SYLLABUS

DIPLOMA IN ELECTRONICS ENGINEERING
(SELF FINANCE COURSES)
w.e.f. 2019

UNIVERSITY POLYTECHNIC
FACULTY OF ENGINEERING & TECHNOLOGY
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EVALUATION SCHEME FOR THREE YEAR DIPLOMA COURSE IN ELECTRONICS ENGINEERING (SELF FINANCE COURSES) - I YEAR

S. No.	Theory Paper		Periods / week			Marks		
	Course No.	Subjects	L	T	P	Sessional	Univ. Exam	Total
1.	DEN-101	English	2	-	-	50	100	150
2.	DPH-102	Applied Physics	2	-	-	50	100	150
3.	DEL-103	Electronic Devices & Circuits-I	2	-	-	50	100	150
4.	DMA-104	Applied Mathematics-I	2	-	-	50	100	150
5.	DCE-105	Applied Mechanics	2	-	-	50	100	150
6.	DME-107	Mechanical Engineering	2	-	-	50	100	150
7.	DEE-107	Electrical Engineering-I	2	-	-	50	100	150
8.	DME-108	Engineering Drawing	3	-	-	100	100	200
9.	DME-109	Workshop Technology	2	-	-	50	100	150
Total			**19**	**-**	**-**	**500**	**900**	**1400**

S. No.	Practical Courses		Periods / week			Marks		
	Course No.	Subjects	L	T	P	Sessional	Univ. Exam	Total
1.	DPH-112	Applied Physics	-	-	2	50	50	100
2.	DEL-113	Electronic Devices & Circuits-I	-	-	2	50	50	100
3.	DCE-115	Applied Mechanics	-	-	2	50	50	100
4.	DME-117	Mechanical Engineering	-	-	2	50	50	100
5.	DEE-117	Electrical Engineering-I	-	-	2	50	50	100
6.	DME-119	Workshop Practice	-	-	3	50	50	100
Total			**-**	**-**	**13**	**300**	**300**	**600**
Grand Total			**32**			**800**	**1200**	**2000**

Note: *In theory average of the two sessional tests will be accounted for the purpose of internal assessment. The practical courses are based upon the contents of theory courses.*

EVALUATION SCHEME FOR THREE YEAR DIPLOMA COURSE IN ELECTRONICS ENGINEERING (SELF FINANCE COURSES) - II YEAR

S. No.	Theory Courses		Periods / week			Marks		
	Course No.	Subjects	L	T	P	Sessional	Univ. Exam	Total
1.	DMA-201	Applied Mathematics-II	2	-	-	50	100	150
2.	DCH-202	Electronics Materials & Components	2	-	-	50	100	150
3.	DEE-202	Electrical Engineering-II	2	-	-	50	100	150
4.	DEE-203	Measurements & Measuring Instruments	2	-	-	50	100	150
5.	DEL-204	Principles of Comm. Engg.	2	-	-	50	100	150
6.	DEL-206	Networks & Transmission Lines	2	-	-	50	100	150
7.	DEL-207	Digital Techniques	2	-	-	100	100	200
8.	DEL-208	Electronic Devices & Circuits-II	2	-	-	50	100	150
9.	DCA-209	Computer Applications	2	-	-	50	100	150
Total			**18**	**-**	**-**	**500**	**900**	**1400**

S. No.	Practical Courses		Periods / week			Marks		
	Course No.	Subjects	L	T	P	Sessional	Univ. Exam	Total
1.	DEE-212	Electrical Engineering-II	-	-	2	50	50	100
2.	DEL-215	Electronics Workshop	-	-	2	50	50	100
3.	DEL-216	Networks & Transmission Lines	-	-	2	50	50	100
4.	DEL-217	Digital Techniques	-	-	2	50	50	100
5.	DEL-218	Electronic Devices & Circuits-II	-	-	2	50	50	100
6.	DCA-219	Computer Applications	-	-	2	50	50	100
Total			**-**	**-**	**12**	**300**	**300**	**600**
Grand Total			**30**			**800**	**1200**	**2000**

Note: *In theory average of the two sessional tests will be accounted for the purpose of internal assessment. The practical courses are based upon the contents of theory courses.*

EVALUATION SCHEME FOR THREE YEAR DIPLOMA COURSE IN ELECTRONICS ENGINEERING (SELF FINANCE COURSES) - III YEAR

S. No.	Theory Courses		Periods / week			Marks		
	Course No.	Subjects	L	T	P	Sessional	Univ. Exam	Total
1.	DEL-301	Electronic Devices and Circuits-III	2	-	-	50	100	150
2.	DEL-302	Television Engineering	2	-	-	50	100	150
3.	DEL-303	Microprocessor & Computer Technology	2	-	-	100	100	200
4.	DEL-304	Electronics Circuit Design	2	-	-	50	100	150
5.	DEL-305	Electronic Instruments & Measurements	2	-	-	50	100	150
6.	DEL-306	Industrial Electronics	2	-	-	50	100	150
7.	DEL-308	Troubleshooting & Servicing of Electronic Equipments	2	-	-	50	100	150
8.	DEL-309	Communication Systems	2	-	-	50	100	150
9.	DME-310	Entrepreneur Development & Industrial Management	2	-	-	50	100	150
Total			**18**	**-**	**-**	**500**	**900**	**1400**

S. No.	Practical Courses		Periods / week			Marks		
	Course No.	Subjects	L	T	P	Sessional	Univ. Exam	Total
1.	DEL-313	Microprocessor & Computer Technology	-	-	2	50	50	100
2.	DEL-316	Industrial Electronics	-	-	2	50	50	100
3.	DEL-318	Troubleshooting & Servicing of Electronic Equipments	-	-	2	50	50	100
4.	DEL-319	Communication Systems	-	-	2	50	50	100
5.	DEL-330	Project	-	-	4	100	100	200
Total			**-**	**-**	**12**	**300**	**300**	**600**
Grand Total			**30**			**800**	**1200**	**2000**

Note: *In theory average of the two sessional tests will be accounted for the purpose of internal assessment. The practical courses are based upon the contents of theory courses.*

ENGLISH
DEN-101

"Complete Course in English" by Robert J. Dixon 20 Marks

Chapters

1. Two Thanks giving Day Gentlemen
2. A Love Story
3. The Gifts of Feoder Himkoff
4. The Prince and the Judge
5. Mr. Travers's First Hunt
6. Portrait of a Teacher

Composition

1. Letter Writing	10 Marks
2. Technical Report	10 Marks
3. Paragraph writing	10 Marks
4. Construction of Dialogue	20 Marks

Grammer

1. Direct to Indirect (Speech)	5 Marks
2. Change of Voice	5 Marks
3. Transformation	5 Marks
4. Tenses	5 Marks
5. Comprehension (Passage)	10 Marks

APPLIED PHYSICS
DPH-102

Unit – I

Units and Dimensions: Fundamental and derived Units (SI system), Dimensions of various physical quantities, uses of dimensional analysis and its limitations.

Surface Tension : Molecular forces, molecular theory of surface tension, surface energy, relation between surface tension and surface energy, angle of contact, shape of liquid surface in a capillary tube, rise of liquid in a capillary tube.

Oscillations : Periodic motion, simple harmonic motion (SHM), derivation of displacment, velocity, acceleration, time period and frequency; vibration of simple spring mass system (vertical and horizontal, two or more springs in series and parallel). Vibration of bodies supported on more than one identical spring.

Unit – II

Electrostatics : Coulombs law, electric field, potential due to charge and number of charges, potential difference between two points, equipotential surface, electric field at a point due to a uniformly charged thin sheet, capacitor, capacitance of a parallel plate capacitor, energy stored in a capacitor, combination of capacitors (series and parallel).

D.C. Circuits: Kirchoff's law, Application of Kirchoff's law to the Wheat-Stone Bridge, post office box, meter bridge and potentiometer. Heating effect of current, heat produced by electric current in a conductor and Joules law of electrical heating.

Unit – III

Electromagnetism: Biot-Savart law, magnetic field around a current carrying conductor and at the center of a circular loop, force experienced by a moving charge and a current carrying conductor in a uniform magnetic field, forces between two parallel current carrying conductor definition of ampere, principle and working of a moving coil galvanometer, conversion of galvanometer into ammeter and voltmeter.

Unit – IV

Temperature and its measurement: Concept of heat and temperature, basic principle for temperature measurement, thermoelectric, platinum resistance thermometer and pyrometers.

Expansions of solids: Concept of linear (α), spherical (β) & cubical (γ) expansion, relations among (α, β, & γ).

Heat Transfer: Modes of heat transfer, coefficient of thermal conductivity and its determination by Searle's and Lee's disc methods, thermal conduction through compound media.

Optics: Huygens's principle, reflection & refraction of a wave at a plane surface, refraction through a prism, lens formula, principle of working and magnifying power of telescopes and microscopes.

Unit – V

Modern Physics : Atomic models: J.J. Thomson's model, Rutherford's model, Neil Bohr's Model and its shortcomings, X-rays production, properties and uses, lasers, types of lasers, study of the He-ne and Ruby lasers and their: properties and applications.

Radioactivity : Natural radioactivity, half life, average life, mass defect & binding energy, nuclear stability, fission, fusion, energy generated in reactors and radiation hazard.

ELECTRONIC DEVICES AND CIRCUITS-I
DEL-103

Unit-I

Introduction to Electronics: Applications of Electronics in different fields, Brief introduction to active and passive components.

Voltage and Current Sources: Concept of constant voltage source, symbol and graphical representation, characteristics of ideal and practical voltage source, Concept of constant current sources, symbol and graphical representation, characteristics of ideal and practical current sources, Conversion of voltage source into a current source & vice-versa.

Unit-II

Semi-Conductor Physics: Intrinsic semi conductors – conductivity, atomic and crystal structure of germanium and silicon, covalent bonds, generation and recombination, effect of temperature on conductivity of intrinsic semi-conductor, energy level diagrams of conductor, insulator and intrinsic semi-conductors, Extrinsic semi-conductor materials, Doping of impurity, P and N type semi-conductors and their conductivity, Minority and majority charge carriers, Drifts and diffusion current, P-N Junction; mechanism of current flow in a P-N. Junction, drift and diffusion currents, depletion layer, potential barrier, Behavior of P-N junction under forward and reverse bias, P-N junction diode characteristics, Zener and avalanche break down, Concept of junction capacitance in forward and reverse bias conditions.

Unit-III

Semi-conductor diode characteristics, static and dynamic resistances and their calculations from diode characteristics, dynamic resistance of diode in terms of diode current ($rd = 26/I_D$). Diode (P-N junction) as rectifier, Half wave rectifier, Full wave rectifier including bridge rectifier, relation between D.C. output voltage and A.C. input voltage, rectification efficiency and ripple factor of rectifier circuits, Filter circuits; shunt capacitance, series inductor, capacitor input filter, Bleeder resistance, physical explanations of the working of the filters and typical applications of each type. Different types of diodes; Brief idea and typical applications of power diode, Zener diodes, varactor diode, tunnel diode and point contact diode, important specifications of power diode and Zener diode.

Unit-IV

Introduction to Bipolar Transistor: Concept of bipolar transistor as a two junction – three terminal device having two kinds of current – carriers, PNP & NPN transistors, their symbols and mechanism of current flow, explanation of fundamental current relations; $I_E = I_B + I_C = C_{dc}\ I_E + I_{CBO}$ concept of leakage current (I_{CBO}), effect of temperature on leakage current, CB, CE and CC configurations, Common Base configurations (CB); Input and output characteristics determination of transistor parameters, (input and output dynamic resistances current amplification factor). Common emitter configurations (CE); current relations in C.E. configurations, collector current in terms of base current and leakage current (I_{CBO}), relationship between leakage current in CB and CE configuration, input, output characteristics, determination of input and output dynamic resistances and current amplification factor, from the characteristics Common collector configuration, (CC); Expression for emitter current in terms of the base-current and leakage current in CC configuration. Comparison of CB and CE configuration with regards to dynamic input and output resistance, current gain leakage current, preference of CE configuration over CB configuration for low frequency voltage amplification.

Unit-V

Transistor as an amplifier in CE configuration, D.C. load line, its equation and drawing it on output characteristics, Determination of small signal voltage and current gain of a basic transistor amplifier using CE output characteristics and load line, concept of power gain as a product of voltage gain and current gain.

Transistor Biasing and Stabilisation of Operating Point: Different transistor biasing circuits for fixing the operating point, effect of temperature on operating point, need for stabilisation of operating point, effect of fixing operating point in cut-off and saturation region on the performance of amplifier, Calculation of operating point for different biasing circuits, use of Thevanin's theorems in analysing potential divider biasing circuit, Simple design problem on potential divider biasing circuit.

APPLIED MATHEMATICS-I
DMA-104

Unit-I

Algebra and Trigonometry

Algebra: Arithmetic progression, its n^{th} terms, sum to n terms. Geometric progression, its n^{th} term, sum to n terms and to infinity. Sum of the squares and cubes of finite natural numbers, Binomial theorem (without proof) for positive integral index (expansion and general term), Binomial theorem (without proof) for any index (expansion only), First, second Binomial approximation.

Trigonometry: Trigonometric ratios of sum and differences of two angles, Multiple and sub-multiple angles, simple trigonometric identities, Inverse trigonometric functions, Statement of cosine formula, sine formula, Napier's, half angle formula and its proof.

Unit-II

Coordinate Geometry: Cartesian coordinates, polar coordinates and their conversion to Cartesian formula, Area of a triangle, Coordinates of the centroid and incentre of a triangle, Simple problems on locus, Equations of straight lines in various forms, Intersection of two straight lines and angle between them, Perpendicular distance formula, General equation of circle, determination of radius and center, Simple problems, Definition of conic section, standard equations of parabola, ellipse and hyperbola and their simple problems.

Unit-III

Differential Calculus: Differential by first principle of x^n, sinx, cosx, logx and a^x. differential of sum, product and quotient function, Differential of function of a function, inverse trigonometric functions, Logarithmic differential, Successive Differentiation (excluding n^{th} order), Maxima and Minima, Equation of tangent and normal to a curve.

Unit-IV

Integral Calculus: Integration as inverse operation of differentiation, Simple integration by substitution, by parts and by partial fractions, Evaluation of definite integrals, properties of definite integrals, Application of Gamma function on simple problems, Area of plain curves, Volume of simple solids of revolution.

Unit-V

Differential Equation and Vectors: Order and degree of differential equations, Solution of differential equations of first order and first degree, variable separable, Homogeneous equations, Scalar and Vectors, addition and subtraction of vectors and their simple applications, multiplication of vector by a scalar, Scalar and Vector product of two vectors, Scalar triple product.

APPLIED MECHANICS
DCE-105

Unit–I

Introduction: Concept of Mechanics and Applied Mechanics, Explanation of Mechanics and Applied Mechanics, its importance and necessity, giving suitable examples on bodies at rest and motion, explanation of branches of this subject, Concept of rigid bodies.

Laws of forces: Force and its effects, Units and measurement of force, Vector representation, Bow's notation. Types of forces, action and reaction, tension and thrust and shear force. Force system: coplanar, non-coplanar force systems. Free body diagrams, Resultant and components of forces, Concept of equilibrium, Parallelogram, Law of forces, equilibrium of two forces, super position and transmissibility of forces. Triangle of forces, different cases of concurrent coplanar two force systems, extension of parallelogram law and triangle law when too many forces acting at one point, Polygon law of forces, method of resolution into orthogonal components for finding resultant, graphical methods.

Unit-II

Moments: Concept of moment, Varigon's theorem' (statement only), Principle of moments – Application of moments to simple mechanism – Parallel forces, calculation of their resultant, Concept of couple-properties and effect, General cases of coplanar force system, General condition of equilibrium of bodies under coplanar forces, Lami's theorem.

Center of Gravity and Moment of inertia: Concept of gravity and center of gravity, Centroid for Day lamina and center of gravity for Day solids, Position of center of gravity of compound bodies and centroid of composite area, C.G. of reminders, Graphical determination of centroid. Concept of moment of inertia of Day bodies, rectangles and circles.

Unit-III

Motion: Concept of displacement, speed, velocity, acceleration, vector representation of velocity and acceleration, composition and resolution of velocities, uniformly accelerated motion, Derivation of equations of motion and their application, motion of freely falling bodies, Relative motion and Relative velocity.

Laws of Motion: concept of momentum, Newton's Laws of motion, their application, derivation of force equation from second law of motion, Numerical problems on second law of motion. Piles, lifts, bodies tied with string, Newton's third law of motion numerical problems. Conservation of momentum, impulse and impulse force.

Unit-IV

Work, Power & Energy: Review of the concept of the work, power & energy, Types of energy, conservation of energy, Horse-power, work done against gravity and work done against friction, Problems pertaining to all types of energy including the nuclear energy.

Circular motion: Curvilinear motion, angular velocity and acceleration, derivation of equation for angular velocity, relation between angular and rectilinear motion, concept of torque and angular momentum, Centripetal and centrifugal forces.

Unit-V

Simple Machines: Concept of machine, mechanical advantage, velocity and efficiency of a machine, their relationship, law of machine, Simple machine (lever, wheel and axle, pulleys, jacks, winch crabs only), Concept of friction, laws of friction, limiting friction and coefficient of friction, Friction in machines. Elasticity, stress, strain, Hook's law, Young's Modulus, Shear Modulus and Poisson's ratio elastic limit, Yield, Ultimate stress & breaking point.

MECHANICAL ENGINEERING
DME-107

Unit – I

Transmission of Power:

Belt drive: Materials of belt, flat belt V-belt, open and cross belt drive, length of belt (without derivation), velocity ratio, slip, creep, angle of contact, derivation of tension ratio for flat & V-belt, Power transmitted through belts, Advantages of V-belt over flat belt, Simple numerical problems.

Chain Drive: Roller chain, silent chain, block chain, comparison between chain & belt drive.

Pulleys: Introduction, type & crowning of pulleys.

Gears: Spur, helical, bevel, spiral warm gears rack & pinion, Gear trains: Simple & Compound gears train and simple numerical problems.

Unit – II

Steam Generators: Introduction, classification, Differentiation between fire tube and water tube boilers, Simple vertical boiler, Babcock & Wilcox boiler, Cochran boiler, Boiler accessories and mountings: Air preheater, super heater, economizer, steam separator, Fusible plug, pressure gauge, Feed check valve, steam stop valve, Blow of cock, water level indicator & safety valves.

Turbines: Introduction & classification of steam turbine: Impulse turbine: Simple impulse turbine, compounding of impulse turbines, Reaction turbines, comparison between impulse & reaction turbines, losses in steam turbine.

Hydraulics turbine: Classification, construction & working of Pelton wheel, Francis & Kaplan turbine.

Unit – III

I.C. Engines: Classification of internal combustion Engines, Main parts of IC engines, Otto cycle, diesel cycle, spark ignition engines, compression ignition engines, working principle of 2-stroke and 4-stroke engines, ignition system of petrol engines i.e. battery & magneto ignition system, spark plug, Simple carburetor, working of solid fuel injection system of IC engines.

Cooling System: Necessity, Air Cooling & Water Cooling.

Lubricants: Introduction, Function of lubrication, method of lubrication: Petrol System, Splash system, pressure feed system, combined splash & pressure feed system.

Unit – IV

Pumps: Working of reciprocating, centrifugal and gear pump, jet and submersible pump.

Air Compressor: Working of reciprocating type air compressor.

Cranes: Tower and bridge crane, Jaw Crushers, Hydraulic Jacks, Dump truck & hydraulic lift.

Unit – V

Refrigeration and Air Conditioning System: Introduction, Performance of machine, Refrigerating machine, vapor compression cycle, simple vapour absorption cycle.

Air Conditioning System: Purpose of Air Conditioning, Factors affecting air conditioning, evaporating cooling system in a desert country, window air conditioning.

ELECTRICAL ENGINEERING -I
DEE-107

Unit-I

DC Circuit Analysis

Concept of electricity, basic terms – voltage, current, potential difference, power, energy and their units. Ohm's law, factors affecting resistance of metallic conductor, resistance in series and parallel, series and parallel grouping of cells, Kirchoff's current law and Kirchoff's voltage law, simple numerical problems.

Unit-II

AC Fundamentals and AC Circuits

Important terminology related to AC fundamentals, representation of sinusoidal quantities by phasors, Phasor algebra, AC circuit containing pure resistance, pure inductance, pure capacitance, numerical problems, RL, RC and RLC series and parallel circuits, series and parallel resonance, numerical problems.

Unit-III

Electromagnetic Induction

Faraday's law of electromagnetic induction, Lenz's law, Fleming's right hand rule and Fleming's left hand rule, principle of self and mutual induction, self and mutually induced emf, dynamically induced emf, self inductance, mutual inductance, coefficient of coupling, numerical problems.

Unit-IV

Network Theorems

Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem and their applications, conversion of circuits from star to delta and delta to star, numerical problems.

Unit-V

Poly Phase Circuits

Concept of generation of three phase voltage, advantage of three phase over single phase, Star and Delta connection (relationship between phase and line values of current and voltage), expression for power measurement by two wattmeter, numerical problems.

ENGINEERING DRAWING
DME-108

Unit – I

Basic Concepts

Introduction to Engg, Drawing, dimensions, lettering, use of drawing instruments, Drawing conventions as per IS: 696-1972 (revised). Scales: simple & diagonal symbols: Electrical, Electronics, Civil and Mechanical.

Unit - II

Plane Geometry

Construction of plane geometrical figures, parabola, ellipse, hyperbola, cycloid, epi-cycloid and hypocycloid involutes of base circle.

Unit – III

Principle of projection, Orthographic projection of solids: Normal position and Inclined position, Development of surfaces of the simple solids, conversion of isometric pictorial projection to orthographic projection of simple objects, Isometric projection of solids and simple objects.

Unit – IV

Building Drawing: Plan and elevation of a simple building.

Machine Drawing: Drawing and free hand sketches of machine components such as screwed fastening (nut & bolts) keys, knuckle, cotter and riveted joint. Some practice in blue print reading of assembly drawing.

WORKSHOP TECHNOLOGY
DME-109

Unit – I

Carpentry Materials: Timber, Classification of timber, Structure and defects, conversion and selection of timber, Seasoning and protection, plywood and its advantages, tools: Marking and measuring tools, Holding and supporting tools, Cutting tools, Planning tools, Striking tools, Boring tools and miscellaneous tools.

Unit – II

Fitting Materials: Material for tools, Vices, V Block, Surface plate, Try square, Combination set, Files, Scrapers, Chisels, Hacksaw, Surface gauge, Universal surface gauge, Punches, Hammers, Calipers and Dividers.

Unit – III

Smithy: Tools and equipments, Hammers, Sewage block, Anvil, Tongs, Chisels, Hardie, Gauges, Fullers, Flatters, Set Hammer, open fire and stock fire, Fuel and blowers.
Processes forging, Upsetting, Welding, Defects in forging.

Unit – IV

Welding: Types of welding, Arc welding and gas welding, Tools and equipment used in arc and gas welding, Types of flames, working pressure, Use of A.C. and D.C. Electrode, Soldering and brazing, precautions.

Unit – V

Metal Cutting: Various metal cutting machine and operations (sawing sharing, plain turning, drilling, grinding and milling).

APPLIED MATHEMATICS-II
DMA-201

Unit-I

Matrices and Determinants

Determinants (up to 3rd order only), minor, cofactor, Laplace expansion and rule of sarrus,
Properties of determinants, Solution of linear simultaneous equations (up to 3 equations) by Cramer's rule, Matrix addition, subtraction and multiplication, Inverse of a matrix, Solution of linear simultaneous equations (up to 3 equations) using matrix method, Solution of resistive network (up to 3 unknown) and L.R.C. network (2 unknown) by mesh and nodal analysis, Solution of simultaneous linear equations and application to network analysis.

Unit-II

Differential Equations

Solution of linear differential equations of 1st order, Applications to L – R and R – C circuits with DC and AC sources, Solution of linear differential equations of 2nd order with constant coefficients including particular integrals of forms e^{ax}, sin ax, cost ax, x^n, e^{ax}sin bx, e^{ax}cos bx, e^{ax} x^n, Applications to LRC circuits.

Unit-III

Fourier Analysis

Periodical functions, Mathematical equations of square, sawtooth, triangular, half and full rectified waves, super position of sinusoidal waves.

Fourier Series

Even and odd functions, Fourier cosine and sine series, Fourier expansion of square, sawtooth, triangular half and full rectified waves.

Unit-IV

Laplace Transform

Definition of Laplace Transform, General Laplace Transforms of Algebraic, Trigonometric and other functions, Inverse Laplace Transform, Applications of Laplace Transforms in solving differential equations of 2nd order and simple problems on LRC circuits.

Unit-V

Complex Number

Complex number, representation (Argand diagram), Complex number in rectangular, polar and exponential forms and conversion from one form to other, De Movire's Theorem, Roots of a complex number, Phasor, Voltage and Current as phasor, addition of alternating quantities by phasor method, Impedance and admittance as a complex number.

ELECTRONICS MATERIALS AND COMPONENTS
DCH-202

Unit-I

Brief idea of atomic structure, classification of materials into conducting, semiconducting and insulating materials on the basis of chemical bonding and band theory, conductivity in metals and semiconductors and Fermi energy.

Materials for special purposes: thermocouple, bimetals, soldering materials, fuse materials, tungstonthoriated tungsten and oxide coated nickel as used tubes.

Unit-II

Insulators: Electrical properties-volume and surface resistivity, permittivity, susceptibility, dielectric constant, polarization and polarizability, dielectric loss and dielectric strength, General properties-hygroscopicity, chemical resistance, thermal conductivity, classification according to working temperature.

Unit-III

Insulating Materials: Plastics-definition, thermoplastics and thermosetting. Properties and electronic applications of polyethylene, polyvinyl chloride (PVC), silicones, teflon, bakelite, epoxy resins.

General insulating materials: glass, ceramics, mica, asbestos, paper, enamels, and transformer oil.

Unit-IV

Magnetic materials: Para magnetism, ferromagnetism, ferrimagnetisms, permeability, magnetic susceptibility, B-H curve and hysteresis loop, coercive force, residual flux density, domains, magneto static and Magnetostrictive energy, Curie temperature, magnetic moment and saturation induction, Magnetic materials and their applicability in electronic instruments, Iron silicon alloys, iron nickel alloys, CRGO, ferrites, alnico and tungsten steel.

Unit-V

Electronics components and their materials: Resistors of different kind-thermistors NTC and PTC, varistor, variable resistors, Capacitors and different kind-variable capacitors, trimmers, PAD and gang, Inductors of different kinds, Relays of different kinds.

ELECTRICAL ENGINEERING-II
DEE-202

Unit-I
3-PHASE SUPPLY SYSTEM
Advantages of 3-phase system over single phase system, Reasons for use of 3-phase system, Elementary 3-phase alternator, some concepts of inter connection of 3-phases,Star and Delta connection, Graphical and mathematical representation of 3-phase sinusoidal waves, Relation between line voltage and phase voltage, line current and phase current in balanced load system, Power in 3-phase Star and Delta connected load, Power and power factor in 3-phase system and their measurement by two watt meter method, Study of variation in watt meter readings with load power factor and Numerical problems.

Unit-II
DC MACHINES
Main constructional features, principle of working, Function of the commutator for motoring and generating action, Armature winding, Factors determining induced emf, Factors determining electromagnetic torque, Action and relationship between terminal voltage and induced emf, Factors determining the speed of a DC motor, Different types of excitation, Performance and characteristic of different types of DC machines, Applications of DC machines, Starting & speed control of DC machines, Losses and efficiency.

Unit-III
TRANSFORMER
Principle of operation, Constructional detail of single phase and 3-phase transformer, Core type transformer & shell type transformer, Difference between single phase and 3-phase transformer, Advantages and disadvantages, EMF equation and equivalent circuit, Voltage regulation of transformer, Losses in the transformer, Efficiency condition for maximum efficiency and all day efficiency, Auto transformers and instrument transformer (construction & applications).

Unit-IV
AC MACHINES
Working principle construction and application of 3-phaseinduction motor, Types of induction motors and constructional features of squirrel cage (SCIM) and slip ring induction motors (SRIM), Starting and speed control, Star Delta Starter, D.O.L. Starter (Direct on line), Reversal of D.O.R. of 3-phase motors, Introduction to synchronous motors and their applications, Application of synchronous motor for power factor improvement.

Unit-V
SINGLE PHASE AND FRACTIONAL KILOWATT MOTORS
Principle of operation of single phase motors, Types of single phase induction motors, Constructional details and applications of split phase, capacitor start, capacitor start and capacitor run, shaded pole and reluctance motor (Hysteresis motor), Single phase synchronous motors, reluctance motor (Hysteresis motor), Commutator type single phase motors: Repulsion induction motor, shaded pole motors, AC series motor and universal motor, Introduction to servo motor and stepper motors.

MEASUREMENTS AND MEASURING INSTRUMENTS
DEE-203

Unit-I

Definition: Instruments accuracy, precision, sensitivity, resolution and error, Basic requirement for measuring instruments, Definition of controlling torque, types and methods, Definition of Damping torque, types and methods, Type and classification of instruments.

Unit-II

Principle of working, constructional feature of Moving Coil Instruments, comparison, Principle of working, constructional feature of induction type meters, Principle of working, constructional feature of electrostatic instruments, Principle of working, constructional feature of Moving Iron instrument, comparison.

Unit-III

Rectifier type instruments, Ammeter, Voltmeter, Measurement of Power and Energy, Constructional feature and working of Dynamometer type wattmeter and single phase, Energy meter.

Unit-IV

Measurement of Circuit Elements: Basic Principle of Wheatstone bridge, Measurement of low and medium resistances, Measurement of high resistances, ohm meter and meggar.

Unit-V

AC Wheatstone Bridge, Max-well, Hay, Wien, bridges, Calibration of Instruments, necessity and importance, Calibration of ammeter, voltmeter and wattmeter with the help of D.C. potentiometer, Expansion of range, Ammeter and Voltmeter.

PRINCIPLES OF COMM. ENGG.
DEL-204

Unit-I

Introduction:

Need of radio communication and brief description of various types of communication systems. Need of modulation and demodulation in communication systems, Types of modulation - Brief description and typical application of AM, FM, phase modulation and pulse modulation, (PAM PM, PWM and PCM), Elementary idea of sampling frequency for pulse modulations.

Amplitude Modulation:

Derivation of expression for an amplitude modulated wave, carrier and side bands, Modulation index, Relative power distribution in carrier and side bands, Elementary idea of DSSB, SSB-SC, ISB modulation and their comparison, Vestigial side band modulation and its application, Working principles and typical application of Grid / base modulation, Plate collector modulation, balanced modulation, Single side band (SSB) generation & typical applications.

Unit-II

Frequency Modulation:

Derivation of expression for frequency modulated wave and its frequency spectrum (without analysis of Bessel functions), Maximum frequency deviation, deviation ratio and modulation index, Advantages and disadvantages of FM over AM in communication systems based on consideration of band width requirement and noise, Working principles and application of varactor diode and Armstrong modulator, Pre-emphasis and de-emphasis in communication systems.

Phase Modulation:

Expression of phase modulated wave and its comparison with frequency modulated wave.

Unit-III

Demodulation of AM Wave:

Principles of demodulation of AM Wave using linear diode detector circuit (No derivation), Concept of diagonal clipping and formula for R.C. time constant for minimum distortion (No derivation).

Demodulation of FM Wave:

Basic principle of detection of FM Wave, Foster Seeley discriminator and its working principles, Working of ratio detector circuits and its advantages over Foster-seeley discriminator.

Unit-IV

Antennas:

Physical concept of radiation of electromagnetic energy from the antenna, Definition and physical concept of terms used with antennas like point source, Power gain, directivity, radiation pattern, beam width and radiation resistance.

Types of Antennas:

Brief description, characteristics and typical applications of medium wave antenna, half wave dipole, Yagi, turnstile, and typical log periodic antenna, loop antenna, ferrite rod antenna in transistor receivers.

Antenna Arrays:

Brief description of broad side and end fire arrays, their radiation patterns and application (without analysis).

Analysis of a two element array of vertical radiators placed at a different distances and fed with equal currents of different phase relation.

Unit-V

Wave Propagation:

Concept of electromagnetic waves, Electromagnetic spectrum and its various ranges - ULF, LF, HF, VHF, UHF and microwaves, Different types of wave propagation, Ground wave propagation: its characteristics, limitations and application, Sky wave propagation: Different ionospheric layers, definition of critical frequency and vertical height of layer, skip distance and maximum usable frequency (MUF), Application of Sky wave propagation, Physical concept about effective earth radius, Range of space waves in a standard atmosphere in terms of antenna heights. Characteristics, limitations and applications of space wave propagation.

NETWORKS AND TRANSMISSION LINES
DEL-206

Unit-I

Network Theorems: Superposition, Thevenin's Norton's and maximum power transfer theorems, their statements and uses for solving simple numerical problems.

Unit-II

Four Terminal Networks: Balanced and unbalanced structures, Symmetrical and asymmetrical structures, Star delta transformation, T and Π structures and their equivalence, Image, iterative & characteristics impedances, propagation constant, Ladder and lattice network.

Unit-III

Attenuators: Symmetrical T and Π types and their design, L type attenuator for impedance matching.

Unit-IV

Filters: Brief idea of the use of filter networks in different communication systems. Prototype low pass, high pass and band pass filters and their attenuation and phase shift characteristics without analysis, Simple design problems.

M-derived Filters and their Characteristics: Simple design problems, Composite filters and their applications.

Unit-V

Transmission Lines: Transmission lines and their significance in communication system, Primary and Secondary constants of a line, Infinite line, characteristics impedance, propagation constant, attenuation and phase constant and their relationship with primary constant. Phase constant and their relationship with primary constant, Transmission line equation. Expressions, for voltage, current and input impedance at a point on the transmission line, for lines with losses and without losses, Distortion less condition, loading of lines for removal of distortion. Radio frequency transmission lines, input impedance for short circuited and open circuited lossless lines, properties and their applications, reflections in transmission lines, standing wave, voltage reflection coefficient in terms of terminating and characteristics impedance (without analysis), Voltage standing wave ratio (VSWR) and its relation with voltage coefficient, Expressions for characteristics impedance of open wire lines and coaxial cables at radio frequencies (without analysis).

DIGITAL TECHNIQUES
DEL-207

Unit-I

Number Systems: The binary system - Binary to decimal conversion and decimal to binary conversion, Octal and Hexadecimal systems. Negative numbers - Signed magnitude representation, 1's complement and 2's complement representation. Binary Codes - BCD code, gray code and Excess-3 code.

Logic Gates: Symbols and truth tables of inverter, AND, OR, NAND, NOR, EX-OR, EX-NOR. Application of NAND and NOR as Universal gate. Laws and theorems of Boolean Algebra and their applications, De-Morgan's Theorem Logic families - DTL, TTL, ECL, I^2L, Basic difference and their characteristics.

Unit-II

Combinational Circuits: Half and full adder, Half and full substractor, Multiplexer and Demultiplexer circuits, Encoder and Decoder circuits, Parity bit generator.

Flip Flop Circuits: Difference between combinational and sequential circuits, Working and application of R.S. & J.K. Flip Flop. Master Slave J.K. flip flop. D-type and T-type flip flop.

Unit-III

Counters: Asynchronous Counters - Four stages binary ripple counter. Decade counter, Up-down counter, 5-bits synchronous counter with series carry, up down synchronous counter with parallel carry, Applications of counters.

Unit-IV

Shift Registers: Buffer register, Serial and parallel shift registers.

Semi-Conductor Memories: ROM, RAM circuits and their applications, Introduction to PROM, EPROM and EEPROM.

Unit-V

Display Systems: Seven segment display system. Dot matrix display systems - A 3 x 5 Dot matrix and 5 x 7 Dot matrix Nixie tube, LED, LCD.

A/C and D/C Converters: A/D Converters - Parallel comparator type ADC, counter type ADC Successive approximation type and dual slop integration type ADC, D/A Converter - Binary weight resistance DAC. Ladder Network DAC, Application of ADC and DAC.

ELECTRONIC DEVICES AND CIRCUITS-II
DEL-208

Unit-I

Single-Stage Transistor Amplifiers: Single-stage CE amplifier with proper biasing components, A.C. load line and its use in: a) Calculation of current and voltage gain of a single stage amplifier circuit, b) Explanation of phase reversal of the output voltage with respect to input voltage, Transistor hybrid low-frequency model in CE configuration, h-parameters and their physical significance, typical values of the parameters and their determination by transistor characteristics. Expressions of voltage gain, current gain, input and output impedance for a single-stage CE amplifier circuit in h-parameters, Appropriate approximations.

Unit-II

Multi-Stage Transistor Amplifiers: Need of multi-stage amplifier, different coupling scheme and their working, brief mention of applications of each types of coupling. Working of RC coupled multistage amplifier, approximate calculations of voltage gain for a two stage RC coupled amplifier, Frequency response for RC coupled and transformer coupled amplifiers and its physical explanation, definition and physical significance of terms, band-width, upper and lower cut-off frequencies, Direct coupled amplifier and its limitations, difference amplifier typical circuit diagram and its working.

Unit-III

Transistor Audio Power Amplifiers: Difference between voltage and power amplifiers, importance of impedance matching in power amplifiers, collector efficiency of power amplifier. Typical single-ended power amplifier and its working, graphical method of calculation of output power, heat dissipation curve and importance of heat sinks, class A, class B, class AB and class C amplifiers, collector efficiency and distortions in each (without derivations). Working principles of push-pull amplifier circuits, its advantage over single-ended power amplifier, cross-over distortion in class B operation and its reduction, different driver stages for push-pull amplifier circuits, Working principles of complementary symmetry push-pull circuit and its advantages, Transformer less audio power amplifier and their typical applications.

Unit-IV

Tuned Voltage Amplifier: Classification of amplifiers on the basis of frequency, Series and parallel resonant circuits, expression for resonant frequency, expression for impedance at resonance, relationship between resonant frequency, Q and band-width (No derivation),
Hybrid equivalent circuits of transistor and its parameters in h parameters, Single and double tuned amplifiers, their working principles & frequency response (no mathematical derivation), Concept of neutralization, Staggered tuned amplifier and typical applications in brief.

Unit-V

Feedback in Amplifiers: Basic principles & types of feedback, Derivation of expression for the gain of an amplifier employing feedback, Effect of negative feedback on gain, stability, distortion and band-width (only physical explanation), typical feedback circuits. R.C. coupled amplifier with emitter bypass capacitor removed, Emitter follower and its application, simple mathematical analysis for voltage gain and input impedance of above circuits.
Vaccum Tubes: Basic ideas about the working of vacuum tubes, Thermionic, secondary and photo-electric emissions, Working and construction of vaccum tube diode and its characteristics, Working of vacuum tube triode, Class C amplifier using vaccum tube, basic principles and applications, wave shapes of anode voltage, anode current, grid voltage and grid current.

COMPUTER APPLICATIONS
DCA-209

Unit – I

Introduction

Digital computer, Brief History, Computer Generations, Types of computers & their classification, PC family, Application of computer in office automation, Science & Engineering, Hardware & Software system, Basic computer organization, Basic concept of data & information. Number systems, Decimal & Binary number systems, Data representation –Fixed point & floating point number representation, Introduction to networking, various types of network, software & Hardware, Internet.

Unit – II

Operating System & PC Software

Basic concepts & functions of an operating system, Disk operating systems, MSDOS, Directories & Files, Commands & Utilities, Batch file programming, Management of computer resources like Memory, CPU, I/O, Storage Computer Virus and protection, Familiarization with Windows structure & use, Working knowledge of PC Software Word processor, Spreadsheet, Database.

Unit – III

Numerical Analysis & Programming Techniques

Numerical Analysis – Iteration methods; Newton - Raphson method; Bisection method Algorithm, Pseudo-codes, Flow charting – rules & symbols, Structured programming concept, Computer Language – Low level, High level & 4 Gls, Compilers, Interpreters, Object oriented programming, Need & Characteristics, Inheritance, Reusability, Polymorphism, Overloading.

Unit – IV

C/C++ Programming

C/C++ - preliminaries Data types, operators, Expressions, Input/Output, Functions and program structure, Program control flow, looping, Arrays, String, Pointers, Structures, Unions, File handling, Functions & Pre-processor commands, Graphics functions, Common programming errors, Classes.

Unit – V

Computer Graphics:

Introduction to Computer graphics, Graphics primitives, Computer aided drafting & design (CADD), Various CADD packages, Auto-CAD, Simple engineering drawing using auto-CADD, Graphic Function in C.

ELECTRONIC DEVICES AND CIRCUITS-III
DEL-301

Unit-I

Wave Shaping Circuits: General idea about different wave-shapes. Review of transient phenomena in RC & RL Circuits, RC and RL differentiating and integrating circuits, Their applications (physical explanation for square rectangular input wave shapes only) Diode clippers and series and shunt biased type double clipper circuits, Zener diode clipper circuits, Use of transistors for clipping, Diode clamping circuit to negative peak, positive peak of any other level for different input wave forms (e.g. sine, square triangular).

Time Base Circuits: Need of time base (sweep) wave forms, special features for time base signals. Simple method of generation of saw tooth wave using charging and discharging of a capacitor, Constant current generation for linear sweep voltage operation of the circuit.

Unit-II

Sinusoidal Oscillators: Application of Oscillators, Use of positive feedback negative resistance for generation of oscillations, Barkhausen criterion for oscillations.

Different Oscillator Circuit: Tuned collector, Hartley, Colpitt's, Phase shift, Wien Bridge and crystal, oscillators and their working principles (no mathematical derivations).

Opto-Electronics Devices and their Applications: Working principles and characteristics of photo resistors, photo diode, photo transistors, photo voltaic cells, LEDs, LCDs and Opto-couplers. Simple applications of Opto electronic devices (one / two examples of each may be mentioned).

Unit-III

Multivibrator Circuits: Ideal transistor switch - explanation using CE output characteristic, calculation of component values (collector and base resistor) for a practical transistor switch), Transistor switching times, use of speed up capacitor (physical explanation). Collector coupled bistable, monostable, and astable multivibrator circuit operation, explanation using wave shapes at collector and base terminals and expressions for time period (No mathematical derivation), Triggering techniques for bistable multivibrator (Symmetrical and unsymmetrical triggering), Operation of Schmitt trigger, Calculation of upper trigger potential (UTP) and lower trigger potential (LTP). Mention of applications of multivibrators and Schmitt triggers. Transistorized voltage controlled oscillator (basic principle only).

Unit-IV

Field Effect Transistor (FET): Construction operation, characteristics and parameters of junction FET, Construction, operation and characteristics of MOSFET in both depletion and enhancement modes, Comparison of JFET with bipolar transistor and vacuum tubes, Comparison between JFET and MOSFET, Simple FET amplifier circuit and its working principles (without analysis).

Unit-V

Integrated Circuits: Importance of ICs in modern electronics, classification of ICs, some examples of ICs available in the country and their functions / applications, Fabrication of transistor by planner process, Typical fabrication processes for ICs (brief explanation), Difference between SSI, MSI, LSI and VLSI. Mention of different IC packages, a brief introduction to different IC technologies and their comparison.

Timer I.C.: Block diagram of IC timer (such as 555) and its working, Use of 555 timer as monostable and astable multivibrators.

TELEVISION ENGINEERING
DEL-302

Unit-I

Block and Schematic diagram of a complete TV system from scene to viewer with explanation of each block of the system.

Television Camera: Block diagram of a TV camera and brief explanation of each block. Brief idea of TV camera tubes i.e. image orthicon, vidicon and plumbicon. Need for and principles of scanning. Need for and principles of synchronization.

Unit-II

TV Standards: Bandwidth requirements of a TV system for picture and sound channels (descriptive treatment), Explanation of the composite video signal, Explanation of composite video signal, Indian TV standards, Explanation of standard TV Test pattern.

Unit-III

TV Transmitter: Block diagram and explanation of a TV transmitter, Need for and explanation of VSB, Difference between positive and negative modulation, TV transmission antennas brief description only with need for and principles of duplexing, Basic principles of Facsimile Transmission and Fax Systems.

Unit-IV

TV Receiver: Block diagram of a typical TV inter carrier receiver and explanation of each block, typical circuit of different stages and their principles of operation, Technical specifications of a TV receiver with explanation of each term, General principles of fault finding and servicing in TV receiver, receiving antennas - brief description of different types of antenna installation techniques. Need for boosters in fringe areas.

Unit-V

Colour Television: Colour signals and colour addition, Difference between monochrome and colour TV broadcasting. Colour video signals, Transmitted chrominance signal. Colour sub carrier frequency, Colour synchronization, Chrominance and burst amplifier, Colour picture tubes, Colour controls and adjustments, Introduction to PAL and SECAM colour systems.

MICROPROCESSOR AND COMPUTER TECHNOLOGY
DEL-303

Unit-I

Introduction and Organization: Introduction to microprocessor: Capabilities and limitations, classification of microprocessors, CPU functions and role of various registers and stack pointer, Organization of 8085, Pin diagram of 8085.

Unit-II

Programming of Microprocessor: Instructions of 8085 and programming techniques, Addressing modes of 8085, Assembly language and machine language, Programming in assembly language, (simple programmers like addition, multiplication, division etc.), Minimal system, necessity for interfacing. Address space partitioning, memory mapped I/O and I/O mapped I/O their advantage and disadvantage. Schemes for data transfer: Programmed data transfer, interrupt data transfer and DMA data transfer. Various interrupt schemes in 8085.

Unit-III

Interfacing Devices and Peripheral sub Systems: Types of Interfacing devices, I/O ports, Programmable peripheral interface, Programmable interrupt controller, Programmable DMA controller, Analog interfacing ADC, DAC.

Unit-IV

Introduction to Computers: Types of Computers, Characteristics of analog and digital computers, Main differences between, large, mini and micro-computers, And I, II, III, IV generation computers, Difference between PC, PC/XT and PC/AT.

Computer Systems: Block Diagram of digital computer, Disk operating system (DOS), Concept of on line and time-sharing systems.

Unit-V

I/O Devices (Characteristics and Relative Merits): Magnetic tape, Printer, VDU and Teletype, Floppy disk drive and Winchester disk drive.

Memory Systems of Modern Computers: Main memory, Peripheral memory.

ELECTRONICS CIRCUIT DESIGN
DEL-304

Unit-I

Design of the circuitry for using a d' Arsonal movement as a voltmeter, a current meter and an ohmmeter for specified ranges, Design of transformers, Explanation of various transformer design equations (No derivation), Design of a small power transformer.

Unit-II

Design of rectifiers and regulated power supplies, A simple power supply using: Half wave rectifier, Full-wave rectifier (including the design of input transformer and filter circuit for given specifications), A simple zener regulated power supply, Simple design of transistorised series and shunt regulator.

Unit-III

Design of Amplifiers: A small signal, RC coupled, single stage, low-frequency amplifier, given specifications, being input impedance, load impedance, voltage gain level and frequency range, a simple complementary-symmetry audio power amplifier.

Unit-IV

Design of oscillators and multivibrators, Design of Colpitt and Hartley oscillators using transistors, Design of astable and monostable multivibrators.

ELECTRONIC INSTRUMENTS AND MEASUREMENTS
DEL-305

Unit-I

Multimeter: Principles of measurement of dc volts, dc current and resistance in various ranges using a multimeter, Significance of the term ohm/volt for the use of multimeter as a voltmeter, Limitations of a multimeter with regards to frequency and impedance.

Electronic Multimeter: Advantages of electronic multimeter over conventional multimeter for voltage measurement with respect to input impedance and sensitivity, Principle of resistance measurement using electronic multimeter and its advantages over the conventional multimeter for measuring very high resistance (M-ohm ranges). Block diagram of different types of electronic multimeters and their applications. Typical values of input impedance of an electronic voltmeter, Use of probes for extending the frequency range of an electronic multimeter.

Unit-II

Cathode ray oscilloscope: Various application of CRO. Block diagram of a CRO and the function of each block, Construction of CRO electron gun, Electrostatic focusing electron beam acceleration, Vertical and horizontal deflection plates and their role in displaying wave form on CRT screen. Screen phosphor for electron beam display, Typical saw tooth sweep circuit for horizontal deflection and its working, importance of linearity of sweep and need of blanking during fly back, Significance of frequency response of vertical amplifier for measurements. Input impedance of a CRO in terms of resistance and the shunting capacitance, its significance for CRO measurements. Measurement of voltage, frequency and wave shapes. Typical panel controls of a CRO and their functions.

Unit-III

Signal Generator: Laboratory AF tests oscillators, their working principles and typical specifications. RF signal generators, their working principles, typical specification and application, Brief introduction to pulse and function generators.

Impedance Bridges (RLC Bridge)

DC Wheatstone bridge (resistance Ratio Bridge). AC bridges, Maxwell, Hay's and Schering bridges. Block diagram and working principles of impedance (R.L.C.).

Unit-IV

Q. Meter: Block diagram and working principles of Q. Meter. Typical applications of Q. meter (Measurement of Q, L, C and M).

Audio Power Meter: Principle of working of audio power meter and its application for the measurement of audio power.

Unit-V

Distortion factor meter: Principle of working and applications.

Digital Instruments: Block diagrams and working principle of digital multimeter, frequency rejection ratio.

INDUSTRIAL ELECTRONICS
DEL-306

Unit-I

Operational Amplifier: Introduction to Op-Amp and its basic equation, the real and ideal characteristics of Op Amp.

Differential Amplifier: Circuit, its operation and application. Use of Op amp in the design of analog circuits, such as: Adder, Inverter, differentiator, Integrator, logarithmic and anti-logarithmic amplifiers, Voltage follower circuit and comparators, Analog computations.

Unit-II

Rectifier Circuit: Review of half wave and full wave rectifier circuits, their efficiency and ripple factor. Filter circuits, Single phase bridge rectifier circuits. Three phase half wave and full wave rectifier circuits and their analysis, Multiphase rectifier circuit and its analysis (i.e. determination of efficiency and ripple factor), Voltage multiplying circuit and its application.

Power supply Regulator: Simple transistorized and IC based voltage regulators.

Unit-III

Silicon Controlled Rectifier (SCR): Theory and working of SCR, its V-I characteristics. Methods of turn-on and turn off SCR. Controlled half wave and full wave rectifier circuits using SCR. Phase control methods of SCR. Device specifications, rating and nomenclature, Series and parallel operation of SCRs, Operation, V-I characteristics, equivalent circuit and parameters of UJT, Description of UJT relaxation oscillator, Use of UJT relaxation oscillator for triggering thyresters, Operation, V-I characteristics and equivalent circuits of DIAC and TRIAC and their applications.

Unit-IV

Converter and Inverter Circuits: Principle of operation of basic inverter circuit. Basic series and parallel commutated inverters (No analysis), Principles of operation of cycloconverter , choppers and dual converter and their applications, Principles and applications of induction and dielectric heating (No mathematical analysis).

Resistance Welding: Electronic welding controls synchronous control circuit, Energy storage Welder system, pulsation welding.

Unit-V

Transducers: Elementary explanation of principle of operation and use in measuring physical parameters, Potentiometer resistance strain gauge, resistance thermometer and themister, Their use for the measurement of temperature, Variable capacitance pressure gauge and dielectric gauge and their typical applications, Differential transformer and magnetostriction gauge, Their use for the measurement of pressure and force, Thermocouple and photovoltaic cell. Mention their typical applications

TROUBLESHOOTING & SERVICING OF ELECTRONIC EQUIPMENTS
DEL-308

Unit-I

Introduction to modern electronic equipments, Mean time between failures MTBF), Mean time to repair (MTR) Maintenance policies, Potential problems, Preventive maintenance and corrective maintenance, Fundamental Trouble shooting Procedures, Fault finding aids; Service manuals, test and measuring equipments, special tools, Trouble shooting techniques; Functional area approach, split half method, Divergent, convergent and feedback path circuit analysis, Measurement techniques.

Unit-II

Electronic Test Equipments: (Familiarization in operation and use), Test waveform generators, Audio oscillators, Function generator and signal generator, Measuring equipments, Single head CRO, Dual trace / dual beam CRO, Electronic and digital multimeter, Universal logic state analyser.

Soldering Techniques: Soldering tools and soldering materials, Soldering procedures, Replacing components, Good and bad soldering joints, Precautions during soldering and desoldering techniques.

Unit-III

Nature of faults, Operation and practical applications of solenoids, Drive motors and stepper motors, Test procedure for checking of passive components such as: resistors, capacitors, inductors, transformers and chokes.

Unit-IV

Testing of Semi-conductor Devices: Diodes, rectifiers and Zener diode, Transistors: Bipolar junction transistor, JFET, MOSFETS, Thyristors SCR, UJT, Photo cells, Data books on transistor.

Unit-V

Trouble shooting in Digital Systems: Typical faults in digital circuits. Digital IC trouble shooters: Logic clip, logic probe, logic pulser current tracer, logic comparator, IC tester.

Typical Examples of Trouble Shooting: Trouble shooting procedures for the following equipments: Oscilloscope, power supply, digital multimeter, signal generator, PA system, Tape recorder and stereo amplifier.

Log Book: Introduction, preparation and significance of log book.

COMMUNICATION SYSTEMS
DEL-309

Unit-I

Electroacostic Transducer: Microphones - Moving coil, ribbon, condenser, and crystal types, their construction, working principles and typical applications, Loudspeakers - Direct radiating and horn loaded type, their constructions, working principle and applications.

Sound Recording and Reproduction: Principles of sound recording on magnetic tape. Need for biasing. Considerations for tape speed, Tape and coating materials. Constructional features of heads and their alignment Need for pre-emphasis and equalization, Block diagram of a tape recorder.

Unit-II

Transmitters: Classification of transmitters on the basis of power, frequency and modulation. Block diagram of an AM transmitter and working of each stage, Low level and high level modulation. Block diagram of SSB transmitter. Block diagram and working principles of varactor diode and Armstrong FM transmitter.

Radio Receivers: AM receiver, Principles of superhetrodyne radio receiver, its block diagram and function of each block, typical wave forms at the input and output of each block, FM receiver, Block diagram and function of each block.

Unit-III

Micro Waves: Limitation of conventional vacuum tube transmitters at VHF and UHF (No derivation), Generation of ultra high and microwave frequencies, construction and working principles of cavity klystron, reflex klystron and multi cavity magnetron, Difficulties in transmission of energy at UHF and microwave frequencies using conventional open-wire lines, Coaxial cables and wave-guides, TM and TE modes in wave-guide and TEM mode in coaxial cable (No derivation).

Unit –IV

Telegraphy: teleprinter code, Brief description of polarized telegraph relays, typical single current and duplex telegraph circuits, Basic working principles of a teleprinter system, construction and working of teleprinter keyboard.

Telephony: Subscribers telephone circuit and function of different components, tones used in auto telephone systems constructions and working principle of uni-selector and two motion selector switches. Trunking diagrams for 10 lines, 100 lines, 1000 lines strowger exchanges, Mention of different types of telephone exchanges and their relative merits.

Unit-V

Basic working Principles of EPBAX

Broad-Band Communication Systems and Radar: Multiplexing in a communication system, Basic principles of TDM and FDM, basic principles of working of 3 channel carrier SYSTEM (type CSI only) and 24 channel FM VFT systems, Satellite communication-Basic ideas, Active and Passive satellites, Meaning of the terms orbit, Apogee and perigee, Geostationary satellite and its need. Block diagram and explanation of a satellite communication links. Block diagram and working principles of microwave link, Introduction to Radar and its various applications. Block diagram and its description of a pulse Radar, Brief introduction to optical Fiber system.

ENTREPRENEUR DEVELOPMENT & INDUSTRIAL MANAGEMENT
DME –309

Unit – I

Management, Industrial Management, Different Functions of Management: Planning, Organizing, Co-ordination and Control, Structure of an Industrial organization, Function of different departments, Relationship between individual departments, Human relations & performance in organization, Understanding self and others for effective behavior, Behavior modification techniques, Industrial relations and disputes, Relations with subordinates, peers and superiors, Interpersonal relationship. Characteristics of group behavior and Trade unionism, Mob Psychology, Grievances, Handling of grievances, agitation's strikes, Lockouts, Picketing and Gherao, Labour welfare, worker's participation in management. Introduction to Human Resource Development / Personnel Management, Staff development and career development, Training strategies and methods, Introduction of wages, Classification of wage payment scheme.

Unit – II

Importance and necessity of industrial legislation, Types of labour laws and disputes, Brief description of the following Acts, The factory Act 1948, Payment of wages Act 1936, Minimum Wages Act 1948, Workmen's compensation Act 1923, Industrial Dispute Act 1947, Employees state insurance Act 1948, Provident Fund Act. Classification of accidents: According to the nature of injuries, fatal, temporary, According to event according to place, Causes of accidents – psychological, physiological, and other industrial hazards. Safety consciousness, safety measures during the execution of engineering works. Ecology, factor causing pollution, effect of pollution on human health, Air pollution and Control Act, Water pollution and Control Act, List of pollution control equipment, Solid waste management, Noise pollution.

Unit – III

Concept of ethics, Concept of professionalism, Need for professional ethics, Code of professional ethics, typical problems of professional engineers, Factors determining motivation, Characteristics of motivation, Methods for improving motivation, Incentives, Pay, Promotion, Rewards, Job satisfaction and Job enrichment. Need of leadership, Function of a leader, Factors to be considered for accomplishing effective leadership, Manager as a leader, Types of production, Job, Batch and mass production, E.O.Q. (Economic order quantity).Concept of quality production, Philosophies of different groups, Concept of total quality management, JIT (Just in time), ISO-9000 & ISO-14000, Concepts of intellectual property rights & patents.

Unit – IV

Concept of Entrepreneurship, Importance and need of entrepreneurship in context of prevailing employment conditions in the country, Qualities of successful entrepreneurs, Career options, Scanning of business environment, Small scale sector, Types and forms of entrepreneurs and enterprises, Government assistance, Steps in setting up enterprises, Social responsibility of an entrepreneur. Project identification techniques, Selection of a project, conducting a market survey, Preparation of project report and project appraisal.

Unit – V

Working capital assessment, Estimating costs, Production cost, Working capital requirement and profit estimation, break even analysis, Book keeping and accounts, Marketing management including export nature and scope of marketing, Identification of products/country, Price analysis, Documentation and procedures. Role of financial institutions like SIDBI, SFC, NGOs, Banks etc. and their support for enterprise building, Role of non-financial institutions like DIC, KVIC, SISI, NSIC etc., Legal requirements in setting up and running an enterprise, Commercial, labour and tax laws.