SCHEME OF INSTRUCTION AND EXAMINATION
ELECTRONICS AND TELECOMMUNICATION ENGINEERING
SECOND YEAR OF BACHELOR'S DEGREE COURSE
IN
ELECTRONICS AND TELECOMMUNICATION

SEMESTER III:

Sub code	Subjects	Scheme Of Instruction Hrs/Week			Scheme Of Examination					
					Th Dur (Hrs)	Marks				
		L	T	P		Th	S	P	O	Total
ETC 3.1	Applied Mathematics-III	3	1	0	3	100	25	-	-	125
ETC 3.2	Electrical Technology	3	0	2	3	100	25	-	-	125
ETC 3.3	Network Analysis &Synthesis	3	1	2	3	100	25	-	-	125
ETC 3.4	Electronic Devices & Circuits-I	3	1	2	3	100	25	50	-	175
ETC 3.5	Digital System Design	3	1	2	3	100	25	50	-	175
ETC 3.6	Computer Oriented Numerical Techniques	3	0	2	3	100	25	-	-	125
		18	4	10	-	600	150	100	-	850

SEMESTER IV:

Sub Code	Subjects	Scheme Of Instruction Hrs/Week			Scheme Of Examination					
					Th	Marks				
		L	T	P		Th	S	P	O	Total
ETC 4.1	Applied Mathematics IV	3	1	0	3	100	25	-	-	125
ETC 4.2	Electronic Devices and Circuits-II	3	1	2	3	100	25	50	-	175
ETC 4.3	Analog Communication	3	1	2	3	100	25	-	-	125
ETC 4.4	Electromagnetic field & Waves	3	1	0	3	100	25	-	-	125
ETC 4.5	Linear Integrated Circuits	3	1	2	3	100	25	50	-	175
ETC 4.6	Managerial Economics	4	0	0	3	100	25	-	-	125
		19	5	6	-	600	150	100	-	850

ETC 3.1: APPLIED MATHEMATICS

Lectures per week----------:4 hours
Max. marks for the paper----------:100
Max. marks for sessional ----------:25
Duration of the paper----------:3 hours
Total no. of modules----------:4
No. of question from each module----------:2
Total no of question to be answered in the paper----------:5

MODULE I

Matrices: types of matrices, determinants, adjoin, inverse of matrix, elementary transformation, elementary matrices, rank of matrix, reduction to normal form,, canonical form. Rank using elementary transformation, linear independence and dependence, system of the form AX=0 and AX=B, and their solutions, Eigen values, Eigen vectors with properties, Cay lay Hamilton theorem with its applications

MODULE II

Fourier series: Periodic functions, Trignometric series, Euler's formulas, Dirichlets condition, even and odd functions, half range series, Paseralis identity
Fourier transforms: Fourier transform, inverse Fourier transform applications

MODULE III

Laplace transforms: Definition, Existence condition, properties, inverse Laplace transforms. Laplace transforms of periodic functions, convolution theorem, Laplace transform of Dirac-Delta function, Application of Laplace transform in storing linear differential. Equation with initial condition, system of Linear simultaneous differential equations.

MODULE IV

Z-transforms, properties, convolution and applications to differential equations wave equations: Derivation and solution of one-dimensional wave equation using separation of variable method. Heat equation, its derivation, and solution using separation of variable method.

Books:

1. Signals & DSP by Xavier, S.Chand
2. . Higher Engineering Mathematics by B.S.Grewal , Khanna Publications
3. Advanced Engineering Mathematics by Erusing Kryszig, New International Ltd.
4. Theory and Problems of matrices by Frank Ayres ,Schaum Outline Series
5. Matrix and Linear Algebra by K.B Data PHI.
6. Engineering Mathematics Vol. III by P. Kandaswamy, S. Chand & Co. New Delhi

ETC 3.2: ELECTRICAL TECHNOLOGY

Lectures per week----------:3hours
Practicals per week----------:2Hours
Max. marks for the paper----------:100
Max. marks for sessionals ----------:25
Duration of the paper----------:3 hours
Total no. of modules----------:4
No. of questions from each module----------:2
Min. no. of questions to be answered from each module----------:1
Total no of questions to be answered in the paper----------:5

MODULE 1

- Principles of electromechanical energy conversion
- DC Motor: principle, voltage equation, torque-equations, motor characteristics, speed control, starting
- Three Phase Induction Motor: Principle, construction, slip, torque-slip characteristics, starting, speed control.

MODULE 2

- Single phase Induction Motor: Principle of operation of split phase type, capacitor start motors.
- Stepper Motors: Types, principle of operation.
- Synchros: Construction, principle of operation and applications.
- Servomotors: DC servomotor, two-phase ac servomotor.
- Drives: Concept of an Electrical Drive, Classification, characteristics and braking of dc motors.

MODULE 3

- Working principle, construction, torque equations of the following analog instruments (a) PMMC (b) Moving iron (c) Electrodynamometer type
  Shunts and multipliers for PMMC type instruments and extension of range,
- Electrodynamometer Wattmeter: construction, torque equation
- Induction type Energy meter: construction, torque equation

MODULE 4

- Potentiometers: DC potentiometer: slide wire type and Laboratory type (Crompton's Potentiometer), applications.
  AC Potentiometer: Drysdale Polar type Potentiometer.
- AC bridges : for measurement of inductance, capacitance and frequency: Maxwell Bridge, Hay's Bridge, Owen's Bridge, Schering bridge, Wein's Bridge, Wagner's Earth bridge.

- Illumination: Definitions, laws of Illumination
- Electrical heating: advantages, principle of resistance heating, high frequency eddy current heating, dielectric heating.

TEXT BOOKS :

1. A Text Book of Electrical Technology-- B.L Theraja.(Vol II)
2. A Course in Electrical and Electronics Measurement and Instrumentation---A.K. Sawhney

REFERENCE BOOKS:

1. Electrical Power : J.B. Gupta
2. A First Course on Electrical Drives: S.K. Pillai

ETC 3.3: NETWORK ANALYSIS

Lectures per week----------:4 hours
Practicals per week----------:2 Hours
Max. marks for the paper----------:100
Max. marks for Sessional ----------:25
Duration of the paper----------:3 hours
Total no. of modules----------:4
No. of question from each module----------:2
Min. no. of question to be answered from each module----------:1
Total no of question to be answered in the paper----------:5

MODULE I

(a) Network classification:
Distributed and lumped, passive and active, time variable and time invariant, symmetrical and asymmetrical networks

Network analysis:

Mesh and nodal analysis; super-node and super-mesh analysis; t-Pi and Pi-T conversions
(b) Network theorems:

Review of Thevenins, Nortons, Millman, Compensation, Reciprocity and Tellgen's Theorems

MODULE II

(a) Graph theory:
Basic definitions, matrices associated with networks graphs: Incidence, Cutset, Tieset Matrices and Duality. Application to Mesh & Nodal Analysis.
(b) Time-Domain Analysis:
Network equations in time-domain, first and second-order circuits, internal conditions, analysis of transient and steady state response to step, ramp, impulse and sinusoidal inputs. Application of

Laplace Transform to analysis of networks for different inputs (impulse, step, ramp and sinusoidal)

MODULE III

(a) Resonance

Series and parallel resonance, Band Width, selectivity and Q-factor of response circuits.

(b) Two port networks

Characteristics in terms of Z, Y, H and ABCD parameters, Equivalent circuits, inter-relationship between the two port parameters; Input, output and image impedance of two ports.

Multi-terminal Networks: Multi-terminal networks, indefinite Admittance Matrix

MODULE IV

(a) Attenuators and filters

Symmetrical and unsymmetrical, balanced and unbalanced attenuators; analysis and design of T, Pi, Lattice and Bridged-T attenuator

Types of filters, classification of pass-band and stop-band, design and analysis of constant K and m-derived filters; Butterworth and Chebyshev approximations.

(b) Elements of network synthesis:

Positive-real functions, Reactance functions, RL and RC functions

Textbooks:

1. Network Analysis And Synthesis by Franklin F. Chuo, Wiley Eastern
2. Circuits and networks by Sudhakar & Shyamohan
3. Networks & Systems by Roy Choudhary
4. Electric Network Theory by N. Balabanian, T.A. Bichkart and Sundaran Seshu, Wiley &sons
5. Linear and Non-linear Circuits by L. O. Chau, C.A. Desoer and E.S. Kuyh, McGraw Hill International, 1987
6. Network Analysis by M.E. Vanvalkenbarg, Prentice (I) Ltd.
7. Network theory and filter Design by Aatre

ETC 3.4: ELECTRONIC DEVICES & CIRCUITS-I

Lectures per week----------:4 hours
Practicals per week----------:2Hours
Max. marks for the paper----------:100
Max. marks for sessional ----------:25
Max. marks for practical ----------:50
Duration of the paper----------:3 hours

Total no. of modules----------:4
No. of question from each module----------:2
Min. no. of question to be answered from each module----------:1
Total no of question to be answered in the paper----------:5

MODULE I

(a) Review of half wave and full wave rectifiers, L, C, LC, RLC and multiple LC filters, ripple factor, dc voltage. Design of all types of filters. Zener breakdown, Zener regulation for change in input voltage and output load, design of Zener regulators.
(b) Transistor as amplifier, CB, CE, CC configuration, types of biasing of transistor (fixed, emitter, collector bias with and without bypassed emitter resistor, voltage divider bias), stability factor and methods of improvement in all types of biasing, hybrid parameters and re model for all biasing, design of biasing circuits.

MODULE II

(a) Field effect transistors, Graphical analysis for finding all FET parameters CG, CS, configurations, various biasing techniques, expressions for Ai, Av, Ap, Zi, Zo for all configurations and biasing
(b) MOSFET, characteristics and method of construction, operation of depletion mode and enhancement mode of MOSFET, Graphical analysis for Q-Point Applications, Dual gate MOSFET and Its applications in AGC amplifier, Field Effect diode, handling of MOS Devices, precautions

MODULE III

(a) Multistage amplifie4rs and methods of coupling (RC, transformer, direct), Differential amplifier, tuned amplifier, frequency response.
(b) Large signal amplifier, Class A,B, AB, push pull circuits, power gain and efficiency calculations, complementary symmetry circuit, Class C operation of amplifier

MODULE IV

(a) Conduction mechanism in semiconductors, carrier density and conductivity of intrinsic semiconductor, hall Effect, Drift and Diffusion currents, compound semiconductors, single crystal growth, Epitaxy and CVD techniques of semiconductor processing, oxidation and electron beam processing, Ion implementation
(b) Principles of fabrication of integrated circuit components (resistors, capacitors, diodes, BJT, FET on wafers, Hybrid IC's

Textbooks:

1. Electronic Devices and circuits by Millman and Halkias, McGraw Hill Publications
2. Electronic Devices and Circuits by Allen Mottershed, PHI Publications
3. Electronic Devices and Circuit Theory by Robert Boylestead and Louis Nashelsky, PHI Publications
4. Electronic Devices and Circuit by Bell.
5. Electrical Engineering materials by A.J. Dekkar, PHI
6. Solid State Electronic Devices by B.G. Streetman, PHI

ETC 3.5: DIGITAL SYSTEM DESIGN

Lectures per week----------:4 hours
Practical per week----------:2 hours
Max. marks for the paper----------:100
Max. marks for sessional ----------:25
Max. marks for practical ----------:50
Duration of the paper----------:3 hours
Total no. of modules----------:4
No. of question from each module----------:2
Min. no. of question to be answered from each module----------:1
Total no of question to be answered in the paper----------:5

MODULE I

1. Number Systems and codes:
   - Decimal, Binary, Hexadecimal, and Octal number systems; Inter conversions, compliments; Addition and Subtraction using 1's and 2's complements; Binary Codes, Gray Code, Excess-3 Code.

2. Boolean Algebra:
   - Basic Boolean functions, Postulates and theorems of Boolean algebra, Sum-of-Products and Product-of-Sums forms of Boolean functions; Canonical and Standard forms.

   - Simplification of Boolean Functions, Plotting of K-Maps, POS and SOP Simplification, NAND and NOR implementation; Plotting and Reading of a K-Map using VEM Process.

MODULE II

1.Combinational Logic:

- Design procedure for combinational logic circuits; design and analysis of Half Adder, Full Adder; their use in designing other combinational logic circuits; Analysis & Design of Encoders and Decoders; Multiplexer and demultiplexers; their use in designing combinational circuits.

2.Memory Elements:

- SR, JK, T, D Flip-flops and Latches, their schematic symbols, Truth table and Excitation Table; Triggering methods if Flip-flops.

MODULE III

Sequential Circuits:

- Design procedure for sequential circuits using state diagrams, State Tables; State assignments and State minimization methods; Circuit implementation.
- Design and analysis of Counters, Single mode and Multi-mode Synchronous Counters; Modulo Counters, Asynchronous, Ripple and Ring Counters; Application of Counters.

MODULE IV

- Types of Shift Registers;

SISO, SIPO, PISO, PIPO, Bi-directional Shift Registers, Loading methods for Shift

Registers.

- Logic Circuits:
  Positive and Negative logic RTL, DCTL, DTL, HTL, TTL, ECL and IIL gates. MOS gates.
  Comparison of logic gates.
- Memory Organisation: memory Hierarchy, Main Memory [RAM & ROM], Associative memory [only definition], Cache memory [Associative, Direct & Set-Associative Mapping],Virtual Memory [only definition]

Laboratory Exercises in Addition to those Based on the above:

1. Write, compile and simulate the VHDL source code for all basic gates of Digital System.
2. Write VHDL Source code for a half adder. Compile the code. Simulate the code with input file.
3. List the VHDL Source codes required to simulate a JK flip flop. Write the outputs to a output file.

Reference books:

1. An Engineering Approach to Digital Design by Fletcher.
2. Digital Logic and Computer Design by M. Morris.
3. Switching Theory and Logic Design by F.J. Hill and G.L. Peterson, John Wiley, 1981
4. Analysis and Design of Digital Integrated Circuits by D. A. Hodges and H.G. Jackson, International Student Edn, McGraw-Hill, 1983.
5. Digital Integrated Electronics by Herbert Taub and Donald Schilling, McGraw-Hill.

ETC 3.6: COMPUTER ORIENTED NUMERICAL TECHNIQUES

Lectures per week----------:3hours
Practical per week----------:2 hours
Max. marks for the paper----------:100

Max. marks for sessional ----------:25
Duration of the paper----------:3 hours
Total no. of modules----------:4
No. of question from each module----------:2
Min. no. of question to be answered from each module----------:1
Total no of question to be answered in the paper----------:5

MODULE I

Errors and Approximations: introduction, sources of errors, problems in computations, safeguards against errors, floating point arithmetic, absolute error, relative error, percentage error- calculations.

Inter-polation: Newton's interpolation formula, LaGrange's Interpolation, Newton's Dividend difference, interpolation formula

MODULE II

Solution of transcendendental and polynomial equations in one variable: Newton Raphson method, Regula Falsi method, Successive bisection, Secant method, etc.

MODULE III

Solution of linear equations: Gauss's Elimination, pivoting, computation of matrix inverse using Gauss Elimination, Gauss Jordan methods.
Iterative Algorithms – Jacobi, Gauss Seidal methods, Eigen values and Eigen vectors

MODULE IV

Numerical Integration: Trapezoidal rule & Simpson's rule, Romberg's formula
Numerical Differentiation: Newton's forward and backward difference formulae.
Solutions of ordinary differential equation, Euler's methods, Runge Kutta methods, Predictor Corrector method

TEXTBOOKS:

1. Numerical algorithm – Krishnamurthy & Sen, PHI
2. Introductory methods of numerical analysis – S. S. Sastry – PHI

Reference books:

1. Computer Oriented Numerical methods by Rajaraman, PHI
2. First Course in Numerical methods by A. Ratson, McGraw Hill
3. Numerical methods in Engineering & Science by Dr. B. S. , Khanna Publication.

ETC 4.1: APPLIED MATHEMATICS-IV

Lectures per week----------:4 hours
Max. marks for sessional ----------:25
Max. marks for the paper----------:100

Duration of the paper----------:3 hours
Total no. of modules----------:4
No. of question from each module----------:2
Min. no. of question to be answered from each module----------:1
Total no of question to be answered in the paper----------:5

MODULE I

Bessel and Legendre's equations and their solutions. Bessel's functions of first kind and second kind. Recurrence relations for Bessel functions of the first kind and applications. Orthogonality for Bessel's functions and Bessel Fourier series. Generating functions for Bessel's functions. Relation between Laplace equation and Bessel's equation

MODULE II

Series solution for Legendre's equation and Legendre's polynomials. Recurrence relations for Legendre's polynomials and their applications. Generating functions for Legendre's polynomial and orthogonality for Legendre's polynomials.
Legendre's Fourier series expansions. Relation between Laplace equation and L equation

MODULE III

Complex Integrations, Cauchys Integral theorem and its applications. Integral formula for simply and multiply connected domains and its applications. Taylors and Laurents Series and their applications. Singular points, Poles and Residues. Maximum modules theorem and its applications. Liouvilles theorem with applications

MODULE IV

Residue Theorem and applications. Contour Integration. Boundary Value, Problems, Derivation of the Differential equation and the solution for the vibrating membrane, both rectangular and circular.

REFERENCE BOOKS:

1. Engineering Mathematics by B. S. Grewal
2. Complex variables and its applications by Churchill & Browns
3. Complex Analysis by Schaum Series
4. Special Functions by K.P. Gupta

ETC 4.2: ELECTRONIC DEVICES & CIRCUITS-II

Lectures per week----------:4 hours
Practical per week----------:2 hours
Max. marks for sessional ----------:25
Max. marks for the paper----------:100
Max. marks for practical ----------:50

Duration of the paper----------:3 hours
Total no. of modules----------:4
No. of question from each module----------:2
Min. no. of question to be answered from each module----------:1
Total no of question to be answered in the paper----------:5

MODULE I

1. Types of waveform, characteristics of pulse waveform, comparison of ideal and practical pulse waveform, Harmonic contents of waveforms. Steady-state response of RC differentiating and integrating circuits to square wave, their steady-state equations, Loading effect.
2. BJT as switch, switching time, effect of junction and diffusion capacitance on switching time, JFET, MOSFET and CMOS as switches, Analysis and design of basic monostable, astable and bistable multivibrators and Schmitt trigger.

MODULE II

1. Principle of negative feedback in electronic circuits, voltage series, voltage shunt, current series, current shunt types of negative feedback, typical transistor circuits, Effects of negative feedback on input and output impedance, voltage and current gains, Bandwidth, Noise and distortion
2. Principle of positive feedback, concept of stability in electronics circuits, Barkhausen criterion for oscillations, various types of oscillators (RC, Clapps, Wein bridge, Colpitt, Hartley, Tuned LC), Crystal Oscillators

MODULE III

1. Semiconductor sensors, Thermistors, Strain gauge, Power electronic devices, SCR, UJT, Diac, SUS, SBS, C-SCR, IGBT, MCT, GTO, SCS power transistors (BJT, MOSFET), principles of operation and applications

MODULE IV

1. Stimulation emissions, Ruby lasers, other laser systems like earth systems and gas lasers, semiconductor lasers, Population inversion at a junction, Emission spectrum for PN junction lasers, basic semiconductor laser, Hetero-junction laser, materials for semiconductors materials.
2. Opto-electronic devices, Photoconductors, photodiodes, photo-transistors, photovoltaic cells, photo couplers, LDR's, Semiconductors lasers, LED's, LCD's

Books:

1. Electronic Devices and circuits by Millman and Halkias, McGraw Hill Publications
2. Electronic Devices and Circuits by Allen Mottershed, PHI Publications
3. Electronic Devices and Circuit Theory by Robert Boylestead, PHI Publications
4. Pulse, Digital and Switching waveforms by J. Millman and Taub, McGraw Hill Publications

5. Solid State Electronic Devices by B.G. Streetman, PHI
6. An Introduction to Thyristor & Applications by Ramamorthy

ETC 4.3: ANALOG COMMUNICATION

Lectures per week----------:4 hours
Practical per week----------:2 hours
Max. marks for the paper----------:100
Max. marks for sessional ----------:25
Duration of the paper----------:3 hours
Total no. of modules----------:4
No. of question from each module----------:2
Min. no. of question to be answered from each module----------:1
Total no of question to be answered in the paper----------:5

MODULE I

1. Types of signals, time domain and frequency domain representation of signals, signal transmission through linear systems, filter characteristics of linear system, Distortion less transmission line, Ideal filter, Relation between Bandwidth and rise time, Paley Wiener criteria of physical realization, Energy and power Density spectrum and their interpretation.
2. Principles of AM, Frequency spectrum of AM wave, AM power and current relationship, modulation by multiple sine waves, generation of AM using solid state circuit. (Base-injected, emitter-injected and collector-injected)

MODULE II

1. DSB-SC and SSB Techniques, Methods of generation and detection of DSB-SC signals-square law modulator, Switching modulator, Ring Modulator, Balance modulator, Coherent detection of DSB-SC, COSTAS receiver, Squaring loop detection, comparison of various methods.
2. Methods of generation and detection of SSB (Selective filtering, phase discrimination & third method), Coherent detection of SSB. Comparison of various methods. Effect of frequency and phase errors in synchronous detection, ISB, VSB, FDM.

MODULE III

1. Principles of FM and PM, Mathematical representation, Spectrum, Narrowband and wideband FM, Multiple frequency modulation, power contents of carrier and sideband,

Effects of noise in FM, Direct modulation using FET, Armstrong method of generation, Frequency Multipliers, Slope Detector, Foster-Seelay discriminator, Radio detector.

2. AM and FM transmitter, TRF receivers, super heterodyne receivers, solidstate circuits for RF-amplifiers, Mixer, IF amplifier, AGC, AFC, Amplitude limiter, Pre-emphasis, De-emphasis, Audio muting, stereophonic FM.

MODULE IV

1. Noise, various noise sources, Noise calculations for – single noise sources, multiple noise sources, cascade and cascode amplifiers. Noise figure and its measurement, Noise temperature, Equivalent input noise resistance, noise Bandwidth, noise measurement on line and channel.
2. Band – pass noise representation, noise figure calculation for various modulation systems (DSB-AM, DSB-SC, SSB and FM), Effects of transmitter noise.

Books:

1. Communication Systems by B.P. Lathi, Wiley Eastern Limited
2. Principle of Communication Systems by Herbert Taub and Donald, Tata McGraw Hill
3. Electronic Communication System by George Kennedy,Tata McGraw Hill
4. Electronic Communication System by Dennis Roddy and John Coolen, PHI
5. Communication System by Bruce Carlson, Tata McGraw Hill.

ETC 4.4: ELECTROMAGNETIC FIELDS & WAVES

Lectures per week----------:4 hours
Max. marks for the paper----------:100
Max. marks for sessional ----------:25
Duration of the paper----------:3 hours
Total no. of modules----------:4
No. of question from each module----------:2
Min. no. of question to be answered from each module----------:1
Total no of question to be answered in the paper----------:5

MODULE I

Vector analysis, vector relations in Cartesian, cylindrical and spherical co-ordinate systems.
Integral theorems: Green's theorem, Divergence theorem, Stoke's theorem
Electrostatics: Coulomb's law, electric field strength, electric displacement & displacement density, Gauss's Law & Divergence theorem (application of Gauss's Law), Potential function, field due to a continuous distribution of charges, Equipotent surfaces.

MODULE II

Electrostatics:
Poisson's & Laplace's equation, Capacitance and electrostatic energy.

Steady Magnetic Fields:

Faraday's Law, Magnetic Flux density, Magnetic Field strength, Magnet motive force, Ampere's circuital law, Energy stored in a magnetic field, Ampere's law for a current element, Ampere's Force Law & Magnetic Vector potential.

MODULE III

Maxwell's Equations:
Continuity equation for time varying fields, Displacement current density, Generalized Ampere's Law, Maxwell's equations, conditions at the boundary surface3 between the media.
Electromagnetic waves:
Electromagnetic waves in a homogenous medium, solution of Maxwell's equations for free space conditions, wave equation,
Uniform plane wave propagation, characteristics impedance of a medium, wave equations for a conducting medium.

MODULE IV

Electromagnetic waves:
Sinusoidal electric & magnetic fields, traveling waves & standing waves (TE, TM, TEM), propagation constant of a medium, wave propagation in conductors & dielectrics, polarization of a uniform plane wave, reflection and refraction of plane wave at the boundary between two media, surface impedance of a conducting medium.

Pointing Vector & power flow:

Poynting's theorem, Power loss in plane conductor.

Books:

1. Electromagnetic waves and radiating systems byJordan & Balmain, Eastern Economy, 1997 Edition
2. Introductory Course to Electromagnetic waves by P.V.Gupta, Dhanpat Rai Publications
3. Electromagnetics by Kraus, McGraw Hill.
4. Elements of Engineering Electromagnetics by Sadiku, Oxford University Press
5. Elements of Engineering Electromagnetics by Narayan Rao, PHI
6. Electromagnetic theory & applications by Fleich & Kraus, McGraw Hill
7. Theory & Problems of Electromagnetics by Joseph, Schaum Series, McGraw Hill

ETC 4.5:LINEAR INTEGRATED CIRCUITS

Lectures per week	:4 Hours
Practical per week	:2 Hours
Maximum marks for the paper	:100
Maximum marks for the sessionals	:25
Maximum marks for the practicals	:50
Duration of the paper	:3 Hours

No. of modules :4
No. of question per module :2
Maximum no. of questions to be answered from each module :1
Total number of questions to be answered :5

MODULE I

Op-amp introduction:
Op-amp parameters, definitions, measurements, offset compensation; functional block diagram and working; Specifications of IC 741; Equivalent circuit of op-amp and transfer curve. Frequency response and method of frequency compensation.

Applications of operational Amplifiers (Linear amplifiers and filters):
Inverting and non-inverting amplifiers, summing amplifiers, Differentiator, Integrator; Subtractor, Instrumentation amplifier, Voltage follower,V-I and I-V Converter, Precision Rectifier, Log and Antilog amplifier, Active filters such as Low Pass, High Pass, Band Pass, Notch, Butterworth (design)

MODULE II

Oscillators, Comparators:

Comparators, Zero crossing detectors, Schmitt trigger, Monostable and astable multivibrators; Ramp generator, Wein bridge oscillator, phase shift oscillators, Sample and hold circuit

Voltage Regulators:

Specifications, functional block diagrams and applications of IC723, as high and low voltage regulators

Three terminal regulators IC78XX series, 79XX series, LM 309, LM317, voltage regulator4, dual tracking regulator.

Principle and working of switching mode regulators, applications of switching regulator IC78540

MODULE III

ADC &DAC:

A/D and D/A conversion principles, Successive approximation, Binary weighted resistor and R-2R resistor ladder. Specifications, functional block diagrams, applications of 0809 &0808

Phase-Locked Loop (PLL):

Basic principle of Phase-locked loop and diagram, transfer characteristics of PLL, Lock Range, Capture range; Applications of PLL frequency multiplier, AM Demodulation, FM demodulation.
Study of PLL IC 565 and its applications. Design

MODULE IV

IC 555:

Functional block diagram and specifications as Monostable, Astable, VCO, Missing pulse detector, design, PWM, frequency divider.

Waveform Generating ICs:

Study of IC NE 566, IC 8038 and IC XR 2206 and their applications in waveform generations.

Books:

1. Integrated Circuits by K.R. Botkar, Khanna Publications.
2. Op-amp and Linear Integrated Circuits by Ramakant Gayakwad, Prentice Hall of India Pvt. Ltd.
3. Integrated Electronics: Analog and Digital Circuits and Systems by Millman & Halkias, Mc-Graw Hill Publications.
4. Design with Operational amplifiers and analog integrated circuits by Sergio Franco, McGraw Hill

ETC 4.6:MANAGEMENT AND ECONOMICS

Lectures per week	:4 Hours
Maximum marks for the paper	:100
Maximum marks for the sessionals	:25
Duration of the paper	:3 Hours
No. of modules	:4
No. of question per module	:2
Maximum no. of questions to be answered from each module	:1
Total number of questions to be answered	:5

MODULE I

Introduction and general concepts:

Demand and supply – Demand curve, Equilibrium, Aggregate Supply and Demand

National Income terms-GDP, Real v/s Nominal GDP, Net Domestic Product, GNP, National Income, Per capita income, Disposable Income, Price Index, Inflation

Exchange Rates – Pure, flexible, Terminology for Exchange rate changes, Forex market, Exchange rate systems.

Individual, firm and Market Demand and Supply, Price, Income and Cross Elasticity

Applications of Elasticity, Estimation/forecasting of Demand.

Pricing – of multiple Products, Price Discrimination, Cost plus pricing, Market driven pricing decisions

MODULE II

Costing And Financial Analysis

Break even Analysis, Basic Concepts-Contribution Cost, Break-even Volume, break-even revenue. Preparation of Income statement, Balance sheet, fund Flow statement, Understanding

and analyzing them using financial ratios. Ratio Analysis Liquidity, Leverage and Profitability ratios
Working Capital Management-Determinants of working capital, Financing of working
Capital, Dangers of Excessive and shortage of working Capital. Inviting investment proposals, Selection of project proposals.
Capital Rationing, different Methods of Evaluation of Project-Payback Period
Accounting rate of return. Discounted cash Flow Methods – Net Present Value, Internal
Rate of return
Profitability Index
Sources of funds for Business-Share capital, Debentures, Loans

MODULE III

General Principles Of Management
Different schools of Management, effectiveness, efficiency, Productivity, functions of Managers, Planning, Types of plans.
Nature of Objectives, MBO, Merits and Demerits of MBO.

Organisation, Purpose, Span of management, Departmentation, Structure of Organisation, O. D. Process, Organisational culture, values. Matrix Organisation, Unity of command, SBU, line and staff function, Decentralization, Advantages, Limitations
Marketing Mix, Advertisement, Sale Promotion, Sales Management and Training, Market Research –Tools, Methods, Analysis

MODULE IV

Managing People
Motivation, Theories of Motivation, Maslow's Theory of Needs, Herzberg's Theory, Vroom's expectancy theory, Managing Creative Staff. Leadership, leadership styles and behaviors.
Human Resource Management, Staffing, Skills needed by Mangers, Recruitment and Selection, Appraisal Methods,
Nature of Communication, Basic communication Process, Barriers in Communication,
Guidelines for improved communication, Informal and formal communication,
Principles of Effective communication, controlling, steps in Basic control process, Importance of Standards.

Books:

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