10. Public Speaking : Advantages of public speaking, essentials of an effective speech, rehearsal techniques, planning and delivering a speech.
11. Role play : Use of dialogues in a variety of situations and settings.
12. Effective use of a dictionary and thesaurus : Advantages of using a dictionary and thesaurus.

Suggested Reading :

1. E. Suresh Kumar et al, *English for Success (with CD),* Cambridge University Press India Pvt. Ltd. 2010.
2. T. Balasubramanian, *A Textbook of English Phonetics for Indian Students,* Macmillian, 2008.
3. Edgar Thorpe, *Winnings at Interviews,* Pearson Education, 2006.
4. Hari Mohan Prasad, *How to prepare for Group Discussions and Interviews,* Tata McGraw Hill, 2006.
5. J. Sethi et al, *A Practical Course in English Pronunciation (with CD),* Prentice Hall India, 2005.

SCHEME OF INSTRUCTION & 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 Hours	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	MAT 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	**9**	-	**525**	**200**

SCHEME OF INSTRUCTION & EXAMINATION

B.E. IInd YEAR

Service Courses : (Offered By Electronics & Communication Engineering Department)

SEMESTER - I

Sl. No	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination		
			Periods per week		Duration In Hours	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

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 equation of first order-Lagrange's solution, Standard types-Charpit'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-odd and even functions of Fourier series-change of interval-Applications of Fourier series-square wave forms-saw tooth wave form and modified square saw tooth wave form-half range sine and cosine expansions-complex Fourier series.

UNIT-III

Applications of Partial differential equations : Solution of wave equation, hear equation and Laplace's equation by the method of separation of variables and their use in problems of vibrating string, one dimensional unsteady heat flow and two dimensional steady state hear flow.

UNIT-IV

Numerical methods : Solutions of Algebraic and Transcendental equations - Bisection method, Regula-Falsi method and Newton-Raphson's method-Solution of Linear system of equations, Gauss elimination method, Gauss Seidel iterative method, ill conditioned equations and refinement of solutions, Interpolation, Newton's divided difference interpolation-Numerical differentiation, Solution of differential equations by Euler's method, modified Euler's method and Runge-Kutta Method of 4th order.

UNIT-V

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

Suggested Reading :

1. R.K. Jain & S.R.K. Iyengar, *Advance Engineering Mathematics,* Narosa Publications - 2008.
2. B.S. Grewal, *Higher Engineering Mathematics,* Khanna Publications, 40th Edition, 2008.
3. N. Bali, M.Goyal, C.Watkins, *Advanced Engineering Mathematics,* 7th Edition, 2009 Laxmi Publications.
4. M.K. Venkatraman, *Engineering Mathematics-III,* Technical Publications, Chennai.
5. H.K. Dass, *Advanced Engineering Mathematics,* S.Chand & Co. Pvt Ltd., 2010.

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

a) 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.

b) 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.

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

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

UNIT-V

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.

Suggested Reading :

1. William H. Hayt, Jr., Jack E. Kemmerly and Steven M. Durbin, *Engineering Circuit Analysis*, 5th edition, McGraw Hill, 2010.
2. Charles A. Desoer and Ernest S Kuh, *Basic Circuit Theory*, McGraw Hill, 2009.
3. Raymond A. DeCarlo and Penmin Lin, Linear Circuit Analysis, 2nd edition, Oxford Univ. Press, 2003.
4. Lawrence P. Huelsman, *Basic Circuit Theory*, 3rd edition, 2009.

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, Stroke'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. Polrization - 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. Transmissio coefficient, power and energy calculations.

Suggested Reading :

1. Jordan, E.C., Balmain, K.G., *Electromagnetic Waves and Radiating Systems*, 2nd edition, PHI, 2009.
2. Hayt., W.H., *Engineering Electromagnetics*, McGraw Hill, 7th edition 2006.
3. Nannapaneni Narayana Rao, *Elements of Engineering Electromagnetics*, 6th edition, 2009.
4. Matthew N.O. Sadiku, *Principles of Electromagnetics*, 4th edition Oxford Univ. Press, 2009.
5. John Krauss and Daniel A. Fleisch, *Electromagnetics*, 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: Half wave, Full wave and Bridge rectifiers - their operation, performance characteristics, and analysis; Filters (L, C, LC and CLC filters) used in power supplies and their ripple factor calculations, design of Rectifiers with and without Filters.

Specials Diodes: Elementary treatment on the functioning of Tunnel/Back ward, Varactor, Photo, Light Emitting diodes. Liquid Crystal Display.
CRO: 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, Modes of transistor operation, Early effect, BJT input and output characteristics in CB, CE CC configuration, BJT as an amplifier, BJT biasing techniques, Thermal runway, heat sinks and thermal stabilization, operating point stabilization against temperature and device variations, stability factors, Bias stabilization and compensation techniques, Biasing circuit design.

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 Introduction to low frequency p and T models.

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 JFET. 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 resistance, Biasing of MOSFETs, MOSFET as a switch

***Suggested Reading*:**

1. Jacob Millman, Christos C. Halkias, and Satyabrata Jit, *Electroni Devices and Circuits*, McGraw Hill, 3rd edition, 2010.
2. S Salivahanan, N Kumar, and A Vallavaraj, *Electronic Devices an Circuits*, McGraw Hill, 2nd edition, 2007.
3. David A. Bell, *Electronic Devices And Circuits,* Oxford Universit Press, 5th edition, 2008.

ME 221

ELEMENTS OF MECHANICAL ENGINEERING

(For ECE)

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

UNIT-I

Thermodynamics: Concept of system, process and properties, laws of thermodynamics, concept of entropy and Clausius inequality, steady flow energy equation for an open system.

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: 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 one dimensional steady state conduction heat transfer through plane walls without heat generation.

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 of cycle on T-S and H-S diagrams, Types and properties of refrigerants, eco-friendly refrigerants., Introduction to psychometry and psychometry 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 processes: Extrusion, rod/wire drawing, Forging and Rolling.

Principles and Applications of basic Machining Processes: Turing, milling and grinding.

UNIT-V

Definition of kinematic link and pair, mechanism and machine. **Gears**: Classifications of gears, nomenclature **Gear Trains**: Simple, compound, inverted and epi-cyclc 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. R.K. Rajput, *Thermal Engineering*, Laxmi Publications, 2005
2. C. Sachdeva. *Fundamentals of Engineering Heat and Mass transfer*, Wiley Eastern ltd, 2004.
3. P.N. Rao, *Manufacturing Technology*, Vol. 1 & 2, Tata McGraw Hill publishing co, 2010.
4. Thomas Bevan *Theory of Machines*, CBS Publishers, 1995.

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 operation, 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, 2002.
2. M.L. Soni, P.V. Gupta and V.S. Bhatnagar, *A Course in Electrical Power*, Dhanpat Rai and Sons, Delhi, 2005.

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. V-I Characteristics of Silicon and Germanium diodes and measuremen of static and dynamic resistances
2. Zener diode characteristics and its application as voltage regulator
3. Design, realization and performance evaluation of half wave rectifier without filters and with LC & p section filters
4. Design, realization and performance evaluation of full wave rectifier without filters and with LC & p section filters
5. Plotting the characteristics of BJT in Common Base configuration an measurement of h-parameters
6. Plotting the characteristics of BJT in Common Emitter configuratio and measurement of h-parameters
7. Plotting the characteristics of JFET in CS configurations an measurement of Transconductance and Drain resistance
8. BJT biasing circuits
9. FET biasing circuits
10. Common Emitter BJT Amplifier and measurement of Gain, bandwidt input and output impedances
11. Common Source FET Amplifier and measurement of Gain, bandwidt input and output impedances
12. Emitter Follower / Source Follower circuits and measurement of Gai bandwidth, input and output impedance

13. Characteristics of special devices-UJT and SCR
14. Characteristics of Tunnel diode and photo diode

Suggested Reading:

1. Paul B. Zbar, Albert P. Malvino, *Michael A. Miller, Basic Electronics, A Text - Lab Manual,* 7th Edidtion, TMH 2001.

Special Note:

i) Wherever possible, Analysis and design of circuits should be carried out using SPICE tools.

ii) Five marks be allocated to SPICE design and analysis and the remaining 20 marks are for other internal lab assessments.

General Note:

1. The experiments should be performed on bread board using discrete components.
2. There should not be more than 2 students per batch while performing any of the lab experiment.
3. A minimum of 12 experiments should be performed

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 discret active & passive devices, display devices, integrated components circuits with their packings etc.,), electro mechanical component (switches, sockets, connectors etc.,) electromagnetic components (coils different types of magnetic and ferrite cored, potted components, relay etc.,)
2. Study and use of different meters (moving coil, moving iron, vol ammeter, AVO/Multimeter) for the measurement of electrica parameters.
3. Measurement of R, L, C components using LCR Meter
4. Study of CRO & Measurement of voltage, frequency and Phase Angl
5. Design and fabrication (winding) of an iron cored inductance coil for given value of L, current and core specifications.
6. Design of AC mains operated step down transformer for a given turn ratio, current ratings and core specifications. Measurements of the functional electrical parameters
7. PCB design of a small circuit with its layout using tapes & etching i the lab
8. Soldering & desoldering exercises using discrete components & IC for a specific circuit requirement

PART - B

1. Verification of superposition theorem and Thevenin's theorems
2. Verification of maximum power transfer theorem

3. Verification of Tellegan's theorem
4. Measurement of two-port network parameters
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.
3. Paul B. Zbar, *Industrial Electronics, A Text – Lab Manual,* 3rd Edition, TMH, 1983.

EC 221

ELECTRONIC ENGINEERING - I
(Common for EEE & IE)

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

UNIT-I

Semiconductor diodes and Rectifiers : Review of semiconductor physic p-n junction as a rectifier, v-I characteristics, temperature dependence of v characteristics; Breakdown of junctions-Zener and Avalanche. Single ha wave, full wave, bridge rectifiers, L,C, pisection filters; Regulation and ripp characteristics.

UNIT-II

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

UNIT-III

Field Effect Transistors and their biasing : Principles of V-I characteristi of JFET and MOSFETs; Depletion and enhancement modes, small sign equivalent circuit, FET and CS amplifier.

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

UNIT-IV

Low frequency BJT amplifier Circuits : Cascading amplifier stage simplified analysis for three amplifier configurations, Miller's theorem-Hig input resistance transistor circuits, cascade configuration, Difference amplifi

UNIT-V

Multistage amplifiers : Classification of amplifiers, Distortion in amplifier Frequency response of RC coupled amplifiers, Transformer couple

amplifiers, step response, Bandwidth of cascaded stages. Effect of emitter (source) by pass capacitor on LF response.

Suggested Reading :

1. Jocob Millman & Christos C. Halkias, *Electonic Devices and Circuits,* McGraw Hill,3/e,2010.
2. Jocob Millman & Christos C. Halkias, *Integrated Electronics,* McGraw Hill, 1991.
3. Donald L Schilling & Charles Belove, *Electronics Circuits : Discrete & Integrated,* McGraw Hill International Edition, 3rd Edition, 1989.

EC 222

BASIC ELECTRONICS
(For CSE)

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

UNIT-I

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

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

UNIT-II

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

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

UNIT-III

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

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

UNIT-IV

Operational Amplifiers - Basic Principle – Characteristics and Applicatio (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, Straingaug Temperature, Force). **Photo Electric Devices and Industrial Devices:** Pho

diode, Photo Transistor, LED, LCD, SCR, TRAIC, DIAC, UJT Construction and Characteristics only.

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

Suggested Reading:

1. Jocob Millman, Christos C. Halkias and Satyabrata Jit, Electronics Devices and Circuits, McGraw Hill, 3/e., 2010.
2. Rama Kanth A. Gaykward, *Op-AMPS and Linear Integrated Circuits* -, EEE, 3/e., 1998.(Ch 2, 3 & 7).
3. Moris Mano, *Digital Design, PHI, 3/e., 2009.* (2,4 Chapters)
4. Cooper, *Electronic Measurements and Instrumentations, 3/e., 1998.* (Ch 7)
5. S.Shalivahnan, N. Suresh Kumar, A Vallavea Raj, *Electronic Devices and Circuits,* TMH, 2003.

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

Experiments on the following :

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 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. RC coupled amplifier BJT frequency response
12. RC coupled amplifier FET frequency response
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.

General Note:

i) There should not be more than 2 students per batch while performing any of the lab experiment.

ii) Mini Project cum design exercise:
   a) The students must design, rig-up, and test the circuits wherever possible and should carry out the experiments individually.
   b) This exercise carries sessional marks of 10 out of 25, while the remaining 15 marks are for the remaining lab exercises.

EC 242

BASIC ELECTRONICS LAB

(For CSE)

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

1. Characteristics of Semiconductor and Zener diodes
2. CRO Applications
3. Fullwave rectifier with and without filter
4. Zener Voltage Regulator
5. Characteristics of BJT transistor (CB.CE.CC)
6. Characteristics of field effect transistor.
7. Feedback amplifier and amplifier without feedback
8. h-parameters of transistors
9. Phase shift oscillator
10. Hartley oscillator & Calpitts Oscillator.
11. Operational Amplifier and it's applications
12. Logic gates and flip flops-verifications
13. Realization of Half and Full adder
14. Comparators

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.

General Note :

1. There should not be more than 2 students per batch while performing any of the lab experiment.
2. Mini Project cum design exercise :
   a) The students must design, rig-up, and test the circuits wherever possible and should carry out the experiments individually.
   b) This exercise carries sessional marks of 10 out of 25, while the remaining 15 marks are for the remaining lab exercises.

SCHEME OF INSTRUCTION & EXAMINATION

B.E. IInd YEAR

(ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER - II

Sl. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination		
			Periods per week		Duration In Hours	Maximum Marks	
			L	D/P		Univ. Exam	Sessonal
		THEORY					
1.	MAT 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	Electronics Circuits - Lab	-	3	3	50	25
2.	EE 292	Electrical Technology Lab	-	3	3	50	25
		TOTAL	**24**	**6**	**-**	**550**	**200**

SCHEME OF INSTRUCTION & 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 Hours	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-II Lab	-	3	3	50	25
2.	EC 292	** Basic Electronics-Lab (For Mech., Prod.,)	-	3	3	50	25

Syllabus same as EC 222

***Syllabus same as EC 242**

MT 251

MATHEMATICS-IV
(CSE, ECE, EEE, Mech. & Production)

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 - Cartesion and Polar form and Harmonic functions-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 - Characteristic function.

UNIT-IV

Distributions : Normal-Gamma - Poisson and Chi-distributions - Tests of Significance - Chi-Square - F and t-tests.

UNIT-V

Curve fitting by method of least squares : Correlation and Regression - lines of regression fitting of cures by the method of least squares (straight line, parabola, exponential curves).

Suggested Reading:

1. R.K. Jain & S.R.K. Iyengar, *Advanced Engineering Mathematics*, Narosa Publications - 2008.
2. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publications, 40th Edition, 2008.
3. N. Bali, M.Goyal, C.Watkins, *Advanced Engineering Mathematics*, 7th Edition, 2009 Laxmi Publications.
4. M. Venkata Krishna, *Probability and Statistics*, B.S. Publications, 2010.
5. H.K. Dass *Advanced Engineering Mathematics*, S.Chand & Co. Pvt. Ltd., 2010.

EC 251

ANALOG ELECTRONIC CIRCUITS

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

UNIT-I

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

UNIT-II

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

UNIT-III

Oscillators: Positive feedback and conditions for sinusoidal oscillatons, R oscillator, LC oscillator, Crystal oscillator, Amplitude and frequency stabili of oscillator.

Regulators: Transistorized series and shunt regulators

UNIT-IV

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

UNIT-V

R.F. Voltage Amplifiers: General consideration, Analysis and design of sin tuned, inductively coupled and double tuned types with BJT's selectiv

gain and bandwidth comparison of multistage single tuned amplifiers and double tuned amplifiers, the problem of stability in RF amplifiers, neutralization & unilaterisation, staggered tuned amplifiers, introduction with FET's.

Suggested Reading:

1. Jacob Millman, Christos Halkias, Chetan Parikh, *Integrated Electronics,* TMH, 2nd edition, 2009.
2. Donald Schilling, Charles Belove, Tuvia Apelewicz, Raymond Saccardi, *Electronic Circuits: Discrete And Integrated*, TMH, 3rd edition, 2002.
3. Donald A. Neamen, *Electronic Circuits:Analysis and Design*, 3rd edition, McGraw Hill, 2006.
4. Allen Mottershead, *Electronic Devices and Circuits: An Introduction*, 2009.

EC 252

NETWORKS AND TRANSMISSION LINES

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

UNIT-I

Asymmetrical networks, Image and Iterative impedances. Image trans constant and iterative transfer constant. Symmetrical networks, characteri impedance and propagation constant. Properties of L, T and Pi section typ

UNIT-II

Constant K-filters – low pass, high pass, band pass, band elimination fi design, m-derived — low pass, high pass, band pass, band elimination fi design and composite filter design. Notch filter.

UNIT-III

Network synthesys: Hurwitz polynomials,positive real functions, I Immitance functions, RC impedance functions and RL admittance functi RL impedance functions and RC admittance functions. Cauer And Fost forms of RL impedance and RC admittance

Attenuators and their design. Equalizers and their design. Impeda matching networks. Inverse network elements.

UNIT-IV

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

UNIT-V

Properties of Transmission lines at UHF, Reflection co-efficient, Stan waves and SWR, Distribution of voltages and currents on loss less l Characteristics of half wave, Quarter-wave and one eighth wave li Construction and applications of Smith chart. Transmission line match Single and double stub matching.

Suggested Reading:

1. John D. Ryder, *Networks, Lines and Fields,* PHI, 2nd edition, 2009.
2. M.E. Van Valkenburg, *Network Analysis,* PHI, 3rd edition, 2009.
3. S.P. Ghosh and A.K. Chakraborty, *Network Analysis and Synthesis,* McGraw Hill, 1st edition, 2009.
4. Roy, Choudhury D., Networks and Systems, New Age International Publishers, 2nd edition, 2010.
5. Smarjit Ghosh, *Network Theory : Analysis and Synthesis*, PHI, 2009.

EC 253

SIGNAL ANALYSIS AND TRANSFORM TECHNIQUES

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

UNIT-I

Signals: Definitions and classifications, Analogy between vectors and signa signal representation by a discrete set of orthogonal functions, orthogonali and completeness, Continuous-time, energy and power signals, Representati of Continuous-time signals: Fourier series – Trignometric and Exponent Fourier series, computational formulae, symmetry conditions, The compl Fourier spectrum.

Fourier Transform: The direct and inverse FT, existence of FT, Propert of FT, The Frequency Spectrum.

UNIT-II

Laplace Transform: The direct LT, Region of convergence, existence of I properties of LT. The inverse LT, Solution of differential equations, syste transfer function. Linear Convolution: Graphical interpretation, propert of convolution, Correlation: Auto and Cross correlation, graphi interpretation, properties of correlation.

UNIT-III

Discrete-time signals and systems: Sampling, classification of DT signa Discrete-time energy and power signals, Linear Shift invariant syste Stability and Causality, Linear constant coefficient systems, Frequency dom representation of discrete time systems and signals.

Linear Convolution: Graphical interpretation, properties of convoluti Correlation: Auto and Cross correlation, graphical interpretation, propert of correlation.

UNIT- IV

Z-Transform: The direct ZT, Region of convergence, Z-plan e and S-plane correspondence. Inverse ZT, Properties of Z-transforms, Solution to linear difference equations, System transfer function.

UNIT- V

Discrete Fourier series, Sampling the z-transform, Discrete Time Fourier Transform (DTFT), properties of DTFT, Discrete Fourier Transform(DFT), properties of DFT, Linear convolution using DFT.

Suggested Reading:

1. B.P. Lathi, *Signals, Systems and Communication*, BS Publications, 2006.
2. Luis F. Chaparro, *Signals and Systems using MATLAB*, Academic press, 2011
3. Alan V. Oppenheim and Ronald W. Schafer, *Digital Signal Processing*, PHI, 2008.
4. P. Ramakrishna Rao, *Signals and Systems,* McGraw Hill, 2008.
5. Alan V. Oppenheim, Alan S. Wilsky and S. Hamid Nawab, *Signals and Systems*, 2nd ed., PHI, 2009.

EC 254

PULSE, DIGITAL AND SWITCHING CIRCUITS

Instruction	4	Periods per we
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, Squa Exponential and Ramp inputs. Integrating and differentiating circui Compensated attenuators. Switching operation of Diodes, BJTs and FE Non-linear wave shaping using Diodes and Transistors. Clipping a Clamping circuits, Clamping circuit theorem.

UNIT-II

Multivibrators: Analysis and design of Transistor Multivibrators – Bistab Monostable and Astable circuits. Operation of regenerative compara (Schmitt Trigger). Time base generators: Speed, transmission a displacement errors.

Analysis and Design of sweep circuits using UJT and SCR.

UNIT-III

Boolean – Algebra: Introduction to Boolean Algebra, Demorgan's theore Canonical forms and standard forms, Simplification of switching functi using theorems, Introduction to Logic Gates, Ex-OR, Ex-NOR operation Minimization of Switching Functions: Karnaugh map method, Qui McCluskey tabular method.

Logic function realization: AND-OR, OR-AND and NAND / NO realizations.

UNIT-IV

Combinational Logic Design: Binary Adders, Subtractors, Code converte Decoders and Encoders, Priority Encoder, contact networks, static and haza free design.

ntroduction to Sequential Logic: Types of Flip-Flops, Excitation Tables nd Flip-Flop Conversions, Classification of sequential circuits.

JNIT-V

equential Logic Design: State Diagram and State Table, Design of ynchronous and asynchronous counters.

inite State Machines: Moore Type and Mealy Type FSM, Design of equence Detector using Moore and Mealy FSM. One Hot Encoding.

uggested Reading:

Jacob Millman and Herbert Taub, *Pulse, Digital and Switching Waveforms*, TMH, 3rd edition, 2011.

Zvi Kohavi, *Switching And Finite Automata Theory,* TMH, 2nd edition, 2001.

M. Morris Mano, *Digital Design,* PHI, 2nd edition, 1994.

Stephen Brown and Zvonko Vranesic, *Fundamentals of Digital Logic with VHDL Design*, TMH, 3rd edition, 2010

David A. Bell, *Solid state Pulse Circuits*, 4th edition, PHI, 2009.

CE 222

ENVIRONMENTAL STUDIES
(Common to all Branches)

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

UNIT–I

Environmental Studies Definition, Scope and importance, need for pu awareness.

Natural resources: Water resources, use and over utilization of surface ground water, floods, drought, conflicts over water, dams-benefits problems. Effects of modern agriculture, fertilizer pesticide problems, w logging salinity.

Energy resources; growing energy needs, renewable and non-renew energy sources. Land resources; land as a resource, land degradation, erosion and desertification.

UNIT–II

Ecosystems: Concept of an ecosystem, structure and function of an ecosyst producers, consumers and decomposers, energy flow in ecosystem, f chains, ecological pyramids, aquatic ecosystem (ponds, streams, lakes, riv oceans, estuaries).

UNIT–III

Biodiversity: Genetic species and ecosystem diversity, biogeograph classification of India. Value of biodiversity, threats to biodiver endangered and endemic species of India, conservation of biodiversity.

UNIT–IV

Environmental Pollution: Cause, effects and control measures of air pollut water pollution, soil pollutions, noise pollution, thermal pollution and s waste management.

Environment protection act: Air, water, forest & wild life acts, issues invol in enforcement of environmental legislation.

UNIT–V

Social issues and the environment: Water conservation, watershed management, and environmental ethics. Climate change; global warming, acid rain, ozone layer depletion, Environmental 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:

De A.K. *Environmental Chemistry*, Wiley Eastern Ltd., 1989.

Odum E.P. *Fundamentals of Ecology*, W.B. Saunders Co., USA, 1975.

G.L. Karia and R.A. Christian, *Waste Water Treatment, Concepts and Design Approach,* Prentice Hall of India, 2005.

Benny Joseph, *Environmental Studeis,* Tata McGraw Hill,2005.

V.K.Sharma, *Disaster Management, National Centre for Disaster Management,* IIPE, Delhi,1999.

EC 281

ELECTRONICS CIRCUITS LAB

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

I.Regular Lab Experiments

PART – I

1. Clipping and Clamping Circuits
2. Astable, Monostable and Bistable multivibrators
3. Schmitt Trigger
4. Voltage to Frequency converter
5. Design & frequency response of Single stage and Multistage R Coupled amplifier using BJT.
6. Design & frequency response of Single stage and Multistage R Coupled amplifier using FET.
7. Voltage series feedback amplifier
8. Current shunt feedback amplifier.
9. RC phase shift oscillator, Hartley oscillator & Colpitts Oscillator.
10. Design of Class-A power amplifier.
11. Design of Class-B power amplifier.
12. Tuned Amplifiers (Single and Double)

PART – II

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

II. Mini Project cum Design Exercise(s)

Example : Design of

i. An audio power amplifier with specified power output and the associated power supply that can take audio input from microphone and deliver the output to a loudspeaker.

ii. Switch Mode Power Supply or Linear Power Supply using discrete components.

Suggested Reading:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, Basic Electronics, A Text - Lab Manual, 7th Ediction, TMH 2001.

Special Note:

1. Sessional marks are to be awarded as per the following breakup.
   i. 20 marks for the regular lab exercises
   ii. 5 marks for the Mini project-cum-design exercise(s).

General Note :

1. A total of not less than 14 experiments must be carried out during the semester. (Wherever possible, more than 1 lab experiment should be carried out in one lab session of 3 periods per week).
2. The experiments should be performed on bread board using discrete components.
3. There should not be more than 2 students per batch while performing any of the lab experiment.
4. Wherever possible, Analysis and design of circuits should be carried out using SPICE tools.

EE 292

ELECTRICAL TECHNOLOGY LAB

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

List of Experiments:

1. Magnetization curve of a separately excited DC generator.
2. Load characteristics of a shunt generator.
3. Load characteristics of a series generator.
4. Performance characteristics of a DC shunt motor.
5. Load characteristics of a DC series motor.
6. Performance characteristics of a compound motor.
7. Speed control of DC motor.
8. O.C. and S.C. tests on single phase transformer.
9. Load test on single phase transformer.
10. 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.

Note: At least 10 Experiments should be conducted in the semester

EC 271

ELECTRONIC ENGINEERING - II

(Common to EE and IE)

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 configurations, 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, lJifferential Amplifier.

UNIT-IV

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

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. Jocob Millman, Christos C. Halkias and Chetan Parikh, *Integrated Electronics,* TMH, 2/e., 2009.
2. Jocob Millman, Christos C. Halkias and Satyabrata Jit, *Electronics Devices and Circuits,* McGraw Hill, 3/e., 2010.
3. Jocob Millman & Herbert Taub, *Pulse, Digital and Switching waveforms,* TMH, 3/e.,2011.

EC 272

BASIC ELECTRONICS
(For Mech., Prod., and CSE)
(Same as EC 222)

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

UNIT-I

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

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

UNIT-II

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

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

UNIT-III

Feedback Concepts – Properties of Negative Feedback Amplifi Classification, Parameters Applications.

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

UNIT-IV

Operational Amplifiers - Basic Principle – Characteristics and Applicati (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, TRAIC, DIAC, UJT Construction and Characteristics only.

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

Suggested Reading:

1. Jocob Millman, Christos C. Halkias and Satyabrata Jit, Electronics Devices and Circuits, McGraw Hill, 3/e., 2010.
2. Rama Kanth A. Gaykward, *Op-AMPS and Linear Integrated Circuits* -, EEE, 3/e., 1998.(Ch 2, 3 & 7).
3. Moris Mano, *Digital Design, PHI, 3/e., 2009.* (2,4 Chapters)
4. Cooper, *Electronic Measurements and Instrumentations, 3/e., 1998.* (Ch 7)
5. S.Shalivahnan, N. Suresh Kumar, A Vallavea Raj, *Electronic Devices and Circuits,* TMH, 2003.

EC 273

SIGNALS & SYSTEMS
(for IT)

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

UNIT-I

Introduction:

Definitions and Classifications of various signals and systems. The exponenti signal, Analog between vector and signal. Signal representation by a discre set of orthogonal functions. Orthogonality and completeness, Exponenti and trigonometric Fourier series. Dirichlet's conditions. Convergence of th Fourier series. Symmetry conditions. Amplitude and phase spectra of period Signals. Band width of periodic signals. Application of Fourier series electrical networks.

UNIT-II

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

UNIT-III

Signal representation by generalized exponentials. The direct and inver Laplace transform. Existence and properties of Laplace transform. Lapla transform of periodic signals. Laplace transform solutions for electric circui System impulse response and definition of system transfer faction.

UNIT-IV

Sampling of continuous time signals. Discrete time signals. Discrete syste The Z-Transform and its properties Z-plane and S-plane correspondenc Inverse Z-Transform, Z-transform solutions of linear difference equatio 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. P. Ramakrishna Rao, *Signals and Systems*, McGraw Hill, 2008.
2. Alan V. Oppenheim, Alan S. Wilsky and S. Hamid Nawab, *Signals and Systems*, 2nd ed., PHI, 2009.
3. Carlson, G.E. *Signals and Linear System Analysis*, Wiley, 2/e., 1998.
4. Haykin, *Signals and Systems*, John Wiley & Sons, 1998.

EC 291

ELECTRONIC ENGINEERING - II LAB
(For EEE and IE)

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

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. Wein 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 Electronic* A Text-Lab Manual,7th Edition, TMH, 1994.
2. Paul B. Zbar, Industrial Electronics, *A Text – Lab Manual,* 3rd Editio TMH, 1983.

General Note :

i. There should not be more than 2 students per batch while performi any of the lab experiment.

ii. Mini Project cum design exercise :
   a) The students must design, rig-up, and test the circuits where possible and should carryout the experiments individually.
   b) This exercise carries sessional marks of 10 out of 25, while remaining 15 marks are for the remaining lab exercises.

EC 292

BASIC ELECTRONICS LAB
(For Mech., Prod. & CSE)
(Same as EC 242)

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

1. Characteristics of Semiconductor and Zener diodes
2. CRO Applications
3. Fullwave rectifier with and without filter
4. Zener Voltage Regulator
5. Characteristics of BJT transistor (CB.CE.CC)
6. Characteristics of field effect transistor.
7. Feedback amplifier and amplifier without feedback
8. h-parameters of transistors
9. Phase shift oscillator
10. Hartley oscillator & Calpitts Oscillator.
11. Operational Amplifier and it's applications
12. Logic gates and flip flops-verifications
13. Realization of Half and Full adder
14. Comparators

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.