WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

ELECTRONICS & COMMUNICATION ENGINEERING

SEMESTER - I

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	MT 201	Mathematics – III	4	-	3	75	25
2.	EC 201	Basic Circuit Analysis	4	-	3	75	25
3.	EC 202	Electromagnetic Theory	4	-	3	75	25
4.	EC 203	Electronic Devices	4	-	3	75	25
5.	ME 221	Elements of Mechanical Engineering	4	-	3	75	25
6.	EE 222	Electrical Technology	4	-	3	75	25
		PRACTICALS					
1.	EC 231	Electronic Devices - Lab.	-	3	3	50	25
2.	EC 232	Electronic Workshop & Basic Circuits - Lab.	-	3	3	50	25
		Total	**24**	**6**	**-**	**550**	**200**

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

SEMESTER - I

Sl. No.	Syllabus Ref.No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	EC 221	Electronic Engineering -I (Common to EEE, IE)	4	-	3	75	25
2.	EC 222	*Basic Electronics (For CSE)	4	-	3	75	25
		PRACTICALS					
1.	EC 241	Electronic Engineering Lab.-I (Common to EEE, IE)	-	3	3	50	25
2.	EC 242	** Basic Electronics - Lab. (For CSE)	-	3	3	50	25

* **Syllabus Same as EC 272** | **Given in Semester - II Curriculum**

** **Syllabus Same as EC 292** |

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

MT 201

MATHEMATICS-III

(Common to all Branches)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT –I

Partial differential Equations : Formation of partial differential equations of first order, Lagrange's solution. Standard types. Charpit's & Jacobi's method of solution, Partial differential equations of higher order, Monge's method.

UNIT-II

Fourier Series : Expansion of a function in Fourier series for a given range, half range sine and cosine expansion, odd and even functions of Fourier series, change of interval, complex form of Fourier Series.

UNIT – III

Partial differential Equations : Solution of wave equation, heat equation and Laplace's equation by the method of separation of variables, and their use in problems of vibrating string, one and two dimensional wave and heat flow and examples thereon.

UNIT-IV

Z - Transforms : Introduction. Basic theory of Z-Transforms. Z-transform of some standard sequences. Existence of Z-Transform, Linearity property, Translational Theorem, Scaling property, Initial and Final Value Theorems, Differentiation of Z-Transform, Convolution Theorem, Solution of Difference equations using Z-transforms.

UNIT-V

Numerical Methods : Solution of linear system of equations. Gauss elimination method Gauss-Seidel iterative method, ill-conditioned equations

and refinement of solutions, Interpolation, Lagrange Interpolation, Newton's divided difference interpolation, Newton's Forward and Backward difference Interpolation Formulas. Numerical differentiation and integration (Trapezoidal and Simpson's formulas) Solution of Differential equations by Runge Kutta Method.

Suggested Reading :

1. E. Kreyszig. *Advanced Engineering Mathematics*, Wiley Eastern Ltd., 8th Edition, New Delhi, 2006.
2. R. K. Jain and S.R.K. Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, 2005.
3. B.V. Ramana, *Higher Engineering Mathematics*, Core Engineering Series, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2007.
4. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publications, 34th Edition, 1998.

EC 201

BASIC CIRCUIT ANALYSIS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Lumped Circuit elements, dependent and independent current and voltage sources, Ohm's law, energy, power, Kirchoff's laws, D.C. circuit analysis. Nodal and mesh analysis. Source transformations, Terminal characteristics of RLC elements. Thevenin's and Norton's theorems. Superposition theorem, Maximum power transfer theorem.

UNIT-II

Linear time invariant first order and second order circuits, Formulation of integro differential equations, RL, RC and RLC circuits, transient and steady state responses. Zero Input Response (ZIR), Zero State Response (ZSR) - complete response.

UNIT-III

Steady state response of RLC networks to exponential signals, Sinusoidal function, response to sinusoidal excitation, phasors, impedance and admittance. Analysis of magnetically coupled circuits. Calculation of power in a.c. circuits, average power, apparent power, complex power, vector representation. Network theorems with impedance.

UNIT-IV

Concept of complex frequency, impedance and admittance functions, Pole-Zero cancellation, calculation of natural response from pole zero plot. Series and parallel resonance, Q-factor, selectivity, bandwidth. Calculation of Q factor for different resonant forms.

UNIT-V

Topological description of networks. Network graphs, tree, chord, cutset, incidence matrix, tieset matrix, cutset matrix. Formulation of node and loop equations. Tellegen's theorem, duality, dual networks.

Suggested Reading :

1. Hayt Jr. W.H. Kemmerly J.E., *Engineering Circuit Analysis,* 6th Edition, Tata McGraw Hill, 2002.
2. Aatre, V.K., *Network Theory and filter Design,* 2nd Edition, New Age International Pvt. Ltd., 1986.
3. Jagan NC, Laxminarayana C, *Network theory, BSP* Publications, 2006.

EC 202

ELECTROMAGNETIC THEORY

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Cartesian, Cylindrical and spherical coordinate systems - review of vector analysis - Coulomb's Law. Electric Field Intensity. Electric field due to different charge distributions. Line of charge, sheet of charge and volume charge distributions. Electric flux, flux density, Gauss's Law and application. Divergence theorem.

UNIT-II

Energy and potential, Potential field of system of charges, potential gradient. Energy density, Boundary conditions in static electric field, Capacitance of two-wire line, Continuity equation, current density, Poisson's equation, Laplace equation, Uniqueness theorem, Applications of simple practical cases.

UNIT-III

Steady magnetic field, Biot-Savart's law, Ampere's law, Stoke's theorem, Magnetic scalar and vector potentials. Magnetic boundary conditions, Magnetomotive force, Permeability, self and mutual inductances, Evaluation of inductance of solenoid, toroid, coaxial cable, two-wire transmission line.

UNIT-IV

Time varying fields, Maxwells equations, Boundary conditions in EM field. EM wave equations in free space and conductors. Sinusoidal variations. Uniform plane wave, wave motion in free space. Wave motion in perfect dielectrics, lossy dielectrics and conductors. Polarization - linear, elliptical and circular polarizations.

UNIT-V

Energy theorem and Poynting vector, Instantaneous, average and complex Poynting vector. Reflection of plane waves by a perfect conductor, normal and oblique incidence. Reflection of plane waves by a perfect dielectric, normal and oblique incidence. Reflection coefficient. Transmission coefficient, power and energy calculations.

Suggested Reading :

1. Jordan, E.C., Balmain, K.G., *Electromagnetic Waves and Radiating Systems*, 2nd Edition, Prentice Hall of India, 2001.
2. Hayt. W.H., *Engineering Electromagnetics*, Tata McGraw Hill, 5th Edition, 1994.
3. J.D.Krauss and Fleish, *Electromagnetics with applications*, 5th Edition, McGraw Hill, 1999.

EC 203

ELECTRONIC DEVICES

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit-I

Junction Diode : Different types of PN Junction formation techniques, PN Junction Characteristics, biasing-band diagrams and current flow, Diode current equations under forward bias and reverse bias conditions, Junction breakdown in diodes and breakdown voltages, effect of temperature on diode characteristics, Diode as a circuit element, small signal diode models, Junction capacitance under forward bias and reverse bias, Diode switching characteristics, Zener Diodes, Zener voltage regulator and its limitation.

Unit-II

PN Diode Applications : Peak Inverse voltage requirements of diodes for Half wave, Full wave and Bridge rectifiers - their performance characteristics, Analysis and design of Rectifiers with and without Filters (L, C, LC and pi filters) Specials Diodes : Elementary treatment on the functioning of Tunnel/Backward, Varactor, Photo, Light Emitting diodes, Liquid Crystal Display, study of block diagram of CRO.

Unit-III

Bipolar Junction Transistor : Transistor Junction formation (collector-base, base-emitter Junctions) Transistor biasing-band diagram for NPN and PNP transistors, current components and current flow in BJT, Ebbers Mold equations, large signal current gain, Modes of transistor operation, common base input, output characteristics, Early effect, Early voltage from CE output characteristics, CE and CC input/output characteristics, BJT as an amplifier, BJT biasing techniques, Thermal runway and heat sinks and thermal stabilization, operating point stabilization against temperature and device variations-current stability factor (Si) SV, SB and their interrelation with Si feedback and compensation techniques, Bias design for a specified output swing.

Unit-IV

Small Signal Transistors equivalent circuits : Small signal low frequency h-parameter model of BJT, Determination of h parameters, analysis of BJT amplifiers using h parameter comparison of CB, CE and CC amplifier configurations, Analysis of BJT amplifier with approximate model. Special Devices : working of UJT, SCR, DIAC, TRIAC and CCD.

Unit-V

Junction Field Effect Transistors (JFET) : JFET formation, operation & current flow, pinch-off voltage, V-I characteristics of JFETS. JFET biasing-zero current drift biasing, biasing against device variations. Low frequency small signal model of FETs. Analysis of CS, CD and CG amplifiers and their comparison. FET as an amplifier and as a switch. MOSFETs: MOSFETs, Enhancement & Depletion mode MOSFETs, V-I characteristics. MOSFET as a resistance Biasing of MOSFETs, MOSFET as a switch, CMOS circuit and CMOS as a low frequency amplifer.

Suggested Reading :

1. Jacob Milliman & Christos C.Halkias: *Electronic Devices & Circuits*, McGraw Hill 1991.
2. Dr. Lal Kishore, *Electronics Devices and Circuits*, BS Publication, 2004.
3. S. Shalivananan, N.Suresh Kumar, A.Vallava Raj, *Electronic Devices & Circuits*, Tata McGraw Hill, 2003.
4. J.B.Gupta, *Electronic Devices & Circuits*, S.K.Kataria & Sons, 2002.

ME 221

ELEMENTS OF MECHANICAL ENGINEERING

(Common for ECE and EEE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

UNIT-1

Thermodynamics: Concept of system, process and properties, laws of thermodynamics, concept of entropy and Clausius inequality, steady flow energy equation for an open system, conditions of reversible and irreversible process, simple calculations of change in internal energy, enthalpy, entropy and workdone

IC Engines: Working of four stroke and two stroke petrol and diesel engine with p-V diagrams, valve timing diagram, calculation of indicated power, brake power, specific fuel consumption, mechanical and thermal efficiencies.

Reciprocating Air compressors:Single and multistage compressors, workdone, efficiency of multistage compressors, effect of clearance volume.

UNIT-II

Heat transfer: Basic modes of heat transfer, Fourier's law of conduction, Newton's law of cooling, Stefan –Boltzamn law of radiation and concept of black body one dimensional steady state conduction heat transfer through plane walls without heat generation. Critical radius of insulation for cylinders.

Heat exchangers: Classification and application of heat exchangers in industry, derivation of LMTD in parallel and counter-flow heat exchangers and problems

UNIT-III

Refrigeration: Types of refrigeration systems- Air refrigeration system, vapor compression system, ammonia-water absorption refrigeration system, thermoelectric refrigeration system, COP and representation cycle on T-S and H-S diagrams, Types and properties of refrigerants, eco-friendly refrigerants., Introduction to psychrometry and psychrometry processes.

UNIT-IV

Basic Manufacturing Processes: Welding, brazing, soldering, brief description of process and parameters, associated principles of gas welding, arc welding.

Casting: Sand casting, die casting, and principles and application.

Forming: Basic concepts of forming process-Rolling and wire drawing.

Principles and Applications of basic Machining Processes: Turning, drilling and shaping

UNIT - V

Applications of four bar planar mechanisms-single slider crank mechanisms. **Gears**: Classifications of gears, nomenclature **Gear Trains**: Simple, compound, inverted and epi-cycle gear trains

Belt and Rope drives: Open and cross belt drives, length of belt, ratio of tensions of flat belt, condition for maximum power transmission for flat belt.

Suggested Reading:

1. P. N. Rao, *Manufacturing Technology*, Vol.1(Foundry, welding and Forming) & 2 (Metal cutting and machine tools), Tata McGraw Hill publishing Co, 2005.
2. Thomas Beva, *Theory of Machines*, CBS Publishers, 1995.
3. R. K. Rajput, *Thermal Engineering*, Laxmi Publications, 2005
4. C. Sachdeva, *Fundamentals of Engineering Heat and Mass Transfer*, Wiley Eastern Ltd., 2004.

EE 222

ELECTRICAL TECHNOLOGY

(For ECE)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Unit I

DC Generators: Constructional details, Simple lap and wave windings, Methods of excitation, Induced emf, Basic ideas of armature reaction and commutation, Characteristics of shunt, series and compound generators and applications

DC Motors: Torque developed in motors, Motor starter, Characteristics of shunt, series and compound motors, Speed control of DC motors.

Unit II

Balanced three-phase system: Star-delta connection, Relationship between line and phase quantities, Measurement of power by Two-Wattmeter method AC Generators: Construction, emf equation, Armature reaction, Synchronous impedance, Regulation.

Unit III

Transformers: Single-phase transformer: Construction, Theory of action, Phasor diagram under no-load and loaded conditions, OC and SC tests on transformer, Efficiency and regulation, Auto transformer, Theory of operation

Unit IV

Induction Motors: Construction, Production of rotating magnetic field, Slip-torque characteristics, Starters for cage and wound rotor induction motors, Single-phase induction motors, Construction, Theory of operation, Characteristics of shaded pole, Split phase and Capacitor motors, Applications.

Unit V

Power Systems : Basic ideas of thermal, hydro, nuclear and non-conventional generating systems and layout, Block schematic of power systems, Transmission using high voltages, Advantages, Basic ideas of line parameters, Short line calculations.

Suggested Reading :

1. H.Cotton, *Electrical Technology*, BI Publications, 1985.
2. M.L. Soni, P.V. Gupta and V.S. Bhatnagar, *A Course in Electrical Power*, Dhanpat Rai and Sons, Delhi, 1995.

EC 231

ELECTRONIC DEVICES LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

1. Measurement of Resistivity of semiconductor samples using 4-probe method
2. Hall Effect Measurements
3. Zener voltage Regulators
4. Design, realization and performance evaluation of half wave & full wave rectifiers
5. Design, realization and performance evaluation of half wave & full wave rectifiers with Capacitance, Inductance, LC & pi-section filters
6. Plotting the characteristics of CB, CE & CC configurations of BJTs
7. Plotting the characteristics of CG, CS configurations of FETs
8. BJT biasing
9. FET biasing
10. Measurement of Transistor h-parameters in Common Emitter Configuration
11. Characteristics of special devices-UJT, SCR, Tunnel diode
12. Characteristics of zener diode, photo diode, photo transistor
13. Driving LEDs, Seven Segment LED/LCD displays
14. Common Emitter Transistor Amplifier
15. FET Common Source Amplifier
16. Analysis & Design of circuits using PSPICE

Suggested Reading:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, *Basic Electronics, A Text. Lab Manual*, 7th Edition, TMH, 1994.
2. Paul B. Zbar, Industrial Electronics, *A Text – Lab Manual*, 3rd Edition, TMH, 1983.

EC 232

ELECTRONIC WORKSHOP & BASIC CIRCUITS LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

PART - A

1. Study of (with reference to typical electromechanical specifications, circuit representation): Electronic components (all types of discrete active & passive devices, display devices, integrated components/ circuits with their packings etc.,), electro mechanical components (switches, sockets, connectors etc.,) electromagnetic components (coils-different types of magnetic and ferrite cored, potted components, relays etc.,)
2. Study and use of different meters (moving coil, moving iron, volt meter/ ammeter, AVO/Multimeter) for the measurement of electrical parameters.
3. Measurement of R, L, C components using LCR Meter
4. Study of CRO & Measurement of voltage, frequency and Phase Angle.
5. Design and fabrication (winding) of an iron cored inductance coil for a given value of L, current and core specifications.
6. Design of AC mains operated step down transformer for a given turns ratio, current ratings and core specifications. Measurements of their functional electrical parameters
7. PCB design of a small circuit with its layout using tapes & etching in the lab.

8. Soldering & desoldering exercises using discrete components & ICs for a specific circuit requirement

PART - B

1. Verification of superposition theorem
2. Verification of Thevenin's theorems
3. Verification of maximum power transfer theorem
4. Verification of Tellegen's theorem
5. Design & verification of Series Resonance
6. Design & verification of Parallel Resonance

Suggested Reading :

1. Zbar, P.B., *Basic Electronics, A Text-Lab Manual,* 7th Edition, TMH, 1995.
2. James M. Kirkpatric, *Electronic drafting and Printed Circuits board design*, Galgotia Publisher, 1988.

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

EC 221

ELECTRONIC ENGINEERING - I

(Common for EEE & IE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Semiconductor diodes and Rectifiers : Review of semiconductor physics, p-n junction as a rectifier, V-I characteristics, temperature dependence of V-I characteristics; Breakdown of junctions-Zener and Avalanche. Half wave, full wave, bridge rectifiers, L, C, pi-section filters; Regulation and Ripple characteristics.

UNIT-II

Transistors and their biasing : BJT, current components; CE, CB, CC configurations; characteristics. Transistor as an amplifier; h-parameters; Analysis of CE, CB, CC amplifiers. Operating point, bias stability, bias stabilization circuits, fixed bias, collector to base bias and Emitter bias.

UNIT-III

Field Effect Transistors and their biasing : Principles of V-I characteristics of JFET and MOSFETs; Depletion and Enhancement modes, small signal equivalent circuit, FET as a CS amplifier.

Biasing of JFET's and MOSFET's, source self bias, biasing for zero current drift, biasing against device variations, Biasing the enhancement MOSFET, Characteristics of UJT, SCR, DIAC & TRIAC.

UNIT-IV

Low frequency BJT amplifier Circuits : Cascading amplifier stages, simplified analysis for three amplifier configurations, Miller's theorem-High input impedance transistor circuits, cascade configuration, Difference amplifier.

UNIT-V

Multistage amplifiers : Classification of amplifiers, Distortion in amplifiers, Frequency response of RC coupled amplifiers, Transformer coupled amplifiers, step response, Bandwidth of cascaded stages. Effect of emitter (source) bypass capacitor on LF response.

Suggested Reading :

1. Jacob Millman & Christos C. Halkias, *Electonic Devices and Circuits,* McGraw Hill, 1991.
2. Jacob Millman & Christos C. Halkias, *Integrated Electronics,* McGraw Hill, 1991.
3. Donald L Schilling & Charles Belove, *Electronics Circuits : Discrete & Integrated,* 3rd Edition, McGraw Hill International Student Edition, 3rd Edition, 1989.

EC 241

ELECTRONIC ENGINEERING LAB -I

(Common to EEE and IE)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

1. Comparison of semiconductor diodes (Ge, Si and Zener)
2. Static Characteristics of BJT (CE)
3. Static Characteristics of BJT (CB)
4. Static Characteristics of FET (CS)
5. Design of Half wave and Full wave Rectifier with and without filters
6. Design of rectifiers with C, L, LC & Pi-filters
7. Static characteristics of SCR
8. Static characteristics of UJT
9. Measurement of phase, frequency and sensitivity with CRO
10. Biasing of BJT and FET
11. Frequency Response of RC coupled amplifier using BJT
12. Frequency Response of RC coupled amplifier using FET
13. Emitter Follower
14. Source Follower
15. Cascaded Amplifiers

Suggested Reading :

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, *Basic Electronics*, A Text – Lab Manual, 7th Edition, TMH, 1994.
2. S. Poorna Chandra, B. Sasikala, *Electronics Laboratory Primer*, A design approach, Wheeler Publishing, 1998.

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

ELECTRONICS & COMMUNICATION ENGINEERING

SEMESTER - II

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction: Periods per Week L	Scheme of Instruction: Periods per Week D/P	Scheme of Examination: Duration in Hrs	Scheme of Examination: Maximum Marks: Univ. Exam	Scheme of Examination: Maximum Marks: Sessionals
		THEORY					
1.	MT 251	Mathematics - IV	4	-	3	75	25
2.	EC 251	Analog Electronic Circuits	4	-	3	75	25
3.	EC 252	Networks and Transmission Lines	4	-	3	75	25
4.	EC 253	Signal Analysis and Transform Techniques	4	-	3	75	25
5.	EC 254	Pulse, Digital and Switching Circuits	4	-	3	75	25
6.	CE 222	Environmental Studies	4	-	3	75	25
		PRACTICALS					
1.	EC 281	Analog Electronic Circuits	-	3	3	50	25
2.	EE 292	Electrical Technology Lab	-	3	3	50	25
		Total	**24**	**6**	**-**	**550**	**200**

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SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

SEMESTER -II

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	EC 271	Electronic Engineering -II (For EEE, IE)	4	-	3	75	25
2.	EC 272	Basic Electronics (For Mech., Prod.)	4	-	3	75	25
3.	EC 273	Signals and Systems (For IT)	4	-	3	75	25
		PRACTICALS					
1.	EC 291	Electronic Engineering Lab. - II	-	3	3	50	25
2.	EC 292	Basic Electronics - Lab. (For Mech., Prod.)	-	3	3	50	25

MT 251

MATHEMATICS-IV

(Common to all Branches)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT–I: Functions of Complex variables

Limit and Continuity of function-Analytic function-Cauchy- Reimann equations – complex integration, Cauchy's theorem-Derivative of Analytic functions-Cauchy's integral formula and it's applications.

UNIT-II: Taylor's and Laurent's Series Expansions

Zeroes and Singularities – Residues-Residue theorem-Evaluation of real Integrals using Residue theorem-Conformal Mapping-Bilinear transformation.

UNIT-III: Statistics

Random Variables, distributions, density functions-conditional distributions-Baye's theorem – mathematical expectation, expected values-moments and Moment generating functions.

UNIT-IV: Distributions

Poisson, Normal, Gamma and Chi - Square distribution-fitting curves to the data.

UNIT-V: Curve fitting by method of least squares

Correlation and Regression-lines of regression -Tests of Significance, Chi-Square, F and T-Tests

Suggested Reading:

1. R.V. Churchill & J.W. Brown, *Complex Variables and Applications,* Fifth Edition, McGraw--Hill International Edition, 1990.
2. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics,* S. Chand & Co., New Delhi, 1997
3. R.K. Jain & S.R.K. Iyengar, *Advanced Engineering Mathematics,* Narosa Publications, 2002.
4. B.V. Raman, *Higher Engineering Mathematics, Core Engineering Series* Tata Mc Graw Hill Publishing Company Ltd, New Delhi, 2007.

EC 251

ANALOG ELETRONIC CIRCUITS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Small Signal Amplifiers: Classification of amplifiers, BJT and FET high frequency equivalent circuits, Mid-band analysis of single and multistage amplifiers, Low frequency and high frequency analysis of single and multistage RC coupled and transformer coupled amplifiers with BJT and FET.

UNIT-II

Large Signal Amplifiers: BJT as large signal audio amplifiers, Classes of operation, Harmonic distortion, power dissipation, efficiency calculations. Design considerations of transformer coupled and transformer-less push-pull audio power amplifiers under Class-A. Class-B, Class D and Class-AB operations.

UNIT-III

Feed Back Amplifiers: The feedback concept, General characteristics of negative feedback amplifier, Effect of negative feedback on input and output impedances, Voltage and current, series and shunt feedbacks. Stability considerations, Local Versus global feedback.

UNIT-IV

R.F. Voltage Amplifiers: General consideration, Analysis and design of single tuned, inductively coupled and double tuned types with BJT's selectivity, gain and bandwidth comparison of multistage single tuned amplifiers and double tuned amplifiers, the problem of stability in RF amplifiers, neutralization & unilaterisation, stagger tuned amplifiers, introduction with FET's.

UNIT-V

Analysis and design of RF tuned class B and class C power amplifiers with BJT's.

Oscillators: Positive Feed Back and conditions for sinusoidal oscillations, RC oscillator, LC oscillator, Crystal oscillator, Amplitude and frequency stability of oscillator.

Suggested Reading:

1. P.M. Chirlian, *Electronics Circuits: Physical Principles, Analysis and Design,* Mc Graw Hill.
2. Shilling, L.D., Belove, C., *Electronic Circuits : Discrete and Integrated,* 3rd edition, Mc Graw Hill, ISE, 1989.
3. S. Shali Vahanan, N. Suresh Kumar, et.al *Electron Devices & Circuits,* Tata McGraw Hills, 2003.
4. Ley Benzeine, *Electronic Communications System,* Prentice Hall,1970.

EC 252

NETWORKS AND TRANSMISSION LINES

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Two port networks, Z, Y, h, g, ABCD parameters. Equivalence of two port networks. T, Pi transformation, Interconnection of two ports, Reciprocity theorem. Analysis of reciprocal networks, Practical and ideal transformers.

UNIT-II

Asymmetrical networks, Image and Iterative impedances. Image transfer constant and iterative transfer constant. Symmetrical networks, characteristic impedance and propagation constant. Properties of L, T and Pi section types. Attenuators and their design. Impedance matching networks.

UNIT-III

Constant K-filters – low pass, high pass, band pass, band elimination filter design, m-derived and composite filter design. Notch filter, inverse networks and equalizers. Elements of network synthesis.

UNIT-IV

Properties of transmission lines. Transmission line equations from source and load end. The finite and infinite lines. Velocity of propagation, input impedance. Open and short circuited lines, telephone cables, distortion less transmission, loading of cables, Campbell's formula.

UNIT-V

Properties of Transmission lines at UHF, Reflection co-efficient, Standing waves, Distribution of voltages and currents on loss less line. Transmission lines as circuit elements. Characteristics of half wave, Quarter-wave and one eighth wave lines. Construction and applications of Smith chart. Transmission line matching. Single and double stub matching.

Suggested Reading:

1. Ryder, J.D. *Networks, Lines & Fields,* Prentice Hall, 2nd Ed., 1991.
2. Van Valkenburg, M.E. *Network analysis,* Prentice Hall of India, 3rd edition, 1996.
3. Umesh Sinha, *Network Analysis and Synthesis,* 5th edition, Satyaprakashan, New Delhi, 2000.

EC 253

SIGNAL ANALYSIS AND TRANSFORM TECHNIQUES

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Introduction: Classifications of signals and systems.

Vector representation of signals: Axioms of vector space. Subspace. Linear independence of vectors. Basis and dimension. Inner product. Norm. Inner product space. Schwarz's inequality. Orthonormal sets. Gram-Shmidt orthogonalization. Best approximation. Projection theorem. Bessel's inequality. Review of sequences, Convergence and limits. Complete spaces. Hilbert space of energy and power signals. Parseval's relation. Complex exponential Fourier series. Trigonometric Fourier series. Applications to electrical networks.

UNIT-II

Signal representation by continuous exponentials. The direct and inverse Fourier transform. Existence and properties of Fourier Transform. Continuous spectrum. Bandwidth of signals. Singularity functions. Fourier transform of periodic signals.

UNIT-III

Signal representation by generalized exponentials. The direct and inverse Laplace transform. Region of convergence. Existence and properties of Laplace transform. Laplace transform of periodic signals. Laplace transform solutions for electric circuits. System impulse response and definition of system transfer function.

UNIT-IV

Sampling of continuous time signals. Discrete time signals. Discrete systems. The Z–Transform and its properties. Region of convergence. Z–Plane and S–Plane correspondence. Inverse Z–Transform, Z–Transform solutions

of linear difference equations. Discrete system impulse response and the system transfer function. Discrete system realization.

UNIT-V

Time and frequency convolution. Graphical interpretation. Convolution properties. Auto and Cross correlation and their graphical interpretation. Properties of correlation integrals.

Suggested Reading:

1. Carlson, G.E. *Signal and Linear System Analysis,* Allied Publishers Ltd, 1993.
2. Lathi, B.P., *Signals and Systems and Communication, BS Publication,* 2001.
3. O'Flynn, M, *Linear Systems,* John Wiley and Sons, 1987.
4. Ziemer, R.F., *Signals and Systems: Continuous and Discrete,* Maxwell Macmillan, 1990.
5. A.V. Openhein, A.L.S. Willsky, S. Hamid Nawab, *Signals and Systems,* 6th edition, Prentice Hall, India, 1997.

EC 254

PULSE, DIGITAL AND SWITCHING CIRCUITS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT- I

Wave- Shaping: RC, RL and RLC circuits, response to Step, Pulse, Square, Exponential and Ramp inputs. Integrating and differentiating circuits, Compensated attenuators. Switching operation of Diodes, BJTs and FETs. Non-linear wave shaping using Diodes and Transistors. Clipping and Clamping circuits, Clamping theorem.

UNIT- II

Multivibrators: Analysis and design of Transistor Multivibrators – Bistable, Monostable and Astable circuits. Operation of regenerative comparator (Schmitt Trigger). Time base generators, speed, transmission and displacement errors. Analysis and Design of sweep circuits using UJT and SCR. Miller and Bootstrap sweep circuits.

UNIT- III

Boolean Algebra: Axiomatic definition of Boolean algebra. Binary operation, Postulates and theorems, Switching functions, Canonical forms and standard forms, Simplification of switching function using theorems. Minimization of Switching Functions: Karnaugh map method, Quine McCluskey tabular method, Prime implicants and essential prime implicants.

UNIT- IV

Combinational Logic Design: Single output and multiple-output combinational logic circuits design, AND-OR, OR-AND and NAND/NOR realizations, Ex-OR, Ex-NOR and equivalence functions. Binary Adders, Subtractors, Code converters, contact networks, static and hazard free design.

Symmetric Networks: Properties of symmetric functions, symmetric relay contact networks, identification and realization of symmetric functions.

UNIT- V

Sequential Logic Design: Various types of Flip – flops and excitation tables. Classification of sequential circuits. Design of simple synchronous and asynchronous sequential circuits such as counters.

Suggested Reading:

1. Zvi Kohavi, *Switching and Finite Automata Theory,* 2nd edition, Tata McGraw Hill, 1992.
2. Millman J and Taub H, *Pulse Digital and Switching Waveforms,* Tata McGraw Hill, ISE 2001.
3. Mano, M. *Digital Design,* 3rd edition, Prentice Hall of India 2002.
4. David A Bell, *Solid state Pulse Circuits,* 4th Edition, PHI 2002.
5. U.A. Bakshi and A.P. Godse, *Pulse & Digital Circuits,* 1st Edition, Technical Publications, Pune, 2006.

CE 222

ENVIRONMENTAL STUDIES

(Common to all Branches)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

UNIT –I

Environmental studies : Definition, scope and importance, need for public awareness. Natural resources: Water resources; use and over utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Effects of modern agriculture, fertilizer-pesticide problems, water logging salinity. Energy resources, growing energy needs, renewable and non-renewable energy sources. Land Resources, land as a resource, land degradation, soil erosion and desertification.

UNIT – II

Ecosystems : Concepts of an ecosystem, structure and functions of an ecosystem, producers, consumers and decomposers, energy flow in ecosystem, food chains, ecological pyramids, aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT – III

Biodiversity : Genetic species and ecosystem diversity, bio-geographical classification of India. Value of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

UNIT - IV

Environmental Pollution : Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution and solid waste management.

Environment Protection Act: Air, water, forest and wild life acts, issues involved in enforcement of environmental legislation.

UNIT – V

Social Aspects and the Environment : Water conservation, watershed management, and environmental ethics. Climate change, global warming, acid, rain, ozone layer depletion. Environmer tal protection act, population explosion.

Disaster management : Types of disasters, impact of disasters on environment, infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology, disaster management cycle, and disaster management in India.

Suggested Reading

1. A. K. De, *Environmental Chemistry*, New Age Publications, 2002.
2. E. P. Odum, *Fundamentals of Ecology,* W.B. Sunders Co., USA.
3. G.L. Karia and R.A. Christian, *Waste Water Treatment, Concepts and Design Approach,* Prentice Hall of India, 2005.
4. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2005
5. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi, 1999.

EC 281

ANALOG ELECTRONICS CIRCUITS LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

PART – A

1. Design & frequency response of Single stage RC - Coupled amplifier using BJT.
2. Design & frequency response of Single stage RC - Coupled amplifier using FET.
3. Design & frequency response of Multistage RC - Coupled amplifier.
4. Voltage series feedback amplifier, & Voltage shunt feedback amplifier.
5. RC phase shift oscillator.
6. Hartley oscillator & Colpitts Oscillator.
7. Design of Class-A power amplifier.
8. Design of Class-B power amplifier.
9. IF amplifier.
10 Analysis and design of electronic circuits using PSPICE.

PART – B

1. Measurement of two-port network parameters.
2. Measurement of image impedance and characteristic impedance.
3. Design & verification of Constant-K low-pass filter.
4. Design & verification of m-derived high-pass filter.
5. Design & verification of L-type matching network.

Suggested Reading:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, *Basic Electronics*, A Text – Lab Manual, 7th Edition, TMH, 1994.
2. Paul B. Zbar, *Industrial Electronics*, A Text – Lab Manual, 3rd Edition, TMH, 1983.

EE 292

ELECTRICAL TECHNOLOGY LAB

(For ECE)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

1. To determine the magnetization curve of a separately excited d.c. generator.
2. To determine the load characteristics of a shunt generator.
3. To determine the load characteristics of a series generator.
4. To determine the performance characteristics of a d.c. shunt motor
5. To determine the load characteristics of a d.c. series motor
6. To determine the performance characteristics of a compound motor.
7. Speed control of d.c. motor
8. O.C. and S.C. tests on single phase transformer
9. Load test on single phase transformer
10. To determine the performance characteristics of a three phase induction motor
11. Speed control methods of induction motors
12. Regulation of alternator by O.C. and S.C. tests.
13. Measurement of three-phase power by Two Wattmeter method.

EC 271

ELECTRONIC ENGINEERING -II

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Feedback amplifiers: Concept of Feedback, Feedback amplifier configuration, Circuits, Advantages of negative feedback, Analysis of simple feedback amplifiers using BJTs and FETs.

UNIT-II

Oscillators: Barkhausen criterion; RC oscillators; Weinbridge, phase shift, LC, Hartley and colpitts oscillators; Crystal controlled oscillators (Analysis of oscillators using BJTs only), stability of oscillators.

UNIT-III

D.C. Amplifiers: Problems of dc amplifiers, drift compensation techniques, differential amplifiers, importance of CMRR, high CMRR differential amplifier.

UNIT-IV

Power Amplifiers: Classification of power amplifiers, analysis of class A and B power amplifiers; Distortion in amplifiers, pushpull amplifiers, complementary symmetry.

UNIT-V

Wave shaping circuits: RC low pass and high pass circuits; response to step, pulse, Ramp and Square wave inputs; differentiating and integrating circuits using diode; clipping circuits for single level and two levels; clamping circuits.

Suggested Reading:

1. Jacob Millman & Christos C. Halkias, *Integrated Electronics,* McGraw Hill, 1991.
2. Jacob Millman & Christos C. Halkias, *Electronics Devices and Circuits,* McGraw Hill, 1991.
3. Jacob Millman & Taub : *Pulse, Digital and Switching wave forms,* McGraw Hill, 1985.

EC 272

BASIC ELECTRONICS

(For Mech., Prod. and CSE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT - I

Semi Conductor Theory: Energy Levels, Intrinsic and Extrinsic Semiconductor, Mobility, Diffusion and Drift current. Hall Effect, Characteristics of P-N Junction diode, Parameters and Applications.

Rectifiers: Half wave and Full wave Rectifiers (Bridge, center tapped) with and without filters, ripple, regulation and efficiency.

UNIT - II

Transistors: Bipolar and Field effect transistors with their h-parameter equivalent circuits. Basic amplifiers classification and their circuits (Qualitative treatment only).

Regulators and Inverters: Zener Diode regulator, Transistorized IC regulators and Simple Inverter Circuits.

UNIT - III

Feedback Concepts – Properties of Negative Feedback Amplifier, Classification, Parameter Applications.

Oscillators – LC Type and RC Type Oscillators and Crystal Oscillators (Qualitative treatment only)

UNIT - IV

Operational Amplifiers - Basic Principle – Characteristics and Applications (Summer Adder, Integrator, Differentiator, Instrumentation Amplifier).

Digital Systems: Basic Logic Gates, half, Full Adder and Subtractors.

UNIT - V

Data Acquisition systems: Study of transducer (LVDT, Straingauge, Temperature, Force). **Photo Electric Devices and Industrial Devices:** Photo diode, Photo Transistor, LED, LCD, SCR, TRIAC, DIAC, UJT Construction and Characteristics only.

Display Systems: Constructional details of C.R.O and Applications.

Suggested Reading:

1. Jacob Milman & C., Halkias, *Electronic Devices* Eighth Edition, Reprinted, McGraw Hill, 1995.
2. Ramakanth A. Gayakwad, *Op-AMPS and Linear Integrated Circuits*, 3rd edition, Prentice Hall of India, 1995.
3. Morris Mano, *Digital Design*, 3rd edition, Prentice Hall of India, 2002.
4. Cooper, *Electronic Measurements and Instrumentation.*
5. S.Shalivahnan, N. Suresh Kumar, A Vallavea Raj, *Electronic Devices and Circuits*, Tata McGraw Hill, 2003.

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

EC 273

SIGNALS & SYSTEMS

(For IT)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

UNIT-I

Introduction:

Definitions and Classifications of various signals and systems. The exponential signal, Analog between vector and signal. Signal representation by a discrete set of orthogonal functions. Orthogonality and completeness, Exponential and trigonometric Fourier series. Dirichlet's conditions. Convergence of the Fourier series. Symmetry conditions. Amplitude and Phase spectra of periodic Signals. Bandwidth of periodic signals. Application of Fourier series to electrical networks.

UNIT-II

Signal representation by continuous exponentials. The direct and inverse Fourier transform. Existence and properties of Fourier Transform. Continuous spectrum. Bandwidth of signals. Singularity functions. Fourier transform of periodic signals.

UNIT-III

Signal representation by generalized exponentials. The direct and inverse Laplace transform. Existence and properties of Laplace transform. Laplace transform of periodic signals. Laplace transform solutions for electric circuits. System impulse response and definition of system transfer function.

UNIT-IV

Sampling of continuous time signals. Discrete time signals. Discrete systems. The Z-Transform and its properties, Z-plane and S-plane correspondence. Inverse Z-Transform, Z-transform solutions of linear difference equations. Discrete system impulse response and the system realization.

UNIT-V

Time and frequency convolution. Graphical interpretation. Convolution properties. Auto and Cross correlation and their graphical interpretation properties of correlation integrals.

Suggested Reading :

1. Carison, G.E. *Signals and Linear System Analysis*, Allied Publishers Ltd., 1993.
2. Haykin, *Signals and Systems*, John Wiley & Sons, 1998.
3. O'Flynn, M, *Linear Systems*, John Wiley and Sons, 1987.
4. Ziemer, R.F., *Signals and Systems: Continuous and Discrete*: Maxwell Macmillan, 1990.

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

EC 291

ELECTRONIC ENGINEERING LAB - II

(For EEE and IE)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

1. Voltage series feedback amplifier
2. Voltage shunt feedback amplifier
3. Current series feedback amplifier.
4. Current shunt feedback amplifier
5. Hartley Oscillator
6. Colpitt's oscillator
7. RC Phase shift oscillator
8. Wien Bridge Oscillator
9. Linear wave shaping - Integrator & Differentiator
10. Nonlinear wave shaping - Clipping
11. Class-B Power Amplifiers
12. Clamping Circuits (Diode)
13. Difference Amplifier (Op. Amp)

Suggested Reading:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, *Basic Electronics*, A Text – Lab Manual, 7th Edition, TMH, 1994.
2. Paul B. Zbar, *Industrial Electronics*, A Text – Lab Manual, 3rd Edition, TMH, 1983.