

# SYLLABUS

## DIPLOMA IN ELECTRONICS ENGINEERING (DAY COURSES)

w.e.f. 2012 & Updated on 2017



**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
<b>Total</b>			<b>28</b>	<b>320</b>	<b>380</b>	<b>700</b>	<b>29</b>

**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
<b>Total</b>			<b>28</b>	<b>320</b>	<b>380</b>	<b>700</b>	<b>29</b>

**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
<b>Total</b>			<b>28</b>	<b>320</b>	<b>380</b>	<b>700</b>	<b>28</b>

**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
<b>Grand Total</b>			<b>28</b>	<b>320</b>	<b>380</b>	<b>700</b>	<b>28</b>

**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
<b>Grand Total</b>			<b>28</b>	<b>315</b>	<b>360</b>	<b>700</b>	<b>28</b>

**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	--
<b>Grand Total</b>			<b>34</b>	<b>430</b>	<b>420</b>	<b>850</b>	<b>30</b>

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

**COMMUNICATION SKILLS-I  
DELS-101**

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

# APPLIED PHYSICS

## DELP-102

### Unit I: Electrostatics

Coulomb's Law, Electric Field, Electric Potential Due to a Point Charge and Numbers 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: Serial and Parallel, Charging and Discharging of a Capacitor, Insulating Materials, Dielectric Materials: Polarization, Polarizability, Dielectric Strength and Power Losses.

### Unit II: Current Electricity

Concept of Current, Resistance, Factors affecting the value of Resistance, Specific Resistance, Equivalent Resistance: Serial and Parallel Combination, Kirchoff's Laws and its Applications, Wheat Stone's Bridge, Meter Bridge, P.O. Box, Potentiometer and its Applications, Heating Effect of Current, Joule's Law of Heating, The Expression for the Amount of Heat Generated in the Conductor, Joule's Calorimeter, Determination of 'J' by Electrical Method, Expression for Electric Power, Relation Between kWh and joule. Expression for Energy Consumed in kWh.

### Unit III: Magnetism

Magnetic Effect of Current, Biot-Savart Law and its Applications: Magnetic Field Intensity at the Centre of a Current Carrying Circular Loop, Magnetic Field Strength at the Axis of a Circular Coil and at a Point Due to a Current Carrying Infinity Long Conductor, Force on a Moving Charge in a Uniform Magnetic Field, Force on a Current Carrying Conductor in a Uniform Magnetic field. Magnetization, Permeability and Susceptibility, Types of Magnetic Materials: Paramagnetic, Diamagnetic, Ferrimagnetic and Ferromagnetic Materials, B-H Curve, Hysteresis Loop, Magnetic Domain, Magneto static and Magnetostrictive Energy, Soft and Hard Magnetic Materials, Iron-Nickel Alloy, CRGO, Alnico and Ferrites.

### Unit IV: Optics

Refraction of Light, Laws of Refraction, Refractive Index of Medium, Concept of Apparent Depth, Total Internal Reflection, Application of Total Internal Reflection, Refraction through Prism, Lens Formula, Principle of Working and Magnifying Power of Telescopes, Simple and Compound Microscopes. Huygens's Principle, Reflection and Refraction of Wave at Plane Surface, Dispersion, Dispersive Power, Chromatic Aberration, Interference of Light and Diffraction of Light.

### Unit V: Semiconductor Physics

Energy Band Diagrams of Conductors, Insulators and Semiconductors, Intrinsic Semiconductors: Atomic and Crystalline Structure of Silicon and Germanium and their Conductivity, Effect of Temperature on the Conductivity of Intrinsic Semiconductors, Doping, Extrinsic Semiconductors, Types of Extrinsic Semiconductors, Crystalline Structure and Schematic Block Diagrams of P type and N type Semiconductors, Effect of Doping on the Conductivity of Extrinsic Semiconductors, Majority and Minority Charge Carriers, Drift and Diffusion Current.

# **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, Co-valent 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. Water Chemistry: Hardness & Units of Hardness, Estimation of Dissolved Oxygen, Alkalinity and Hardness.

### **Unit III: Electrochemistry**

Metallic and Electrolytic Conductivity, Arrhenius' 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: Electroplating, Electrorefining, 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.

# **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 (upto 3<sup>rd</sup> 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.

## **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-I

**Number Systems:** Binary number system, Binary to decimal conversion and decimal to binary conversion, Octal and hexadecimal number systems, Negative numbers: signed magnitude representation, 1's complement and 2's complement representation.

**Binary Codes:** BCD code, Grey code and Excess-3code.

### Unit-II

**Logic Gates:** Symbols and truth tables 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 applications, De-Morgan's theorem, Logic expressions: SOP, POS and canonical form, Minimization of logic expressions by using Boolean laws, theorems and K-map.

### Unit-III

**Combinational Circuits:** Half and full adder, Half and full subtractor, Multiplexer and demultiplexer, Encoder and decoder, Parity bit generator.

**Flip Flops:** Difference between combinational and sequential circuits, working and application of RS & JK Flip Flop, Master Slave JK Flip flop, D-type and T-type flip flop.

### Unit-IV

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

**Counters:** Counters, Asynchronous Counters: Four stages binary ripple counter, Decade counter, Up and down counter, 4-bit synchronous counter with series carry, up down synchronous counter with parallel carry, Applications of counters.

### Unit-V

**Logic Families:** Introduction to logic families.

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

A/D and D/A converters.

# 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 temp., humidity etc. Window air conditioner and desert cooler.

## **ELECTRICAL ENGINEERING-II**

### **DEE-205**

#### **Unit-I**

##### **DC GENERATOR**

Construction, armature resistance working principle e.m.f. 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  $\Pi$  structures and their equivalence, Image, iterative & characteristics impedances, propagation constant and Ladder and lattice network.

### Unit-III

**Attenuators:** Symmetrical T and  $\Pi$  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).

# ENGINEERING DRAWING-I

## DME-216

### Unit-I Introduction:

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

b. **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, cycloid epicycloid hypocycloid and involute .



# **ELECTRONIC DEVICES AND CIRCUITS-I**

## **DEL-301**

### **UNIT I**

#### **PN Junction Diode**

Unbiased PN Junction, mechanism of current flow, depletion layer, potential barrier. Behaviour of P-N junction under forward and reverse bias, Reverse saturation current, surface leakage current, Concept of junction capacitance in forward and reverse bias condition, effect of temperature on the characteristics, ideal characteristic, 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 (Boltzmann's' equation), Diode ratings and specification, Numerical examples.

### **Unit II**

#### **Rectifier and Filter Circuits**

Rectification, diode as half wave rectifier, full-wave centre tapped and bridge rectifier: construction, operation, output frequency and peak inverse voltage, average value and rms value of output voltage and load current, ripple factor, rectification efficiency, Numerical Examples. Filtration, shunt capacitor filter, series inductor filter, choke input LC filter, pie filter and bleeder resistor, Physical explanation of working of the filters, expression of ripple factor in each case and their application.

### **Unit III**

#### **Special Diodes and Applications**

Breakdown diode-Zener and avalanche breakdown mechanism, Zener diode - construction, operation, V-I characteristics and its ratings – Zener voltage, Zener resistance, maximum power dissipation, minimum Zener current and maximum Zener current, Application of Zener diode in voltage regulator circuit, brief description with V-I characteristics and applications of tunnel diode, varactor diode, point contact diode, schottky diode, light emitting diode and laser diode.

### **UNIT IV**

#### **Physics of Bipolar Junction Transistor**

Concept of bipolar junction transistor as a two junction three terminal device having two kinds of current carriers, PNP and NPN transistors, their symbols and mechanism of current flow, Working of the transistor, concept of leakage current and effect of temperature on it. CB, CE, and CC configurations, their current relations, input and output characteristics, Determination of input, output dynamic resistances and current amplification factor from the characteristics, Comparison of the three configurations with regards to input, output resistances, current gain, voltage gain, and leakage currents, Preference of CE configuration over other configurations for low frequency voltage amplification, Transistor as an amplifier in CE configuration, Concept of power gain as a product of voltage gain and current gain.

### **UNIT V**

#### **Transistor Biasing and Stabilization of Operating Point**

Transistor biasing, Effect of fixing operating point in cut-off, saturation and active region on the performance of the amplifier, Need for stabilization, Factor effecting stability of Q-point, Stability factor, Expression for stability factor, Different transistor biasing circuits, their merits and demerits, Calculation of operating point for different biasing circuits, Use of Thevenin's Theorem in analyzing potential divider biasing circuits, Bias compensation.

## **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 –circuit 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 Electrodynamic 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.

**COMMUNICATION SKILLS-II**  
**DELS-401**

<b>UNIT</b>	<b>Topic</b>	<b>Marks</b>
I	Reading <i>a. Comprehension ( Advanced )</i>	10
II	Grammar <i>a. Direct &amp; 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, go to statement, for, while and do-while loops, switch decision making statement, Arrays: Array notation, storage and representation, Functions: user defined functions and their use.

## **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 planar 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's, LED, LCD and Plasma.

# COMPUTER SYSTEM ARCHITECTURE

## DEL-504

### **Unit 1:**

Register transfer language, register transfer, bus and memory transfer, Arithmetic micro operations, Logic micro operations, and Shift micro operations, one stage of arithmetic and logic unit.

### **Central Processing Unit:**

Major components of CPU, general register organization, bus system, control word, ALU, examples of micro operations; Instruction formats: Three address, Two Address, One and Zero Address instructions, CISC characteristics, RISC characteristics.

### **Parallel Processing:**

Throughput, multiple functional units, pipelining: introduction, arithmetic pipeline, instruction pipeline (concepts only) and Vector processing.

### **Control Unit:**

Structure of Control unit, Fetch, Indirect Execute, Interrupt and the Instruction cycle, Hardwired control and Micro-programmed Control.

### **Unit 2:**

#### **I/O Interface:**

Need for I/O interface, Major functions of the I/O interface, I/O versus memory bus, isolated versus memory mapped I/O, Asynchronous data transfer, Strobe control, handshaking, Asynchronous serial transfer.

#### **Modes of Transfer:**

Three possible modes; example for programmed I/O, interrupt initiated I/O; priority interrupt -daisy chain priority, parallel priority interrupt, priority encoder, Interrupt cycle, software routines, Initial and final operations; DMA -DMA controller, DMA transfer.

#### **I/O Processor:**

I/O Programming, CPU and IOP communications.

### **Unit 3:**

#### **Memory Organization:**

Memory hierarchy, Main memory and Auxiliary memory.

#### **Associative Memory:**

Hardware organization, Match logic, Read operation, Write operation.

#### **Cache Memory:**

Need for cache memory, organization of cache memory, operational principle of cache memory, different mapping techniques, cache initialization.

#### **Virtual Memory:**

Address space and memory space, address mapping, associative memory page table, page replacement.

### **Unit 4:**

#### **PC Architecture:**

Block diagram of 8086, Registers, Segment registers, Address, Effective address, Segment address, Physical address and Flag registers.

#### **Assembly Language Statements:**

Types - Instructions, directives, macros, Statement format, Label, mnemonic, operand and comment fields and Pseudo operations.

#### **Instructions:**

Data Transfer Instructions: Mov, XCHG, Arithmetic Instructions: ADD SUB, INC, DEC and NEG Instructions: MUL, IMUL, DIV, IDIV Instructions, CLC, STC and CMC Instructions, Decimal Arithmetic:

BCD representation-Packed and unpacked representation, Packed BCD to ASCII and ASCII to packed 13CD conversion; DM, DAS; Unpacked representation - ASCII and Unpacked pseudo-ops, AM, AAS, AAM, AAD Instructions and their uses.

**JMP Instruction:**

Unconditional JMP, Forward and Backward reference, Short operator for short jumps, Conditional Jumps: Conditional jump Instructions, CMP instruction, LOOP, LOOPZ, LOOPNZ instructions.

**Unit 5:**

**Subroutines and Procedures:**

Stack and its initialization, CALL and RET instructions, PUSH and POP instructions - String operations: MOVS, CMPS, SCAS, STOS and LODS Instructions, Byte and Word options, the direction flag.. CLD and STD Instructions - Repeat prefixes - REP, REPE (REPZ), REPNE (REPNZ), - XLAT instructions, Translation table - Bit operations: AND, OR, XOR and NOT Instructions, TEST Instruction, SHR, SHL, SAR and SAL Instructions

**Interrupts:**

Introduction, Hardware & Software Interrupt (Definition), Processing of an Interrupt, Dos Interrupts: 21h.., Function Numbers, Examples, BIOS Interrupts: 10h.., Screen Processing Functions – Examples.

**Writing Programs:**

To find the average of two values & larger of two values, to print the alphabets from A to Z and to find the largest and the smallest values and character translation (upper to lower and vice versa).

# **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.



# 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

# 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.