using IC 7805/7812 voltage regulator and measure the load and line regulations

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EEE- 451: ELECTRO-MECHANICAL ENERGY CONVERSION– II LABORATORY

L T P 0 0 3

Note: The minimum 8 experiments are to beperformed from the following, out of whichthere should be at least two software based experiments.

1.To perform no load and blocked rotor testson a three phase squirrel cage induction motor and determine equivalent circuit.

2.To perform load test on a three phase induction motor and draw:

3.Torque -speed characteristics

4.Power factor-line current characteristics

5.To perform no load and blocked rotor tests on a single phase induction motor anddetermine equivalent circuit.

6.To study speed control of three phase induction motor byKeeping V/f ratio constant

7.To study speed control of three phaseinduction motor by varying supply voltage.

8.To perform open circuit and short circuit tests on a three phase alternator and determine voltage regulation at full load and at unity, 0.8 lagging and leading power factors by (i) EMF method (ii) MMF method.

9.To determine V-curves and inverted V-curves of a three phase synchronous motor.

10.To determine Xd and Xq of a three phase salient pole synchronous machine using the slip test and draw the power-angle curve.

11.To study synchronization of an alternator with the infinite bus by using:

12.dark lamp method (ii) two bright and one dark lamp method

Software based experiments (Develop Computer Program in ‘C’ language or useMATLAB or other commercial software)

13.To determine speed-torque characteristics ofthree phase slip ring induction motor and study the effect of including resistance, or capacitance in the rotor circuit.

14.To determine speed-torque characteristics ofsingle phase induction motor and study the effect of voltage variation.

15.To determine speed-torque characteristics ofa three phase induction motor by (i) keeping v/f ratio constant (ii) increasing frequency at the rated voltage

16.Draw O.C. and S.C. characteristics of a threephase alternator from the experimental data and determine voltage regulation at full load, and unity, 0.8 lagging and leading powerfactors.

17.To determine steady state performance of athree phase induction motor using equivalent circuit.

EEE-452: NETWORK LABORATORY

L T P 0 0 2

Note: Minimum eight experiments are to be performed from the following list.

1. Verification of principle of superposition with dc and ac sources.
2. Verification of Thevenin, Norton and Maximum power transfer theorems in ac circuits
3. Verification of Tellegin's theorem for two networks of the same topology
4. Determination of transient response of current in RL and RC circuits with step voltage input
5. Determination of transient response of current in RLC circuit with step voltage input for underdamp, critically damp and overdamp cases
6. Determination of frequency response of current in RLC circuit with sinusoidal ac input
7. Determination of z and h parameters (dc only) for a network and computation of Y and ABCD
parameters
8. Determination of driving point and transfer functions of a two port ladder network and verify with theoretical values
9. Determination of image impedance and characteristic impedance of T and Π networks, using O.C. and S.C. tests Write Demo for the following (in Ms-Power point)
10. Verification of parameter properties in inter-connected two port networks : series, parallel and cascade also study loading effect in cascade.
11. Determination of frequency response of a Twin – T notch filter.
12. To determine attenuation characteristics of a low pass / high pass active filters.
13. to 15 College may add any three experiments in the above list.

EEE-453: ELECTRICAL SIMULATION LAB

(List of Experiments (PSPICE based)

L T P 0 0 2

Note: Select any 10 out of the following:

1. Study of various commands of PSPICE.
2. To determine node voltages and branch currents in a resistive network.
3. To obtain Thevenin's equivalent circuit of a resistive network.
4. To obtain transient response of a series R-L-C circuit for step voltage input.
5. To obtain transient response of a parallel R-L-C circuit for step current input.
6. To obtain transient response of a series R-L-C circuit for alternating square voltage waveform.
7. To obtain frequency response of a series R-L-C circuit for sinusoidal voltage input.
8. To determine line and load currents in a three phase delta circuit connected to a 3-phase balanced ac supply.
9. To plot magnitude, phase and step response of a network function.
10. To determine z,y,g,h and transmission parameters of a two part network.
11. To obtain transient response of output voltage in a single phase half wave rectifier circuit using capacitance filter.
12. To obtain output characteristics of CE NPN transistor.
13. To obtain frequency response of a R-C coupled CE amplifier.
14. To obtain frequency response of an op-Amp integrator circuit.
15. To verify truth tables of NOT, ANDor OR gates implemented by NAND gates by plotting their digital input and output signals.

Reference Books:

1. Irvine, Calif, "PSPICE Manual" Microsim Corporation, 1992.
2. Paul W. Tuinenga, "SPICE : A guide to circuit Simulation and Analysis Using PSPICE", Prentice Hall, 1992.