

SYLLABUS

DIPLOMA IN ELECTRONICS ENGINEERING (DAY COURSES)

Updated on July, 2019



**UNIVERSITY POLYTECHNIC
FACULTY OF ENGINEERING & TECHNOLOGY
JAMIA MILLIA ISLAMIA
NEW DELHI - 110 025**

**EVALUATION SCHEME FOR THREE YEAR
DIPLOMA COURSE IN ELECTRONICS ENGINEERING
(DAY COURSES) - I YEAR**

First Semester

S.No	Code No	Subject	Credit Hrs	Sessional	Univ. Exam	Total	Periods/Week
<i>Theory Courses</i>							
1	DELS 101	Communication Skills-I	4	40	60	100	4
2	DELP 102	Applied Physics	4	40	60	100	4
3	DELC 103	Applied Chemistry	4	40	60	100	4
4	DELM 104	Applied Maths-I	4	40	60	100	4
5	DEE 105	Electrical Engg.-I	4	40	60	100	4
<i>Practical Courses</i>							
1	DELP 112	Applied Physics	2	30	20	50	2
2	DELC 113	Applied Chemistry	2	30	20	50	2
3	DEE 115	Electrical Engg.-I	2	30	20	50	2
4	DME 116	Workshop Practice	2	30	20	50	3
Total			28	320	380	700	29

Second Semester

S. No	Code No	Subject	Credit Hrs	Sessional	Univ. Exam	Total	Periods/Week
<i>Theory Courses</i>							
1	DELM 201	Applied Maths-II	4	40	60	100	4
2	DEL 202	Digital Electronics	4	40	60	100	4
3	DME 203	Elements of Mechanical Engg.	4	40	60	100	4
4	DEE 205	Electrical Engg.-II	4	40	60	100	4
5	DEL 205	Networks & Transmission Lines	4	40	60	100	4
<i>Practical Courses</i>							
1	DEL 212	Digital Electronics	2	30	20	50	2
2	DME 213	Elements of Mechanical Engg.	2	30	20	50	2
3	DEL 215	Networks & Transmission Lines	2	30	20	50	2
4	DME 216	Engineering Drawing	2	30	20	50	3
Total			28	320	380	700	29

**EVALUATION SCHEME FOR THREE YEAR
DIPLOMA COURSE IN ELECTRONICS ENGINEERING
(DAY COURSES) - II YEAR**

Third Semester

S. No	Code No	Subject	Credit Hrs	Sessional	Univ. Exam	Total	Periods/Week
<i>Theory Courses</i>							
1	DEL 301	Electronic Devices & Circuits-I	4	40	60	100	4
2	DEL 302	Data Communication & Networking	4	40	60	100	4
3	DEL 303	Digital System Design	4	40	60	100	4
4	DEL 304	Principles of Communication	4	40	60	100	4
5	DEE 305	Measurements. & Measuring Instruments	4	40	60	100	4
<i>Practical Courses</i>							
1	DEL 311	Electronic Devices & Circuits-I	2	30	20	50	2
2	DEL 312	Data Communication & Networking	2	30	20	50	2
3	DEL 313	Digital System Design	2	30	20	50	2
4	DEE 315	Measurements & Measuring Instruments	2	30	20	50	2
Total			28	320	380	700	28

Fourth Semester

S. No	Code No	Subject	Credit Hrs	Sessional	Univ. Exam	Total	Periods/Week
<i>Theory Courses</i>							
1	DELS 401	Communication Skills-II	4	40	60	100	4
2	DEL 402	Industrial Electronics	4	40	60	100	4
3	DEL 403	Microprocessors & Applications	4	40	60	100	4
4	DEL 404	Electronic Devices & Circuits-II	4	40	60	100	4
5	DCA 405	Computer Applications	4	40	60	100	4
<i>Practical Courses</i>							
1	DEL 412	Industrial Electronics	2	30	20	50	2
2	DEL 413	Microprocessors & Applications	2	30	20	50	2
3	DEL 414	Electronic Devices & Circuits-II	2	30	20	50	2
4	DCA 415	Computer Applications	2	30	20	50	2
Grand Total			28	320	380	700	28

**EVALUATION SCHEME FOR THREE YEAR
DIPLOMA COURSE IN ELECTRONICS ENGINEERING
(DAY COURSES) - III YEAR**

Fifth Semester

S. No	Code No	Subject	Credit Hrs	Sessional	Univ. Exam	Total	Periods/Week
<i>Theory Courses</i>							
1	DEL 501	Electronic Devices & Circuits-III	4	40	60	100	4
2	DEL 502	Microwave and Radar	4	40	60	100	4
3	DEL 503	Television Engineering	4	40	60	100	4
4	DEL 504	Computer System Architecture	4	40	60	100	4
5	DME 506	Industrial Management	4	40	60	100	4
<i>Practical Courses</i>							
1	DEL 511	Electronic Devices & Circuits-III	2	30	20	50	2
2	DEL 512	Microwave and Radar	2	30	20	50	2
3	DEL 513	Television Engineering	2	30	20	50	2
4	DEL 517	Electronics Workshop	2	30	20	50	2
Grand Total			28	315	360	700	28

Sixth Semester

S. No	Code No	Subject	Credit Hrs	Sessional	Univ. Exam	Total	Periods/Week
<i>Theory Courses</i>							
1	DEL 601	Advance Communication Systems	4	40	60	100	4
2	DEL 602	Electronics Circuit Design	4	40	60	100	4
3	DEL 603	Microcontrollers & Embedded Systems	4	40	60	100	4
4	DEL 604	Consumer Electronics	4	40	60	100	4
5	DEL 605	VLSI Design	4	40	60	100	4
<i>Practical Courses</i>							
1	DEL 611	Advance Communication Systems	2	30	20	50	2
2	DEL 613	Microcontrollers & Embedded Systems	2	30	20	50	2
3	DEL 620	Project	8	120	80	200	6
4	DEL 630	Industrial Training & Visits	2	50	--	50	--
Grand Total			34	430	420	850	30

NOTE: Project Topics (DEL 620) shall be assigned to the students at the commencement of 5th Semester.

COMMUNICATION SKILLS-I
DELS-101

UNIT	Topic	Marks
I	Reading <i>a. Comprehension (Beginner)</i>	10
II	Grammar <i>a. Tenses , Active , Passive</i> <i>b. Vocabulary</i>	20
III	Structure <i>a. Sentence Formation</i> <i>b. Word Formation</i>	10
IV	Writing - I <i>a. Report Writing</i> <i>b. Curriculum Vitae</i>	10
V	Writing - II <i>a. Application</i> <i>b. Business Letter</i>	10

APPLIED PHYSICS

DELP-102

UNIT – I

Unit and Dimensions: Fundamental and derived units (SI System), Dimension of various physical quantities, uses of dimensional analysis and its limitations, Accuracy and precision of measuring instruments, error in measurement.

UNIT – II

Electrostatics: Coulomb's law, Electric field, Gauss's theorem, electric field at a point due to a uniformly charged thin sheet, potential due to a point charge, Equi potential surfaces, Capacity of parallel plate capacitor, energy store in a capacitor, combination of capacitor (Series and Parallel), Charging and discharging of capacitor, Dielectric Materials, Polarization, Polarizability, Dielectric Strength and power Losses.

UNIT – III

Current Electricity: Kirchhoff's law, application of Kirchhoff's law to the wheat stone bridge, Post office Box, Meter Bridge and potentiometer, Heating effect of current, Electric Power, Relation between kWh and Joule, Expression for Energy Consumed in kWh.

UNIT – IV

Electromagnetism: Motion of charged particles in uniform magnetic field and electric field, Biot-savart law, Magnetic field due to straight wire, circular loop, Force experienced by moving charge and a current carrying conductor in a uniform magnetic field, Torque on current loop, force between two parallel current carrying conductors, Definition of an Ampere, Moving coil galvanometer, conversion of galvanometer into ammeter and voltmeter.

UNIT – V

Geometric optics: Lens formula, Refraction through Prism, Principle working and magnifying power of simple Telescope, Astronomical Telescope and compound microscope.

Wave Optics: Huygens's principle, reflection and refraction of wave at plane surface, Interference of light waves, Young's Experiment.

TEXT BOOK - Halliday & Resnick

REFERENCE BOOKS

1. Basic Applied Physics by H. R Meena, Neeraj Pant, Arjun Singh & Har Lal
2. Applied Physics by R. K Gaur.

APPLIED CHEMISTRY DELC-103

Unit I: Atomic Structure and Bonding Atomic Structure:

Bohr's Theory, Quantum Numbers, Electronic Configuration of first 36 elements, Aufbau's Principle, Pauli's Exclusion Principle and Hund's Rule. Bonding: Ionic Bond, Covalent Bond and Metallic Bond. Classification of Materials based on Band Theory: Conductors, Semiconductors and Insulators, Fermi Level, Donor Level and Acceptor Level.

Unit II: Volumetric Analysis & Water Chemistry Volumetric Analysis:

Mole, Weak and Strong Electrolytes, Equivalent Mass. Strength, Normality and Molarity of a Solution,, Problems based on Volumetric Analysis and Gravimetric analysis. Water Chemistry: Hardness & Units of Hardness, Estimation of Dissolved Oxygen, Alkalinity and Hardness.

Unit III: Electrochemistry Metallic and Electrolytic Conductivity:

Arrhenius's Theory of Ionization, Distinction between Atom and Ion, Ionization and Dissociation, Electrolysis, Mechanism of Electrolysis, Mechanism of Molten Sodium Chloride using Carbon Electrodes, Faraday's Law of Electrolysis, Numerical Problems Based on these Laws, Industrial Applications of Electrolysis: Electro plating, Electro refining, Electrometallurgy and Electrotyping.

Unit IV: Conducting Materials & Polymers Conducting Materials:

Copper, Aluminum and Graphite, Materials of Fuses, Bimetals, Solders and Thermocouples, Polymers: Introduction, Monomer and Polymer, Classification of Polymers, Polymerization, Modes of Polymerization: Addition and Condensation Polymerization, Plastics, Preparation, Properties and Uses of Polythene, Polystyrene, Teflon and PVC.

Unit V: Chemical Processes in VLSI Technology and Management of E-waste Materials Chemical Processes in VLSI Technology:

Epitaxy, Thermal Oxidation, Doping: Diffusion Method and Ion Implantation Method, Etching and Masking: Photolithography and Photomask. Management of E-waste Materials: E-waste Materials, Disposal, Recycling and their Harmful Effects.

TEXT BOOK

1. ENGINEERING CHEMISTRY BY S.S. DARA
2. ENGINEERING CHEMISTRY BY SHIKHA AGRAWAL

**APPLIED MATHEMATICS-I
DELM-104**

UNIT-I

ALGEBRA

Arithmetic progression, its nth term, sum to n terms. Geometric progression, its nth term, sum to n terms and sum of infinite terms, Binomial theorem (without proof) for any index, General and middle term, terms independent of x, First and second binomial approximation.

UNIT-II

DETERMINANTS

Determinants (up to 3rd order only), minors, co-factors, Properties of determinants, solution of linear simultaneous equations in three variables by Cramer's rule.

UNIT-III

MATRICES

Definition and examples of matrices, types of matrices, basic operations, equality of matrices, addition, multiplication and scalar multiplication of matrices, transpose of a matrix, symmetric, skew-symmetric matrices, singular and non-singular matrices, cofactor matrix, adjoint of a matrix, inverse of a matrix, solutions of simultaneous equations in three variables by matrix inverse methods.

UNIT-IV

CO-ORDINATE GEOMETRY OF TWO DIMENSIONS

Definition of locus with problems, Equations of straight lines in various forms, Angle between two lines, Perpendicular distance formula, Conic sections, Circle, Parabola, Ellipse and Hyperbola.

UNIT-V

VECTORS

Scalar and vectors, addition and subtraction of vectors and their simple applications, multiplication of vector by scalar, Scalar and vector product of two vectors, Scalar product of three vectors, Geometrical interpretation.

ELECTRICAL ENGINEERING-I

DEE-105

UNIT-I

BASIC CONCEPTS:

Current, pd, resistance, power, energy, & their units, ohm's law, series, parallel combination of resistances, law's of resistance, effect of temperature on resistance, Kirchoff's laws & its application numerical problems.

UNIT-II

ELECTROSTATICS

Concept of capacitance units & its ratings, parallel plate, spherical & cylindrical capacitor & their capacities, energy stored in capacitor, concept of dielectric, dielectric constant, dielectric breakdown, series & parallel combination of capacitor, numerical problems

UNIT-III

ELECTROMAGNETISM:

Concept of mmf, flux, reluctance, & permeability, analogy between electric & magnetic circuit, force on a moving charge & current in a magnetic field, force between two current carrying parallel conductor, magnetic field around current carrying straight conductor, circular loop & solenoid, numerical problems.

UNIT IV

AC CIRCUITS:

Concept of alternating current and voltage equation of instantaneous values, a c through pure resistance, pure inductance & pure capacitance, concept of conductance, susceptance & admittance, R LRC, RLC, series parallel circuits, different methods of solving AC series & parallel circuits, numerical problems

Unit-V

POLYPHASE CIRCUITS:

Generation of 3-ph voltage, star-delta connections, relationship between phase & line values of current & voltage, power in 3-ph circuit, star delta transformation, numerical problems.

APPLIED PHYSICS LAB
DELP - 112

1. To find the volume of metal used in a hollow cylinder closed at one end using vernier calipers.
2. To Measure Density of a Wire using Screw gauge.
3. To Measure Radius of Curvature of a Lens, Mirror using Spherometer.
4. To find the acceleration due to gravity using simple pendulum and to draw $l-T^2$ graph and hence to read the length of the seconds pendulum.
5. To find resistance of a given wire using metre bridge.
6. To compare the EMF of two given primary cells using potentiometer.
7. To Determine Refractive Index of Glass using Prism.
8. To determine the focal length of a convex lens by two-pin method.

APPLIED CHEMISTRY LAB
DELC - 113

1. To determine the purity percentage of oxalic acid in a given impure mixture.
2. To analysis a mixture of NaOH and KOH (given a solution contacting 2.5g mixture of NaOH and KOH per litre).
3. To estimate the calcium and magnesium hardness in the given water sample.
4. To estimate the Chloride ion (Cl^-) in the given water sample.
5. To estimate the free Chlorine (Cl_2) in the given water sample.
6. To estimate the dissolved Oxygen (D.O.) in the given water sample.
7. To estimate the Alkalinity in the given water sample.
8. To estimate the temporary, permanent and total hardness in the given water sample by EDTA method.
9. To determine the viscosity of a lubricating oil by Redwood Viscometer.
10. To determine the moisture percentage in a given coal sample.

ELECTRICAL ENGINEERING - I LAB
DEE-115

LIST OF EXPERIMENTS:

1. To verify the Ohm's law. Draw V-I Characteristics.
2. To verify the relation $R_T = R_1 + R_2 + R_3 + \dots + R_n$
3. To verify the relation $1/R_T = 1/R_1 + 1/R_2 + 1/R_3 + \dots + 1/R_n$.
4. To verify the Kirchhoff's current law.
5. To verify the Kirchhoff's voltage law.
6. To find voltage current relationship in a single phase R-L series circuit. Draw its impedance triangle and determine the power factor.
7. To find voltage current relationship in a single phase R-C series circuit. Draw its impedance triangle and determine the power factor.
8. To find voltage current relationship in a single phase R-L-C series circuit. Draw its impedance triangle and determine all the parameters.

WORKSHOP PRACTICE-I

DME-116

Carpentry shop:

Introduction of tools, Making of various joints: Cross lap joint, half lap joint, Mortise and Tenon joint, Dovetail joint.

Fitting shop:

Introduction of tools
Cutting and filing practice as per drawing
Drilling

Smithy Shop:

Introduction of tools
Hot working and cold working
Making of U clamp, fan hook
Making of sheet metal Joints

Welding Shop: A/C welding and gas welding

Preparation of lap joint and but joints
Preparation of Oxy acetylene gas welding joints

APPLIED MATHEMATICS-II
DELM-201

UNIT-I

DIFFERENTIAL CALCULUS

Limit and continuity (without problems), Differentiation of functions by First Principle, Differential of sum, product and quotient functions, Differential of a function of a function (Chain rule), Logarithmic differential, Higher order derivatives.

UNIT-II

INTEGRAL CALCULUS

Indefinite integral, Integration of a function, standard formulae, the fundamental laws of integration, Integration by substitution method, by parts method and partial fractions method.

UNIT-III

APPLICATIONS OF CALCULUS

Maxima and minima, Tangent and normal, Evaluation of definite integral, Properties of definite integral, Area bounded by a curve between two ordinates and x-axis.

UNIT-IV

DIFFERENTIAL EQUATIONS

Differential equation, Order and degree of differential equations, Solution of differential equations of first order and first degree, variable separable, Homogeneous and linear differential equations, Solution of linear differential equations of 2nd order with constant co-efficient.

UNIT-V

COMPLEX NUMBERS

Complex Number, representation of a complex number (Argand Diagram), Complex number in rectangular, polar and exponential forms, Conversion from one form to another form. De Moivre's Theorem, Roots of complex number.

DIGITAL ELECTRONICS

DEL-202

Unit -1

Number Systems: Binary number system, Binary to decimal conversion and decimal to binary conversion, octal and hexadecimal number system, Representation of Negative numbers, 1's complement and 2's complement representation.

Binary Codes: BCD code, Grey code and excess -3 codes.

Unit -2

Logic Gate: symbol and truth table of AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR gates.

Application of NAND and NOR gates as Universal gate.

Boolean Algebra: Laws and theorems of Boolean algebra and their application, De-Morgan's theorem, minimization of logic expression by using Boolean laws, theorem and K-map.

Unit -3

Combinational circuits: Half and full Subtractor, multiplexer and demultiplexer, Encoder and decoder,

Flip Flop: Difference between Combinational and sequential circuits, Introduction of RS flip flop, JK flip flop and D-type flip flop.

Unit -4

Shift Registers: Shift Register, buffer register, serial and parallel shift register.

Counters: Synchronous and Asynchronous Counters.

Unit -5

Logic Families: Introduction to Logic Families and their types, Various characteristics of logic families.

A/D and D/A Converters: Introduction to Analog to Digital Converter and Digital to Analog Converters, Types of Analog to Digital Converter and Digital to Analog Converters.

Text Books:

1. VK Puri: Digital Electronics
2. RP Jain: Modern Digital Electronics

Reference Books:

1. Malvino: Digital Computer Electronics
2. BR Gupta & V Singhal: Digital Electronics

ELEMENTS OF MECHANICAL ENGINEERING

DME-203

UNIT – I

TRANSMISSION OF POWER

Different modes of power transmission Belt Drive :Material of belt, flat belt V belt open and cross belt device, length of belt (without derivation),Velocity ratio, slip, angle of contact, derivation of tension ratio for flat belt., Power transmitted through belts.

Advantage of V-belt over flat belt, Simple numerical problems, $T_1/T_2=e^{\mu\theta}$.

Chain Drive: Classification Clutch: Principle of clutch, comparison between chain and belt drive.

Pulleys: Introduction, types of pulleys.

Gears: Spur helical, bevel, spiral, worm gear, rack and 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,

Turbines: Introduction & classification of steam turbine, concept of reaction and Simple impulse turbine, comparison between impulse & reaction turbines, losses in steam turbine.

Hydraulics turbine: Classification, construction, working of peloton wheel, Francis turbine and application of reaction and impulse turbine.

UNIT –III

Internal Combustion Engines

1. Classification & application of I.C. engine commonly used spark ignition engine and compression engines.
2. Working principles of two stroke petrol and diesel engine
3. Ignition system in petrol engine.
4. Simple carburetor
5. Cooling and lubrication system of IC engines.

Lubricants: Introduction, method of lubrication: Petrol System, mixed, Splash, force system,

UNIT-IV

Pumps Construction and Working of reciprocating, centrifugal and gear pump, Air compressor: Working of various type of air compressor and their application Material Handling: Tower and bridge crane, jaw Crushers, Hydraulic jack and hydraulic Lift.

UNIT-V

Refrigeration and Air Conditioning System: Introduction, unit of refrigeration, coefficient of performance, vapour compression cycle, simple vapour absorption cycle, Applications, Air conditioning System: Purpose, of air conditioning, Factor affecting air conditioning, some definition relating to psychometric parameters like dry bulb temp, wet bulb temperature, humidity etc, Window air conditioner and desert cooler.

ELECTRICAL ENGINEERING-II

DEE-205

Unit-I

DC GENERATOR

Construction, armature resistance working principle emf equation, types of d.c. generator; separately excited, self excited, shunt wound ,series wound, compound wound, characteristics of d.c. generator, application of d.c generator, losses in d.c. generator, numerical problems.

Unit-II DC MOTORS

Working principle, back emf, types of d.c. motors, characteristics of d.c. motors, application of d.c. motors, speed control of d.c. motors, speed regulation, necessity of starters,3 points Shunt motor starter, numerical problems.

Unit-III

TRANSFORMER

Construction and working principle, emf equation, Transformer on no load, Transformer on load, types of transformer, equivalent circuit losses efficiency and condition for maximum efficiency, open circuit test, short circuit test, all day efficiency, auto transformers, numerical problems.

Unit-IV

INDUCTION MOTOR

Constructional features of three ph induction motor, principle of operations, slip, frequency of rotor current, SCIM & SRIM, starting and speed control, dol starter, star delta starter, auto transformer starter.

Unit-V

SINGLE PHASE MOTORS

Principle & operation of single phase induction motor split phase induction motor, capacitor start induction motor, shaded pole motor, ac series motor & universal motors.

NETWORKS AND TRANSMISSION LINES

DEL-205

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 and Ladder and lattice network.

Unit-III

Attenuators: Symmetrical T and Π types and their design and 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 ELECTRONICS LAB
DEL-212

LIST OF EXPERIMENTS

1. To verify the truth tables of basic logic gates.
2. To verify the truth tables of universal logic gates.
3. To design and verify the truth tables of basic logic gates by using NAND gates.
4. To design and verify the truth table of basic logic gate by using NOR gates.
5. To design and verify truth table of the Ex-OR gate by using NAND gates.
6. To design and verify the truth table of Ex-NOR gate by using NOR gates.
7. To design and verify the circuit and truth table of Half Adder.
8. To design and verify the circuit and truth table of a Full Adder.
9. To design and verify the circuit and truth tables of a Half Subtractor.
10. To design and verify the circuit and truth table of Full Subtractor.

**ELEMENTS OF MECHANICAL ENGINEERING LAB
DME-213**

List of Experiments:

1. Study of the construction and working of simple vertical boiler.
2. Study of the construction and working of Cochran boiler.
3. Study of the construction and working of Babcock & Wilcox boiler.
4. Study of the construction and working of boiler mountings.
5. Study of the construction and working of boiler accessories.
6. Study of the construction and working of four stroke petrol engine.
7. Study of the construction and working of four stroke diesel engine.
8. Study of the construction and working of two stroke petrol engine.
9. Study of the construction and working of two stroke diesel engine.
10. Study of the construction and working of desert cooler.
11. Study of the construction and working of window air conditioner.
12. Study of different modes of power transmission.

**NETWORK AND TRANSMISSION LINES LAB
DEL-215**

List of Experiments:

1. To find the resistance of a given resistor using colour coding method and verify it using Multimeter.
2. To state and verify the Superposition Theorem.
3. To state and verify the Thevenin's Theorem.
4. To state and verify the Norton's Theorem.
5. To state and verify the Maximum Power Transfer Theorem.
6. To find the characteristic impedance of a symmetric T network using open/ short circuit method and verify it with the formula.
7. To find the characteristic impedance of a symmetric π network using open/ short circuit method and verify it with the formula.
8. To study a T type attenuator circuit and find its attenuation.
9. To study a π type attenuator circuit and find its attenuation.

ENGINEERING DRAWING LAB DME-216

Unit-I

Introduction:

Drawing Instruments: Drawing instruments, Sizes and layout of standard drawing sheets, Sizes of drawing boards.

Lines, Lettering and Dimensioning : Different types of lines and freehand Sketching , Different types of lines in engineering drawing as per BIS Specifications, Practice in free hand sketching of vertical , horizontal and inclined lines, geometrical figures such as triangles, rectangles, small and large circles, parabolas, curves and ellipses .

Unit-II

Lettering techniques and Practice: Instrumental single stroke vertical and inclined) lettering of 3 to 7 mm height. Instrumental double stroke lettering of 35 mm height in the ratio of 7:4 vertical

Unit-III

Dimensioning: Necessity of dimensioning, terms and notations- methods and principles, dimensioning small components as in 4.2. below(mainly theoretical instructions) , Dimensioning of overall sizes, circles thread holes, chamfered surfaces, angles tapered surface holes equally spaced on PCD counter sunk hole counter bored holes, cylindrical parts narrow. Space and gaps radii curves and arches chain and parallel dimensioning.

Unit-IV

Scale: Scales and their need and importance, Definition of representative fraction (RF) find RF of a given scale, Types of scales, Construction of plain and diagonal scales.

Unit-V

Constructions of curves such as ellipse, parabola, hyperbola, cycloids epicycloids hypocycloid and involutes.

ELECTRONIC DEVICES AND CIRCUITS-I

DEL-301

UNIT I

PN Junction Diode:

PN Junction diode, Depletion layer, Potential barrier, Behavior of P-N junction diode under forward and reverse bias, Cut-in voltage, Reverse saturation current, V-I characteristics, Breakdown phenomenon, Zener and avalanche breakdown, Static and dynamic resistance and their calculations from diode characteristics, Dynamic resistance of the diode in terms of diode current, Diode ratings and specifications.

Unit II

Rectifiers and Filters

Rectifier circuits, Principle of operation and output waveforms of half wave rectifier, centre tapped and bridge type rectifier, Average value and RMS value of output voltage and load current, Performance analysis of rectifier circuits: ripple factor and rectification efficiency, Filter circuits, Shunt capacitor filter, Series inductor filter, L-type and pie type filter, Physical explanation of working of the shunt capacitor and series inductor filter and their suitability.

Unit III

Special Purpose Diodes

Zener diode: construction and operation, zener and avalanche breakdown mechanism, V-I characteristics, Zener ratings: zener voltage, minimum zener current, maximum zener current, maximum zener power dissipation and zener resistance, Application of Zener diode in voltage regulator circuit, Brief description with V-I characteristics and applications of varactor diode and light emitting diode.

UNIT IV

Bipolar Junction Transistor

Concept of bipolar junction transistor as a two junction three terminal device, NPN and PNP transistor, Principle of operation of transistor, Transistor current relation, Different configurations: CB, CE, and CC, concept of leakage current and effect of temperature on it, input and output characteristics, Determination of input, output dynamic resistances and current amplification factor from the characteristics, Comparison of the three configurations.

UNIT V

Amplifier and Biasing Circuits

Transistor as an amplifier in CE configuration, DC equivalent circuit, DC load line and operating point, Factors affecting operating point, Thermal runaway condition of transistor, Effect of fixing operating point in cut off and saturation region, Different biasing circuits: Fixed biasing, collector to base biasing, potential divider biasing and emitter biasing circuit, Calculation of operating point for these biasing circuits, Merits and demerits.

DATA COMMUNICATION AND NETWORKING DEL-302

Unit I:

Data Communication Fundamentals, Data transmission, Transmission media, Data modulation, Encoding and interface.

Unit II:

Network topologies, protocols, OSI-model TCP/IP model, Comparison between OSI and TCP/IP models

Unit III:

Multiplexing technique, Error correction and detection techniques

Unit IV:

Transmission techniques ócircuit and packet switching networks and routing techniques, x.25

Unit V:

ISDN and ATM networks, Narrow band ISDN, its service, system architecture and interface Broadband ISDN, ATM architecture and its services and switching.

DIGITAL SYSTEM DESIGN

DEL-303

Unit-1

Combinational Circuits

Review of logic variable, Boolean expression, minimization of Boolean expression using map method, tabular method of function minimization, Design of code converter using decoder, Design of Full Adder, Full subtractor using MUX, code converter, Magnitude comparator using DTL/SSI/MSI approach.

Unit-2

Logic Family

Digital integrated circuits, (Bipolar & MOS logic families) characteristic of Digital IC's, current sourcing and current sinking logic & TTL, 12L, ECL & MOS digital ICs.

Design examples of different gate using logic family, charts of CMOS & NMOS. Compatibility or interfacing: interfacing CMOS with TTL, TTL driving CMOS; CMOS driving TTL. CMOS inverter.

Unit-3

Memory Devices

Static and Dynamic memory, sequential access memory, basic memory structure, ROM architecture, RAM and ROM - IC's, Combinational logic design using ROM. Programmable logic devices (PLDs) :PLA, PAL.

Unit-4

Sequential Circuits

Counters, asynchronous counters, ripple type, up down counters, design of modulo N-counters Introduction to synchronous counters, Design of dual binary adders.

Unit-5

Asynchronous Sequential circuits

Essential sequential circuits, Synchronous and asynchronous sequential circuits, classification of sequential circuit, (Mealy & Moore M/Cs), Generation of primitive state - table/diagram, State reduction, state assignment, Design next state decoder, sequence detector, Analysis of sequential network using flip flop.

PRINCIPLES OF COMMUNICATION

DEL-304

Unit-I

Introduction: Introduction to principles of communication, communication process, elements of communication system, communication channels, classification of communication systems, various signals and their bandwidth in communication process, the modulation process, need of modulation, types of modulation and the communication resources. Electromagnetic Wave Propagation: Electromagnetic frequency spectrum, ground wave, sky wave, space wave and tropospheric propagation.

Unit-II

Amplitude Modulation: Expression, side bands and frequency spectrum, types of AM: DSB-FC, DSB-SC, SSB-SC, and VSB, Balanced modulator, SSB Generation- phase shift and filter method, advantages and disadvantages of SSB and AM detectors. AM Transmitters: Types of transmitters, block diagram of high and low level AM transmitter, SSB transmitter, AM Receivers: TRF receiver, super heterodyne radio receiver, explanation of each stage, SSB receiver.

UNIT III

Frequency Modulation: Expression and waveform, frequency spectrum, effects of noise in FM, comparison of FM & AM. FM Modulators: Varactor Diode FM modulator and Armstrong FM modulator. FM Detectors: Basic principle of detection, Slope detector, Foster Seeley ratio detector (without derivation). FM Receiver: Block diagram, AFC stereophonic FM receiver.

UNIT IV

Phase Modulation: Principles, comparison between FM and PM, Pulse Modulation: Types, sampling theorem, PAM, PWM and PPM, PCM transmitter, receiver quantizing noise & companding.

UNIT V

Antenna: Basic antenna action, antenna direct gain, Radiation resistance, bandwidth, beam width and polarization, types of Antenna: Yagi-Uda, Parabolic, Turnstile, Loop, Ferrite rod, Dish, Rhombic, Log periodic, Horn Antenna etc, broad side and end fire antenna array.

MEASUREMENTS & MEASURING INSTRUMENTS

DEE-305

UNIT 1

Introduction to Measuring Instruments

Important terms (Accuracy, precision, sensitivity and resolution), Errors, Classification of instruments, Essentials of indicating instruments (Deflecting, Controlling and Damping systems)

UNIT 2

Measurement of Voltage and Current

Construction and working of PMMC Instruments, Construction and working of Moving Iron Instruments & Rectifier Instruments.

UNIT 3

Measurement of Power and Energy

Construction and working of Electrodynamometer type wattmeter, Construction and working of Energy meter, Errors adjustments of wattmeter and energy meter.

UNIT 4

Measurement of Resistance

Measurement of Low Resistance, Measurement of Medium Resistance, Measurement of High Resistance, Ohmmeter.

UNIT 5

Bridges

A.C Bridges, Calibration of instruments using DC Potentiometer and Extension of range of Instruments.

ELECTRONIC DEVICES AND CIRCUITS-I LAB
DEL-311

List of Experiments:

1. To draw V-I characteristics of p-n junction diode and calculate static and dynamic resistances in forward and reverse bias conditions.
2. To draw V-I characteristics of zener diode and calculate static and dynamic resistances in forward and reverse bias conditions.
3. To draw V-I characteristics of light emitting diode and calculate static and dynamic resistances in forward and reverse bias conditions.
4. To calculate ripple factor of half wave rectifier without and with filters.
5. To calculate ripple factor of centre-tap full wave rectifier without and with filters.
6. To calculate ripple factor of bridge-type full wave rectifier without and with filters.
7. To draw input characteristics for common base transistor and calculate input static and dynamic resistances.
8. To draw output characteristics for common base transistor and calculate output static and dynamic resistances.
9. To draw input characteristics for common emitter transistor and calculate input static and dynamic resistances.
10. To draw output characteristics for common emitter transistor and calculate output static and dynamic resistances.

DATA COMMUNICATION & NETWORKING LAB

DEL-312

List of Experiments:

1. To make RJ45 connection for unshielded twisted pair (UTP) cable (category 6).
2. To study PC to PC communication using Ethernet crossover cable.
3. To study different types of transmission media.
4. To design and verify the operation of C (4, 3) simple parity check code for error detector circuit.
5. To study OSI and TCP/IP model.
6. To study and Simulate Star topology network using NetEmul software.
7. To study PC to PC Communication using Serial Port (RS-232).
8. To study Fiber Optics Communication using Data communication Trainer kit.
9. To study Wireless Communication Data communication Trainer kit.
10. To study Modem Communication using Data communication Trainer kit.

DIGITAL SYSTEM DESIGN LAB
DEL-313

List of Experiments:

1. To simplify the logic expression using DeMorgan's Theorem and verify with logic gates.
 - a) $Y = \overline{A + BC}$
 - b) $Y = \overline{A(B + C)}$

2. To simplify Boolean function expression using K-map and verify with logic gates.
 - a) $Y = ABC\bar{C} + A\bar{B}C + \bar{A}BC + ABC$
 - b) $Y = B\bar{C} + A\bar{B}C$

3. To study 4-bit full adder for binary addition and verify the truth table.

4. To study Digital Comparator and verify the truth table.

5. To study BCD to Seven Segment decoder /driver and display Decimal Digits 0-9 using BCD to Seven Segment decoder /Driver.

6. To verify Binary to Gray code conversion.
To obtain Gray Code using EX-OR Gate.

7. To study and verify the truth table of Multiplexer (4x1) MUX.

8. To Study the Arithmetic Logic Unit (ALU) using IC 74181 and perform the following operations.
 - a) Logic Operation
 - b) Arithmetic Operation
 - c) Comparison of Binary Numbers

**MEASUREMENTS & MEASURING INSTRUMENTS LAB
DEE-305**

List of Experiments:

1. To calibrate single phase Energy meter.
2. To measure unknown inductance of a coil using Maxwell's Bridge.
3. To measure the frequency using Wien's Bridge.
4. To measure inductance using Anderson's bridge
5. To measure inductance using Hay's bridge.
6. To measure low resistance using Kelvin's bridge.
7. To measure unknown resistance with the help of Whetstone's Bridge.
8. To measure voltage and current using Instrument Transformers.

COMMUNICATION SKILLS-II
DELS-401

UNIT	Topic	Marks
I	Reading <i>a. Comprehension (Advanced)</i>	10
II	Grammar <i>a. Direct & Indirect</i>	5
III	Writing <i>a. Dialogue</i> <i>b. Paragraph</i>	15
IV	Speaking - I <i>a. Presentation Skills</i>	15
V	Speaking - II <i>a. Interview</i>	15

INDUSTRIAL ELECTRONICS

DEL-402

Unit 1:

Solid State Devices

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 2:

Introduction to Converters

Principle of operation of basic inverter circuits, Basic series and parallel commutated inverters (No Analysis), Principles of operation of cyclo converter, choppers and dual converter and their applications, Principles and applications of induction and dielectric heating (no mathematical analysis).

Unit 3:

Introduction to Inverters

Single phase inverters using thyristors with R, RL loads and Output voltage control in inverter, Methods of obtaining sine wave output from an Inverter Typical inverter circuit, three phase inverter circuit and Inverter characteristics through pass inverter circuit, Applications of inverters, DC transmission: Block diagram, Parallel inverter using MOSFET & IGBT's, Advantages.

Unit 4:

Introduction to PLC

Introduction to PLC - Relays - Parts of PLC - Processor - Memory - Input and Output modules - Digital and Analog I/O's - Communication with PLC Logic functions (OR, AND, NAND & EX-OR) - Ladder programming Bit instruction - Timer / counter - "Program control instruction - Data handling instruction math instruction - Simple ladder diagrams for DOL, Star-Delta starter.

Unit 5:

Operational Amplifier and its Applications

Concept of ideal operational amplifier, ideal and practical op-amp parameters, pin configuration of IC LM741, operational amplifier as: inverting amplifier, sign changer, non-inverting amplifier, voltage follower, summing amplifier, adder, difference amplifier, subtractor, integrator, differentiator, logarithmic and antilogarithmic amplifier, comparator and square waveform generator.

MICROPROCESSORS AND APPLICATIONS

DEL-403

UNIT I THE 8085 PROCESSOR

Evolution of Microprocessors, 8085 architecture, PIN diagram of 8085, Addressing modes, Instruction set, Assembly language programming, Interrupts and interrupt service routines, types of registers, Flag registers, general purpose registers.

UNIT II 8085 SYSTEM DESIGN

Instruction set of 8085, format of instruction, single, double and three byte instructions, 8085 Signal Descriptions, Basic configurations, System bus timing, System design using 8085, Minimum mode /Maximum modes 8085 system and timings.

UNIT III ASSEMBLY LANGUAGE PROGRAMMING

Memory Interfacing and I/O interfacing, Parallel communication interface, Serial communication interface, Timer, Keyboard /display controller, Interrupt Controller, DMA controller, Programming and applications.

UNIT IV

INTRODUCTION to 8086

Block diagram, Architecture, BIU, registers, data and addressing bus, Addressing modes, Brief introduction to other advance microprocessors.

UNIT V ADVANCED PROCESSORS

Intel 80286, Internal Architectural, Register Organization, Internal Block Diagram, Modes of operation, Real Address Mode, Protected Virtual Address Mode, Privilege, Protection, Architectural features and Register Organization of i386, i486 and Pentium processors.

ELECTRONIC DEVICES AND CIRCUITS-II

DEL-404

UNIT - I

Single Stage Small Signal Amplifier

Single stage transistor amplifier with proper biasing components, Explanation of phase reversal of the output voltage with respect to input voltage, AC and DC load lines, Concept of power gain as a product of voltage gain and current gain, Development of transistor hybrid low frequency model in CE configuration. Complete analysis of the transistor using approximate and exact hybrid equivalent circuit in CE configuration. Loading effects of R_s and R_L

UNIT - II

Multistage Transistor Amplifier

Need of multi-stage amplifier. Gain of multistage amplifiers. Different coupling schemes used in amplifiers, Decibels and its significance. RC coupled multistage amplifier, its working, advantages, disadvantages, applications, and Frequency response. Transformer coupled amplifier, its working, advantages, disadvantages, applications, and frequency response. Direct coupled amplifier, its working, advantages, disadvantages, applications and frequency response, Darlington amplifier, Difference amplifier, typical circuit diagram, construction and its working.

UNIT-III

Transistor Audio Power Amplifier

Need for power amplifier, Difference between voltage and power amplifier, Performance parameters, Classification of power amplifiers (class A, B, AB & C). Single ended class A power amplifier, Importance of impedance matching. Characteristics of class A power amplifier, Collector efficiency and overall efficiency, Class B power amplifier, characteristics, collector efficiency and overall efficiency, Maximum power dissipation curve and its significance, derating factor. Heat sinks, its importance, Distortion in amplifiers.

UNIT-IV

Transistor Audio Power Amplifier and Tuned Voltage Amplifier

Working of principle of push-pull amplifier circuits, its advantage over single-ended power amplifier, Construction and working of class A and class B push-pull amplifier Cross-over distortion in class B operation and its reduction, Working principle of complementary symmetry push-pull amplifier circuits and its advantages, Transformer-less class B push-pull amplifier and their typical applications and numerical examples.

Introduction to tuned voltage amplifier, classification of amplifiers on the basis of frequency, expression for resonant frequency and impedance at resonance, relationship between resonant frequency, Q and band-width. Single tuned and double tuned amplifiers, their working principles, and frequency response and limitations and remedy.

UNIT-V

Feedback Amplifiers

Feedback concept and principle, type of feedbacks, Derivation of expression for the gain of an amplifier employing feedback, Effect of negative feedback on gain, stability, distortion and band-width, Typical practical feedback circuits. RC coupled amplifier circuit with emitter bypass capacitor removed, Emitter follower and its application, simple mathematical analysis for voltage gain and input impedance of above circuits and numerical examples.

COMPUTER APPLICATIONS

DCA-405

UNIT-I

Digital Computer systems, Characteristics, History, Computer Generations, Types of computers & their classifications, application of Computer in various fields, Computer Hardware & Software, Elements of computer hardware-CPU, I/O devices, storage media, Computer Software-Types of Software, System Software, Application Software.

UNIT-II

Basic concept & functions of an operating system, textual Vs GUI Interface, type of Operating Systems, concept of multiprogramming, multitasking, multiprocessing, Introduction to disk operating system (DOS), Commands and utilities, working with MS Windows, Unix and Linux, Working knowledge of PC Software Word Processor.

UNIT-III

Computer Languages, Generation of Languages, Translators- Assemblers, Interpreters, Compilers, Algorithm, Pseudo-code, Flowcharts- rules & symbols, Structured Programming concepts, various techniques of programming, Use of programming.

UNIT-IV

Introduction to C, importance of C, basic structure of a C program, constants, variables and data types, operators and expressions, managing I/O operators, Control Statement: if statement and its various forms, goto statement, for, while and do-while loops, switch decision making statement, Arrays: Array notation, storage and representation, Functions: user defined functions and their use.

Text Books:

1. Fundamentals of Computers & Programming with C by A.K. Sharma- Dhanpat Rai Publications.

Reference Books:

1. Computing Fundamentals and C Programming by E Balagurusamy-Mc Graw Hill Education.
2. Programming in ANSI C by E Balagurusamy-Mc Graw Hill Education.

**INDUSTRIAL ELECTRONICS LAB
DEL-412**

List of Experiments:

1. To design and realize Inverting Amplifier using 741 Op-amp IC.
2. To design and realize Non-Inverting Amplifier using 741 Op-amp IC.
3. To design and verify operation of op-amp as an Integrator.
4. To design and verify operation of op-amp as a Differentiator.
5. To design and verify operation of op-amp as a Comparator.
6. To design Square Wave Generator circuit using Comparator.
7. To design Triangular Wave Generator using op-amp.
8. To study and plot V-I characteristics of Silicon Controlled Rectifier.

MICROPROCESSORS AND APPLICATIONS DEL-413

List of Experiments:

1. To add two 8-bit numbers in which the sum should be in 8-bit.
2. To add two 8-bit numbers in which the sum should be with carry.
3. To add two 16-bit numbers in which the sum should be in 16-bit.
4. To subtract two 8-bit numbers in which the difference should be in 8-bit.
5. To write a program for finding the 2's complement of a 16-bit number.
6. To subtract 8-digit decimal numbers.
7. To find the larger of two numbers.
8. To find the smaller of two numbers.
9. To write a program for finding the largest number from the series of numbers.
10. To find larger numbers in a data array.

**ELECTRONIC DEVICES AND CIRCUITS-II LAB
DEL-414**

List of Experiments:

1. Measurement of Voltage & Frequency with C.R.O.
2. Study of Single Stage Transistor Amplifier.
3. Study of Multistage RC Coupled Transistor Amplifier.
4. Study of Transformer Coupled Amplifier.
5. Study of Single Ended Class A Power Amplifier.
6. Study of Push Pull Amplifier.
7. Study of the Negative Feedback Amplifiers.
 - a) Series Current Feedback Amplifier
 - b) Series Voltage Feedback Amplifier
 - c) Shunt Current Feedback Amplifier
 - d) Shunt Voltage Feedback Amplifier
8. Study of the Tuned Amplifier.

COMPUTER APPLICATIONS LAB

DCA-415

List of Experiments:

1. Given a PC, name its various components and list their functions.

2. Features of Windows Operating System:

- a. Start
- b. Shutdown and restore
- c. Creating and operating on the icons
- d. Opening, closing and sizing the windows
- e. Creating, saving, modifying, renaming, finding and deleting a file
- f. Creating and operating on a folder
- g. Changing setting like-date, time
- h. Using shortcuts
- i. Windows system Tools
- j. Control Panel

3. MS-WORD

- a. File Management: Opening, creating and saving a document, files, copying contents in some different file(s).
- b. Page Setup: Setting margins, tab setting, ruler, indenting.
- c. Editing a Document: Entering text, cut, copy and paste using toolbars.
- d. Formatting A Document: Using different fonts, changing font size and color, changing the appearance through bold/italic/underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods.
- e. Aligning of text in a document justification of document, inserting bullets and numbering.
- f. Use of headers, footers: inserting foot note, endnote, use of comments.
- g. Inserting date, time, special symbols, importing graphic images, drawing tools.
- h. Tables and border: Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table.
- i. Print preview, zoom, page setup, printing options.
- j. Using tools like: Spellchecker, help, use of macros, mail-merge, thesaurus word content and statistics, printing envelops and labels.

4. MS-EXCEL

- a. Starting excel, open worksheet, enter and edit data, formulas to calculate values, format data, create chart, printing chart, save worksheet.
- b. Menu Commands: Create, format charts, organize, manage data, solving problem by analysing data.

- c. Editing a worksheet, copying, moving cells, pasting inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet.
- d. Creating a Chart: Working with chart types, changing data in chart, formatting a chart, use chart to analyse data.
- e. Using a list to organize data, sorting and filtering data in list.

5. MS-POWER POINT

- a. Preparing Presentation: Creating a new slide, sorting slides, inserting pictures, setting header and footer.
- b. Formatting: Setting fonts, alignments, slide design, slide layout.
- c. Slide Show: View show, Rehearse timing, action buttons, slide transition, animation skills.

6. PROGRAMMING IN C

- a. Write a program in Con defining variables and assigning values to variables.
- b. Write a program in Con formatting input/output using printf and scanf.
- c. Write a program in Con arithmetical, relational and logical operators.
- d. Write a program in Con if-else statement.
- e. Write a program in Con do-while statement/loop.
- f. Write a program in Con for statement/loop.
- g. Write a program in Con switch statement.
- h. Write a program in Con 1 dimensional array.
- i. Write a program in C on 2 dimensional arrays.
- j. Write a program in C on strings.
- k. Write a program in Con functions.

ELECTRONIC DEVICES AND CIRCUITS-III

DEL-501

Unit-I

Field Effect Transistor

Construction, operation, characteristics, and parameters of junction FET, Construction, operation, characteristics and parameters of MOSFET in both depletion and enhancement modes, Comparison of JFET, and MOSFET, Simple FET Amplifier circuit and its working principles.

Unit-II

Sinusoidal Oscillators

Use of positive feedback for generation of oscillations, Barkhausen criterion for oscillations, Application of oscillators, Construction, principle of operation and working of Tuned Collector, Hartley, Colpitt's, Phase shift, Wein-bridge and crystal oscillators.

Unit-III

Multivibrators Using BJTs

Transistor as a switch, Explanation using CE output characteristics. Calculation of component values for a practical transistor switch. Transistor switching times, use of speed up capacitor (Physical explanation only) Construction and operation, using wave shapes of collector coupled Bistable, Monostable and Astable Multivibrator circuits, Expression for time period (No mathematical derivation), Triggering techniques for bi-stable Multivibrator (Symmetrical and Un-symmetrical triggering), Operation of Schmitt trigger, Calculation of upper trigger potential (UTP) and lower trigger potential (LTP), Transistorized voltage oscillator (Basic Principle only) & applications.

Unit-IV

Opto-Electronics

Working principle and characteristic of Photo resistors, Photo diode, and Phototransistors Photovoltaic cells, LCDs and Opto- Couplers, Seven-Segment Displays and simple applications

Unit-V

IC Fabrication and Development

Importance of ICs in modern electronics, classification of ICs, Some examples of ICs and their functions/applications, Fabrication of transistor by planner process: Typical fabrication processes for ICs (Brief explanation), Difference between SSI, MSI, LSI, VLSI. Mention of different IC packages, Brief introduction to different IC technologies and their comparison. Block diagram of IC timer (555) and its working. Use of 555 timer as Monostable and Astable Multivibrator.

MICROWAVE AND RADAR

DEL-502

Unit 1

Introduction to Microwaves

Introduction to microwaves and its applications, Classification on the basis of its frequency bands (HF, UHF, VHF, L, S, C, Ka and Ku), Basic concepts of thermionic emission and vacuum tubes, Effects of inter electrode emission and transit time on the high frequency .Performance of conventional vacuum tubes and their steps to extend their high frequency.

Unit 2

Waveguides & Components

Introduction to waveguides, Types of waveguides, TE & TM modes in rectangular waveguide (without derivation), Method of excitation of waveguide, Waveguide passive components such as Waveguide Cavity Resonators, Magic Tees, Directional Couplers, Circulators and Isolators.

Unit 3

Microwave Operations Devices

Constructional features, characteristics and operating principle and typical applications of the following multi cavity klystron, Reflex klystron, multi cavity magnetron, travelling wave tube, Gun diode and impatt diode.

Unit 4
Microwave Antenna: Structure, characteristics types and application of Horn and Dish antenna.
Microwave Measurement: Techniques to measure VSWR, Q and other quantities.

Unit 5

Radar Systems

Introduction, its application, Radar range equation, Block diagram and basic principle of basic pulse Radar, Block diagram and operating principle of CW (Doppler), Block diagram and operating principle of MTI radar.

TELEVISION ENGINEERING

DEL-503

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, Indian TV standards, Explanation of standard TV Test pattern.

Unit-III

TV Transmitter: Block diagram and explanation of a TV transmitter, Need for 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

Basic Principles of Video recording and reproduction, 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: Brief idea of HDTV, LED, LCD and Plasma.

COMPUTER SYSTEM ARCHITECTURE

DEL-504

Unit I: Register Transfer and Microoperations

Register Transfer language, Register Transfer, Bus and Memory Transfers: Three-State Bus Buffers, Memory Transfer, Arithmetic Microoperations: Binary Adder Binary Adder-Subtractor, Binary Incrementer, Arithmetic Circuit.

Unit II: Logic Microoperations

Logic Microoperations: List of Logic Microoperations, Hardware Implementation, Some Applications, Shift Microoperations: Hardware Implementation, Arithmetic Logic Shift Unit.

Unit III: Basic Computer Organization and Design

Instruction Codes: Stored Program Organization, Indirect Address, Computer Registers: Common Bus System, Computer Instructions: Instruction Set Completeness, Timing and Control, Instruction Cycle: Fetch and Decode, Determine the Type of Instruction, Register-Reference Instructions.

Unit IV: Memory Organization

Memory Hierarchy, Types of Main Memory, Types of Auxiliary Memor, Associative Memory, Cache Memory and Virtual memory.

Unit V: Input- Output Organization

Input-Output Interface: I/O versus Memory Bus, Isolated versus Memory-Mapped I/O, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP).

Text Books:

1. Mano, Morris- Computer system Architecture-Pearson publication, Latest Edition
2. Ghoshal, Subrata-Computer Architecture and Organization-Pearson publication, Latest Edition

Reference Books:

3. Behrooz ,P - Computer Architecture - Oxford publication, Latest Edition

INDUSTRIAL MANAGEMENT

DME-506

UNIT-I

Management, Industrial Management, Different functions of Management, Planning, Organizing, Co-ordination, Controlling, Structure of an Industrial Organization, Functions of different departments, Human relations and performance in organizations.

UNIT-II

Trade Union, Grievances, Handling of grievances, Agitations, Lockouts. Labour welfare, Workers participation in management, Labour laws and disputes, Wages, types of wages, wage & incentive plants .Factory act 1948, Payment of wages act 1936. Industrial dispute act 1947.

UNIT- III

Business ethics, Managerial ethics, Codes of ethics. Causes of accidents, Safety consciousness, Safety measures, Factors causing pollution, Effect of pollution on human health. Noise pollution.

UNIT-IV

Entrepreneurship Development, Entrepreneur, Modern concept of entrepreneur, Entrepreneurship, Qualities to become entrepreneur, Classifications of Entrepreneurs, EDP training, Small scale industry, Characteristics of small scale industries, Classifications of small scale industries. Project report guidelines, Content of project report, Project appraisal, Market survey, Preparation of project report and Role of financial institutions.

UNIT-V

Types of Production, Job, Batch, Mass production, Concept of Total Quality Management, six Sigma concept Just in Time (JIT), ISO-9000 and ISO-14000 series, Concept of intellectual property right and patents. Breakeven analysis, Marketing management, Price Analysis, Determination of Economic order Quantity.

**ELECTRONIC DEVICES AND CIRCUITS-III LAB
DEL-511**

List of Experiments:

1. To draw the drain and transfer characteristics of n-channel JFET.
2. To draw the drain and transfer characteristics of n-channel D type MOSFET.
3. To draw the drain and transfer characteristics of n-channel E type MOSFET.
4. To measure the frequency of oscillations for different values of R and C in Phase Shift Oscillator.
5. To tabulate the frequency of oscillations for different positions of variable capacitance in Hartley Oscillator.
6. To tabulate the frequency of oscillation at different positions of capacitor in Colpitt Oscillator.
7. To determine the frequency of an Astable Multivibrator using IC555 timer.
8. To determine the frequency of a Monostable Multivibrator using IC555 timer.

MICROWAVE AND RADAR LAB DEL-512

List of Experiments:

1. To study and identify various Microwave Components and set-up Microwave test bench.
2. Study of following Microwave Instruments:
 - i. Klystron Power Supply.
 - ii. Gun Power Supply
 - iii. SWR Meter
3. To plot characteristics of Reflex Klystron Tube and determine its electronic tuning range.
4. To study and plot V-I characteristics of Gunn Diode.
5. To determine output power and frequency of Gunn Diode as a function of bias voltage.
6. To study and verify the operation of Magic Tee.
7. To study and plot radiation pattern of following antennas:
 - i. Horn Antenna
 - ii. Dish Antenna
 - iii. Dielectric Antenna
8. To study the Voice Communication by using Microwave test bench.
9. To setup a Voice Communication link using wireless Microwave test bench and study effect of variable attenuator and radiation pattern on voice communication.
10. To determine frequency of given tube by slotted line method and wavemeter method and calculate error.

TELEVISION ENGINEERING LAB
DEL-513

List of Experiments:

1. To study and observe an AM wave on CRO produced by a standard signal generator using internal and external modulation.
2. To measure the depth of modulation (m) of DSB-FC AM wave.
3. To study the detection characteristics of an envelope detector circuit and demodulate a DSB-FC AM wave.
4. To study and generate a frequency modulated (FM) Signal.
5. To study FM detection using slope detector and Ratio detector method and generate a FM demodulated wave.
6. To set up a fiber optic Analog link using 650 nm optic fiber link.
7. Study of Voice Communication through fiber optic cable.
8. To setup a fiber optic digital link using 650 nm optic fiber link.
9. Measurement of propagation loss, alternation loss and Bending loss in optical fiber cable.

ELECTRONICS WORKSHOP LAB
LAB DEL-517

LIST OF EXPERIMENTS:

1. Testing value of Resistors using Colour Code and Multimeter.
2. Testing value of Capacitors and also determine capacitance value in series and parallel combination.
3. Testing value of Inductor and also determine inductance value in series and parallel combination.
4. Testing of Diodes: pn junction diode, Zener diode , LED.
5. Testing of Bipolar Junction Transistor (BJT)
6. Testing of FET and MOSFET.
7. Testing of photo diode and photo transistor.
8. Testing of Digital IC.
9. Study soldering and De-soldering process of basic components.
10. Assembling of basic components on bread-board to implement a circuit.

**ADVANCE COMMUNICATION SYSTEMS
DEL-601**

UNIT-1

Digital Communication: Fundamental block diagram and basic elements of digital communication system .Advantages/Disadvantage of digital comm. Characteristics of data transmission circuits, Bandwidth requirement-speed-baud rate-noise distortion-equalizers-echo compressor etc.
Digital modulation techniques: ASK modulation/demodulation, FSK modulation/Demodulation, PSK modulation/demodulation, QAM: only block diagram and operation.

UNIT-2

Optical Communication: Introduction of optical fiber, Bandwidth offered, Light propagation in fiber, Losses in fiber optic communication link and its block diagram, Comparison of optical fiber system with other system.

UNIT-3

Satellite Communication: Introduction, Kepler's law, orbits. Types of satellite: LEO, MEO and GEO satellites, Advantages a apogee-perigee-Active and passive satellite uplink-down link, Transponders and their types, Satellite sub systems satellite communication Satellite services-INTEL SAT-GPS-MSAT.

UNIT-4

Cellular Communication: Cellular Telephone-evolution, fundamental concepts, simplified cellular Telephone system, frequency reuse, interference-co channel interference Adjacent channel interference-Improving coverage and capacity in cellular system s-Roaming and handoff, multiple access techniques: TDMA FDMA & CDMA, Digital cellular system-GSM and GSM services.

UNIT-5

Telephony and Fax: Switching techniques, Exchanges, Telephone instrument, Facsimile transmission.

ELECTRONICS CIRCUIT DESIGN

DEL-602

Unit-I

Design of Meters

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

Unit-II

Design of Rectifiers

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 and simple design of transistorized series and shunt regulator.

Unit-III

Design of Amplifiers

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

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

Unit-V

Design of Multivibrators and Schmitt Triggers

Design of Multivibrators and Schmitt Triggers using Op-amp IC, Op-amp as comparators, Design of Schmitt triggers.

MICROCONTROLLERS & EMBEDDED SYSTEMS

DEL-603

UNIT-I

ARCHITECTURE of 8051

Block diagram of Microcontroller - Comparison with Microprocessor and Microcontroller, Pin details of 805, ALU, Special function registers, ROM, RAM, RAM Memory Map (Including registers and register banks).

UNIT-II

INSTRUCTION SET

Program Counter, PSW register, Stack, I/O Ports, Timer Interrupt, Serial Port, External memory, Clock, Reset, Clock Cycles Machine Cycle', Instruction cycle, Instruction fetching and execution -Overview of 8051 family.

UNIT-III

EMBEDDED SYSTEM

Assembling and running an 8051 program, Instruction set of 8051, Data transfer instructions Different addressing modes - Arithmetic Instructions, Signed number concepts and arithmetic operations, Logic and Compare instructions, Rotate instruction and data serialization, BCD, ASCII, Loop and jump instructions, Call instructions, Time delay routines, Program control, Assembler directives, Sample programs.

UNIT-IV

INTERRUPTS

Interrupt handling & programming: concept of synchronous & asynchronous interrupts, ISR, programming external hardware ' interrupt & Timer interrupt, Timer Mode 1 and Mode 2.

UNIT-V

DEVICE DRIVER & INTERFACING APPLICATIONS

Concept of Device Driver, Interfacing of seven segment display & LCD display Interfacing diagram & pin out of LCD, Interfacing of Key board, ADC & DAC- interfacing diagram & programming, Interfacing of stepper motor- interfacing diagram, & programming.

CONSUMER ELECTRONICS DEL-604

UNIT 1

Audio System:

Microphones and their types carbon, moving coil, velocity, crystal, condenser, cordless etc.

Loud speaker: Direct radiating, horn LS, tweeter, woofer, mull speaker system, baffles and enclosures.

UNIT-2

Sound Recording:

Magnetic recording, its principle, block diagram and tape transport mechanism.

Digital sound recording on tape and disc CD system.

UNIT-3

Cable Television:

Block diagram and principles of working of cable TV and DTH, Cable TV using Internet

UNIT-4

VCR, VCD and DVD:

Principle of video recording and magnetic tapes, Block diagram of VCR VHS tape transport mechanism.

UNIT-5

Consumer Electronics Devices: Basic block diagram working principles and Application of the following:

- Calculator
- Digital watch/clock
- Microwave oven
- Washing machine
- Photocopier machine
- Electronic ignition system for automobiles.
- Cordless Telephone

Text Books:

1. Consumer Electronics a fundamental approach by J. Malhotra, 2nd Edition Satya Prakashan, New Delhi.
2. Consumer Electronics by Dr. B.R. Gupta, V. Singhal, S.K. Kataria & Sons.

Reference Book:

3. Audio and Video system óPrincipal, maintenance and troubleshooting by R.G Gupta.
Edition, Mc Gra Hill Education (p) Ltd.

VLSI DESIGN

DEL-605

UNIT-I

Introduction

Classification of IC Technology- SSI, MSI, LSI, VLSI, ULSI, MOSFET's current equation in Linear & Saturation Mode Threshold voltage- Definition, Derivation of Threshold voltage (Numericals) Body effect & effect of body effect on Threshold voltage. Short channel effect a) Channel length modulation b) Hot electron effect c) Mobility variation effect.

UNIT-II

VLSI Concepts

Resistance & capacitance estimation of MOSFET, C- V (capacitance-voltage) characteristics of MOS capacitor, Principle of MOS scaling, types of scaling, functional limitation of scaling.

UNIT-III

Wafer Processing with C-Z Method

Definition & Application of Mask generation, Oxidation, Diffusion, Ion Implantation, Metallization, Photolithography in MOSFET, Basic process steps of n-MOS, Basic process steps of CMOS (n Well, p Well & Twin Tube), Latch up in CMOS and its prevention.

UNIT-IV

MOS Inverters

Aspect ratio and Inverter ratio, n-MOS inverter with resistive load, n-MOS inverter with EMD load, n-MOS inverter with DMD load, CMOS inverter., Logic Gates using n-MOS & CMOS.(Only circuit diagram & operation), Realization of any Boolean equation using n-MOS & CMOS.

Unit-V

Hardware Description Language (HDL)

Features of Verilog-Entity, Architecture, Configuration, Package, Bus, Driver, Attributes Process, Behavioral Modeling, Sequential Processing, Data Types and Configurations.