VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.-II (Electronics Engg.)

SCHEME FOR TEACHING AND EXAMINATION

B.E.III (Electronics) 3rd Semester		Teaching Scheme			Examination Scheme						
					Theory Exam University Exam.		Practical/Quiz/Viva/T.W. etc.				
							University Exam.		Tutorial	Cont. Evaluation	Total Marks
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	Duration Hrs.	Marks	Duration Hrs.	Marks			
Electrical Network-I	ELE 301 EC	3	1	0	3	100	-	-	25	-	-
Electrical Machine	ELE 302 EC/CO	3	1	2	3	100	3	30	25	20	50
Eng. Mathematics III	ASH 303 EC	3	2	2	3	100	-	-	50	-	75
Strength of Materials	AM 304 EC/CO	2	0	2	3	75	3	30	-	20	75
Computational Methods Using C	EC 305 EC	3	0	2	3	100	3	30	-	20	50
Electronics Devices & Circuits	EC 306 EC	3	1	0	3	100	3	30	25	20	75
	TOTAL :	17	5	8	-	575	-	120	125	80	325
Total Contact Hours : 30 Total Marks : 900											

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Semester - III

ELECTRICAL NETWORK-I : ELE 301 EC/CO

B.E.II (EC/CO)

1 Network Concepts:Network element symbols andconventions,active element conventions,current and voltage conventions,loops and meshes,nodes,coupled circuits and dot conventions.

2 Mesh Current Network Analysis:Mesh currents, choice of mesh currents, number of mesh current required in setting up mesh equations, setting up of mesh equations by inspection, self and mutual inductances, setting up mesh equations in the impedence matrix form by inspection, use of cramer's rule, solution of linear mesh equations & circuit analysis materials

3 Node Voltage Network Analysis:Node voltages, number of nodal voltages required in setting up modal equations, self and mutual admittances, setting up nodal equations in the form of admittance materials by inspection, use of Cramer's rule, solutions of linear nodal equations and circuit analysis using materials.

4 Network Theorems: Linearity and superposition, independent & dependent sources and their transformations, Thevenin's, Norton's, Millman's, Tellengen's, Reciprocity, Substitution and Maximum power transfer theorems. Use of these theorems in circuit analysis, duality and dual of a planner network.

5 Polyphase Unbalanced Network: Analysis of polyphase circuits using Kirchoff's laws, analysis of unbalanced delta connected circuit's, analysis of unbalanced three phase three wire and four wire star connected circuit's , determination of neutral point potential and phase voltages for unbalanced star connected circuits.

6 DC Circuit Transients: Laplace Transform, R-L, R-C and R-L-C dc transients, two mesh transients, applications to circuit analysis using Laplace Transform method. Intial and final value theorems.

7 Topics in Time Domain and Frequency Domain: Unit step function, other unit functions, the impulse, ramp and doublet. Laplace transforms for shifted and singular functions, convolution intergral.

8 Wave form analysis by Fourier series: Trigonometrical and complex exponential forms, the frequency spectra of periodic wave forms, the Fourier integral and continues frequency spectra, Fourier transforms and their relations to Laplace transforms.

9 Network Functions and Two port parameters: Two port network concepts, driving point and transfer impedance and admittance, series and parallel combinations of transform impedance. Definitions, calculations and interrelationship and admittance parameters for four terminal networks.

Text/References :

1. Iyer TSKV: Circuit Analysis , THM
2. Van Valkenberg :Network Analysis , Asia Publishing House.
3. Edminister : Electrical Circuits, Asia publishing House.
4. Hayt and Kimmerly: Engineering Circuit Analysis , Mc Graw Hills

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Semester - III

ELECTRICAL MACHINE : ELE 302 EC/CO

B.E.II (EC/CO)

1 Direct Current Machines: Construction,magnetic circuit, flux density distribution, e.m.f equation, power and torque equation.Armature windings. Single layer and double layer windings, simple lap and wave windings.Armature reaction, demagnetizing and cross magnetizing ampere-turns, compensating winding.Commutation : commutation time and type, reactance voltage, inter-poles, ampere-turns for inter-poles.Self and separate excitations, shunt, series and compound wound motors and generators, magnetization characteristics, failure to self excite.Performance characteristics of DC generators and motors.Losses and efficiency. Testing and separation of losses, no load (swinburn)test, Hopkinson Test, Field's Test, Retardation Test.DC motor speed control (armature and field)Ward Leonard control.DC Motor starting and starters. Starting resistance step calculations.

2 Transformers :Single and three phase transformers, core and shell type, construction, transformer ratio, no load current, ideal transformer,real transformer: equivalent circuits and vector diagram, per unit impedance,regulation,losses,efficiency,open and short circuit tests,back to back test. Excitation phenomena,Polyphase transformers : standard connections,phase angle difference. V connection,Scott connections three phase to six phase conversion. Auto transformers Voltage and current ratios,advantages and limitations. Parallel operation.

References/Text

1.Clayton A.E.:Performance and design of DC Machines,Pitman.

2.Say MG:Performance and design of AC machines.Pitman.

3.Nagrath I.J. & Kothari D.P.Electric Machines,. TMH.

4.Mukherjee and Chakravorti:Electrical Machines,Dhanpat Rai.

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Semester - III / IV

MATHEMATICS III : ASH 303 EC / ASH 402 CO

B.E.II (EC/CO)

1 Multiple Integrals : Reorientation of concept of integrals, double and triple integrals, evaluation techniques, change of order of integration, integrals in polar and cylindrical coordinates, change of variables of multiple integrals, Application of double and triple integrals for evaluation of area, volume and mass.

2 Vector Calculus : Basic concepts of Vector calculus, line integrals, scalar and vector point functions, differential operator, gradient, directional derivative, divergence, curl and Laplacian with their properties and physical interpretation.

3 Surface integrals, Green's, Gauss and Stokes theorem (without proof), Applications.

4 Gamma, Beta and Error functions : Improper integrals and their convergence, Gamma and Beta functions and their properties, Error functions, Evaluation and application.

5 Fourier Series : Fourier expansion of functions with arbitrary period, in particular periodic functions with period 2p, conditions of convergence, Fourier series of even and odd functions, Half range Fourier series.

6 Partial Differential Equations (PDE) : Basic mathematical concepts, First order PDE of Lagrange's form, Pp + Qq = R, Second order pde of mathematical Physics (Heat, Wave and Laplace equation) with standard boundary conditions, Solution by separation of variable method using Fourier Series. Partial differential equation Modelling.

7 Complex Variables : Basic mathematical concepts, Analytic functions, C-R equations, Harmonic functions, Related problems; Linear transformations of complex domains, Some special transformations, bilinear transformation, Conformal Mapping and applications; complex integration including contour Integration (Simple cases).

REFERENCES :

1. E. Kreyszig : Advanced Engineering Mathematics, John Wiley, International Student Ed. (1995).

2. C. R. Wylle : Advanced Engineering Mathematics, Mc-Graw Hill, International Student Ed. (1993).

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B.E.-II (Electronics Engg.)

Semester - III

STRENGTH OF MATERIALS : AM 304 EC/CO

B.E.II (EC/CO)

1 Simple stress/strain in Tension, Shear B. Young's shear & Bulk Modulii, Strength & Elasticity of material., Temp. Stresses

2 Shear force & Bending moment diagrams & their relationship Theory of Simple lending, Bending & shear stresses.

3 Torsion of circular bars, solid & hollow, Shear stresses & strains.

4 Introduction to compressive stresses, Principal stresses and strains Deformation, vibration & strain energy concept.

5 Mechanical properties of engineering materials including latest advancements as applicable to electrical/electronics/ computer engg.

REFERENCES :

1. Junnarkar & Shah : Mechanics of Structure Vol.I, Charotar Publications, Anand.

2. Timoshenke & Young : Elements of Strength of Materials, TMH.

3. Popov, Kapila & Agnihotri : Introductions of Mechanics of Solids, Prentice Halls.

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Semester - III

COMPUTATIONAL METHODS USING C : EC 305 EC

1 ERROR ANALYSIS AND SOLUTION OF NON LINEAR EQUATIONS : Error, accuracy and stability; Bisection method; Method of false position; Newton-Raphon method; Secant method; Roots of polynomials.

2 INTERPOLATION AND EXTRAPOLATION : Newton-Gregory formula; Lagrange interpolation formula; Interpolation through central differences; Formulation of polynomials; Cubic spline interpolation; Interpolation in two or more dimensions

3 NUMERICAL INTEGRATION AND DIFFERENTIATION : Classical integration formula for equally spaced abscissa; Trapezoidal formula for a single interval; Solution of linear systems; Numerical derivatives.

4 MATRICES : Gauss jordan elimination; Row vs column elimination strategies; LU decomposition; Matrix inversion; Determinant of a matrix; Complex system of equations; Singular value decomposition; Vander monde matrices and toeplitz matrices; Eigenvalue and eigenvectors; Applications in problem of Electrical Network Theory.

5 NUMERICAL SOLUTION OF ORDINARY AND PARTIAL DIFFERENTIAL EQUATION : Taylor's series; Picards method, Range-Kutta method for ordinary differential equations; Initial value and boundary value problems; Gauss-Seidel and Jacobi's method for partial differential equations.

6 RANDOM NUMBERS : Uniform deviates; Transformation method; Exponential and normal deviates; Rejection method; Gamma, Poisson and Binomial derivatives; Generation of random bits; Quasi random sequences.

REFERENCE :

1. SASTRY S.S. : Introductory Methods of Numerical Analysis, Prentice-HalI India, Edition 1994.

2. GOTTFRIED : Programming with C, Tata McGraw-Hill, Edition 1991, Reprint 1996.

3. PRESS, TEUKOLSKY, VELLERLING AND FLANNERY : Numerical Recipes in C, The Art of Scientific Computing Cambridge University Press fisrt Indian Edition 1993.

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Semester - III

ELECTRONIC DEVICES & CIRCUITS : EC 306 EC

1 Diode Circuit Analysis : Introduction to Semiconductor junction diode; Non-linear properties; Ideal diode; Basic theory and analysis of simple diode circuit; DC load line; Small signal analysis and concept of dynamic resistance; AC load line; Diode capacitance; Temperature effects of diode; Different types of diode (Zener, schottckey) Manufacturer's specifications.

2 RECTIFIERS : Circuit analysis of halfwave and full wave rectifier using semiconductor devices; Bridge rectifier; Ripple and form factor calculation for above circuits; Efficiency and IV for above circuits; Types of filters; C filter, L filter, L.C. filter, PIE filter; Analysis of filter and calculation of ripple and regulation.

3 INTRODUCTION TO TRANSISTOR CIRCUITS : Transistor characteristic; Plots for NPN and PNP configurations; Current flow mechanism in the junction transistor and calculation of Alpha and Beta; Analysis of CE configuration; Current amplification in the transistor; Graphical analysis of transistor circuits; Power calculations; Infinite bypass capacitor; Infinite coupling capacitors; Different dc biasing methods; Fixed bias, emitter stabilised bias, potential divider bias, dc bias with voltage feedback; Common base configuration analysis; Emitter follower.

4 BIAS STABILITY : Quiescent point variation due to uncertainty in Beta; Effect of temperature on the Q point; Stability factor analysis; Temperature compensation using diode biasing.

5 AUDIO FREQUENCY LINEAR POWER AMPLIFIERS : Introduction to Class A, B, AB and C operation; Class A common-emitter power amplifier; Transformer coupled amplifier; Class B push-pull power amplifier; Amplifiers using complementary symmetry; Class C amplifier.

6 SMALL SIGNAL LOW FREQUENCY ANALYSIS AND DESIGN : Hybrid parameters; CE configuration; CB configuration; CC configuration; Impedance reflection; Bootstrapping circuit; Phase splitter; Interpretation of manufacturers specification

7 MULTIPLE TRANSISTOR CIRCUITS : Cascading of amplifier stages; Difference amplifier; Common mode rejection ratio; Difference amplifier with constant current source; Different amplifier with emitter resistor for balance; Darlington amplifier; Cascode amplifier

REFERENCE :

1. SCHILLING & BELOVE : Electronic Circuits-Discrete and Integrated McGraw-Hill Pub., 3rd edition 1989, Reprint 1994.
2. BOYLESTAD & NASHLESKY : Electronic Devices & Circuit Theory, Prentice-Hall India, 5th edition 1992, Ninth reprint 1995.
3. SEDRA & SMITH : Microelectronic Circuits, 3rd Edition, 1990.
4. HORENSTEIN : Microlectronic Circuits & Devices, Prentice-Hall of India, 1996.