SYLLABUS

DIPLOMA IN COMPUTER ENGINEERING
(SELF-FINANCED)

w.e.f.: 2019

UNIVERSITY POLYTECHNIC
FACULTY OF ENGINEERING & TECHNOLOGY
JAMIA MILLIA ISLAMIA
NEW DELHI-110025

EVALUATION SCHEME FOR THREE YEAR
DIPLOMA COURSE IN COMPUTER ENGINEERING (SELF-FINANCED) – I YEAR

S.No.	Course No.	Subjects	Periods per week	Sessional	Univ. Exam	Total
Theory Papers :						
1.	DEN-101	English	2	50	100	**150**
2.	DPH-103	Applied Physics	2	50	100	**150**
3.	DMA-104	Applied Mathematics - 1	2	50	100	**150**
4.	DEE-108	Electrical Engineering	2	50	100	**150**
5.	DME-106	Mechanical Engineering	2	50	100	**150**
6.	DCO-101	Introduction to Computers & Programming	2	50	100	**150**
7.	DEL-104	Electronics Devices & Application – 1	2	50	100	**150**
8.	DEL-101	Digital Electronics	2	50	100	**150**
9.	DME-108	Engineering Drawing	3	100	100	**200**
		Total	**19**	**500**	**900**	**1400**

Practical Courses :						
1.	DPH-113	Applied Physics	2	50	50	**100**
2.	DEE-118	Electrical Engineering	2	50	50	**100**
3.	DME-116	Mechanical Engineering	2	50	50	**100**
4.	DCO-111	Computer Programming-1	2	50	50	**100**
5.	DEL-114	Electronics Devices & Application-1	2	50	50	**100**
6.	DEL-111	Digital Electronics	3	50	50	**100**
		Total	**12**	**300**	**300**	**600**
		Grand Total	**31**	**800**	**1200**	**2000**

Note: *There will be two sessionals and one assignment in each theory course.*

EVALUATION SCHEME FOR THREE YEAR
DIPLOMA COURSE IN COMPUTER ENGINEERING (SELF-FINANCED) – II YEAR

S. No.	Course No.	Subjects	Periods per week	Sessional	Univ. Exam	Total
Theory Papers :						
1.	DCO-201	Data Structure & Algorithms	2	50	100	**150**
2.	DEL-203	Communication Engineering	2	50	100	**150**
3.	DMA-202	Applied Mathematics – 2	2	50	100	**150**
4.	DCO-202	Object Oriented Programming	2	50	100	**150**
5.	DCO-203	Database Management System	2	50	100	**150**
6.	DEL-200	μP, Programming & Interfacing	2	50	100	**150**
7.	DCO-204	Computer Organization & Architecture	2	50	100	**150**
8.	DEL-201	Electronics Devices & Application-2	2	50	100	**150**
9.	DEL-209	Digital System Design	2	100	100	**200**
		Total	**18**	**500**	**900**	**1400**

Practical Courses :						
1.	DCO-212	Computer Programming–2	2	50	50	**100**
2.	DCO-213	PC Software	2	50	50	**100**
3.	DEL-210	μP, Programming & Interfacing	2	50	50	**100**
4.	DEL-211	Electronics Devices & Application-2	2	50	50	**100**
5.	DCO-214	Computer Workshop	2	50	50	**100**
6.	DEL-219	Digital System Design	2	50	50	**100**
		Total	**12**	**300**	**300**	**600**
		Grand Total	**30**	**800**	**1200**	**2000**

Note: *There will be two sessionals and one assignment in each theory course.*

EVALUATION SCHEME FOR THREE YEAR
DIPLOMA COURSE IN COMPUTER ENGINEERING (SELF-FINANCED) – III YEAR

S. No.	Course No.	Subjects	Periods per week	Sessional	Univ. Exam	Total
		Theory Papers :				
1.	DCO-301	Computer Graphics & Image Processing	2	50	100	**150**
2.	DCO-302	Computer Network	2	50	100	**150**
3.	DEL-300	Small Computer Architecture & Peripheral Interfacing	2	50	100	**150**
4.	DCO-303	System Analysis & Design	2	50	100	**150**
5.	DCO-304	Operating System & System Software	2	50	100	**150**
6.	DCO-305	Web Development & Internet	2	50	100	**150**
7.	DCO-306	Advance RDBMS & Development Tools	2	50	100	**150**
8.	DME-309	Entrepreneurship Development & Industrial Management	2	50	100	**150**
		Total	**16**	**400**	**800**	**1200**

Practical Courses :						
1.	DCO-312	Network & Communication	2	50	50	**100**
2.	DCO-314	Operating System	2	50	50	**100**
3.	DCO-315	Web Development & Internet	2	50	75	**125**
4.	DCO-316	Advance RDBMS & Development Tools	2	50	75	**125**
5.	DCO-310	Industry Oriented Project	6	150	200	**350**
		Total	**14**	**350**	**450**	**800**
		Grand Total	**30**	**750**	**1250**	**2000**

Note: *There will be two sessionals and one assignment in each theory course.*

ENGLISH
DEN – 101

"**COMPLETE COURSE IN ENGLISH**" by Robert J. Dixson **20 Marks**

CHAPTERS:

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

COMPOSITON

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

GRAMMER

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

APPLIED PHYSICS
DPH - 103

Unit - I

Concept of work, power energy, types of energy, conservation of energy, Horse power, work done against gravity and against friction, problems pertaining to all types of energy including the nuclear energy.

Curvilinear motion, angular velocity and acceleration, equation for angular velocity, relation between angular and rectilinear motion, concept of torque, angular momentum, centripetal and centrifugal forces.

Periodic motion, simple harmonic motion, derivation of displacement, velocity, acceleration, time period and frequency, vibration of simple spring mass system, resonance.

Unit - II

Coulomb's Law, electric field, potential at a point due to charge, potential difference, equipotential surface.

Biot - Savart law, magnetic field around a current carrying conductor and at the center of circular loop, force experienced by a current carrying conductor, torque, working principle of a moving coil galvanometer, conversion of galvanometer into ammeter and voltmeter, motion of charge particle under electric and magnetic fields.

Unit - III

Magnetic properties of materials and magnetic circuit, Para, dia, ferromagnetic substances, magnetic circuits, magneto-motive forces(mmf), reluctance, permeance, Ohm's law of magnetic circuit, reluctance in series, reluctance in parallel, relation between mmf and magnetizing force (H), magnetic circuit due to a solenoid and hysteresis loops, generation and propagation of electromagnetic waves, complete electromagnetic spectrum, electromagnetic radiation and earth's atmosphere.

Unit - IV

Concept of heat and temperature on the basis of kinetic energy of the molecule, basic principle of temperature measurement, thermoelectric, platinum resistance, bimetallic thermometer and pyrometer, thermostatic and other temperature control.

Modes of heat transfer, coefficient of thermal conductivity and its determination, thermal conduction through compound media.

Huygen's principle, reflection and refraction of a wave at a plane surface, refraction through a prism, lens formula, principle- working and magnifying power of telescope(optical/radio) and microscope, electron microscope, fiber optics - its types and use.

Unit - V

Atomic models, J.J. Thomson model, Rutherford model, Bohr's model and its shortcomings, x-ray :- production, properties and uses, LASERS:- properties and applications.

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

APPLIED MATHEMATICS - 1
DMA - 104

Unit-I

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

Trigonometry : Trigonometrical ratios of sum and differences of two angles. Multiple and submultiple angles, simple trigonometrical identities, Inverse trigonometric functions. Statement of cosine formula, sine formula Napiers formula and half angle formula.

Unit-II

Coordinate Geometry : Cartesian co-ordinates, polar co-ordinates and their conversion to cartesian formula. Area of a triangle. Coordinates of centroid and incentre of a triangle. Simple problems on locus.

Equations of straight lines in various forms. Intersection of two straight lines and angle between them. Perpendicular distance formula.

General equation of circle, determination of radius and centre. Simple problems.

Definition of conic section standard equations of parabola, ellipse and hyperbola and their simple problems.

Unit-III

Differential Calculus

Differentiation by first principle of x^n, sinx, cosx, logx, a^x. Differentiation of sum, product and quotient of functions. Differentiation of function of a function, inverse trignometric function. Logarithmic differentiation, Maxima and Minima

Equation of tangents and normals to a curve.

Unit-IV

Integeral Calculus :

Integration as inverse operation of differentiation. Simple integration by substitution, by parts and by partial fractions.

Evaluation of definite integrals, properties of definite integrals. Application of Gamma function on simple problems. Areas of plain curves.

Volumes of simple solids of revolution.

Unit-V

Differential Equations:

Order and degree of differential equations. Solutions of differential equations of first order and first degree, variable separable. Homogeneous form.

Scalars and vectors, addition and subtraction of vectors and their simple applications, multiplication of vector by a scalar.

Scalar and Vector products of two vectors. Scalar triple product.

ELECTRICAL ENGINEERING
DEE - 108

Unit – 1

Basic Concepts : Electric current, electric potential, potential difference. Concept of e.m.f. and potential difference. Resistance, factors upon which resistance depends. Specific resistance or resistivity and conductance. Effect of temperature on resistance, Temperature Coefficient, determination of α, temperature coefficient at various temperature and simple problems.

DC Circuits : Ohm's law, series and parallel combination of resistances, wattage consideration and simple problem. Power and energy, heating effect of electric current. Conversion of Mechanical to electrical units and vice-versa. Grouping of cells, series grouping parallel grouping & mixed grouping of cells (Series – Parallel). Kirchoffs laws, illustration of Kirchoff's laws, methods to solve circuits by Kirchoff's law.

Unit – 2

Electrostatic & Capacitance : Concepts of capacitance and capacitors, units of capacitance, capacitor ratings. Parallel plate, spherical & cylindrical capacitors and their capacities. Energy stored in the capacitor. Concept of dielectric and its effect on capacitance, dielectric constant, dielectric break down. Series- parallel combination of capacitors, simple problems.

Transient and Batteries : Rise and decay of current and voltage in an R-L / R-C circuit. Concept of time constant in R-L and R-C circuit. Types of cells and their uses. Basic constructional features of Nickel Cadmium batteries and lead acid batteries. Main properties. Difference between dry and wet cells, Standard cell and its applications. Ratings and maintenance of cells. Battery, battery rating, charging discharging, care and maintenance of batteries.

Unit – 3

Electro Magnetism : Concept of magnetic field production by flow of current. Concept of magneto-motive force, flux, reluctance, permeability. Analogy between electric and magnetic circuits. Force on a moving charge and current in a magnetic field, force between two current carrying parallel conductors. Magnetic field around a current carrying straight conductor, circular loop and solenoid. Faradays laws, Lenz's law and rules of electromagnetic induction. Principles of self and mutual induction. Self and mutually induced emfs, simple numerical problems.

Measuring Instruments : Working principles and construction of Ammeters and voltmeters (moving coil and moving iron type). Difference between moving iron and moving coil instruments. Extension of range of ammeter and voltmeter, simple numerical problems. Principle and working of watt meter (Dynamo-meter type) and energy meter (Induction type). Application of above said instruments.

Unit – 4

AC Fundamentals : Alternating voltage and current, sinusoidal alternating voltage and current, generation of alternating voltage and currents, Equation of alternating voltage and currents. Important A.C. terminology and important relations, different forms of alternating voltage, values of alternating voltage and current. Peak value, average value of sinusoidal current, rms value, rms value of sinusoidal current and voltage, form factor, peak factor. Phase and phase difference, phasor representation of sinusoidal quantities, phasor diagram of sine waves of same frequency. Addition of alternating quantities, phasor diagram using rms values. Notations of phasors on rectangular coordinate axis, significance of operator j, mathematical representation of phasors, conjugate of complex number,

addition, subtraction, multiplication and division of phasors. Application of phasor algebra to AC circuits.

AC Series and Parallel Circuits : AC circuit containing pure resistance only, pure inductance only and pure capacitance only. R-L series ckt, impedance triangle, power factor, true power, reactive power, significance of power factor. R-C series ckt. And R-L-C series ckts. Methods of solving parallel ac circuits by phasor diagram, by phasor algebra. Admittance, components of admittance, admittance triangle. Admittance method for solving parallel AC circuits. Resonance in AC circuits, series resonance effect of series resonance, Q-factor, band width & selectivity of series resonant circuit. Parallel resonance, Q-factor of a parallel resonant circuit. Comparison of series and parallel resonant ckts.

Unit - 5 **: Engineering Materials**

Conducting materials their properties and applications : copper, tungston, stranded conductor, crytron and cryogenic. Insulating materials their properties and applications: polyethylene, polyvinyl chloride (PVC), Silicon, Teflon, Bakelite, epoxy resins, glass, ceramic, mica, transformer oil & enamels. Dielectric properties of materials and their applications : Solids, gaseous, liquid dielectric, electrical conductivity in gaseous, liquid and solid dielectrics. Magnetic materials: Paramagnetism, Ferromagnetism. Common magnetic materials properties and their applications : Iron, Nickel alloy (Permalloy) Alsifar, Camalloy materials, magnetoslrictive materials, magneto dielectric type materials, ferrites, ferroxides, manganese – magnesium ferrites, powder magnets, impurities in ferromagnetic materials. Brief idea of some special purpose alloys : mumetals, permalloys , high nickel permalloy, low nickel permalloy, super-permalloy, perminvar and permendur etc.

MECHANICAL ENGINEERING
DME - 106

Unit I : Modes of Transmission of Power

Belt drive : classification of belt, flat belt, V-belt, open and cross belt drive, length of belt (without proff), Velocity ratio, slip and creep, angle of contact, tension ratio for flat and v-belt, Power transmitted through belts, simple numericals.

Chain drive : Classification, Roller chain, silent chain, Hock chain, comparison between chain & belt drive.

Pulleys : Introduction, types & crowning of pulleys

Gears : Classification, Velocity ratio of simple and compund gear trains. Simple numericals.

Unit II : I.C. Engines

Classification, Main parts of I.C. engines, Otto cycle, diesel cycle, spark ignition and comparison ignition engines, working of two stroke and four engines, bettery and magneto ignition system, spark plug, simple carburettor, fuel injection system.

Cooling system : Necessity, Air and different types of water cooling.

Lubricants : Introduction, Function and method of lubrication.

Unit III : Refrigeration & Air Conditioning System

Refrigeration system : Introduction, Application, systems of refrigeration, C.O.P. of a refrigerating machine, Vapour compression refrigeration cycle, Vapour absorption refrigeration cycle, Common refrigerants.

Air Conditioning Systems : Introduction, Purpose of air conditioning, Factors affecting airconditioning, Types of airconditioning, Central systems, Unitary Systems, Evaporative Cooling, Desert air Cooler.

Unit IV : Welding

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

Unit V : Machine Tools

Introduction to various metal cutting machines, Lathe and its operations, Drilling machines, Boaring m/c, Shaper, Planning m/c, Milling m/c, slotting m/c, NC and CNC machines.

INTRODUCTION TO COMPUTERS & PROGRAMMING
DCO - 101

UNIT - I : INTRODUCTION :
Digital computer, Brief History, Computer Generations, Types of computers & their classification, PC family, Application of Computer in Office Automation, Science & Engineering, Computer Hardware & Software, Computer organization in brief - Element of computer hardware CPU, I/O Devices, storage and media used in PCs. Information concept and processing, Multiprocessing, Timesharing, multitasking, real time computing.

UNIT - II : OPERATING SYSTEM & PC SOFTWARE :
Basic concepts & functions of an operating system, Single user and multiuser OS, Disk operating systems - MSDOS, Directories & Files, Commands & Utilities, Batch file programming, autoexec.bat and config.sys files, .com, .exe, .bin and other files. Computer Virus and protection, Familiarization with Windows structure & use. Working knowledge of PC Software Word processor, Spreadsheet, DBMS.

UNIT - III : PROGRAMMING TECHNIQUES :
Algorithm, Pseudo-code, Flowchart - rules & symbols, Structured programming concepts, Computer Languages - Low level, High level & 4Gls, Compilers, Interpreters, Program development in C, program structure, C preliminaries, data types, operator, expression, input/output functions, Control flow, looping .

UNIT - IV : C PROGRAMMING :
Arrays, String, Pointers, Structures, Unions, Pre-processor commands, Common programming errors.

UNIT - V : ADVANCE C PROGRAMMING :
Graphics Functions, User defined functions, File handling - sequential and random file. Memory allocation, Command Line Parameters.

PRACTICALS :
Practical based on theory in C & PC packages (Word processor, Spreadsheet), Minor Science / Engineering Project in C/C^{++}.

ELECTRONICS DEVICES & APPLICATION - 1
DEL - 104

Unit - 1
Introduction to Electronics. Application of electronics in different fields. Brief introduction to active and passive components.

Voltage and Current Sources:
Concept of voltage source, internal impedance of a source and its determination, symbol and graphical representation, characteristics of ideal and practical voltage source.
Concept of constant current source, symbol and graphical representation, characteristics of ideal and practical current source. Equivalence between voltage source and current source, conversion of voltage sources into a current source and vice-versa. Problems.

UNIT - II
Semi-conductor Physics:
Intrinsic and extrinsic semi-conductors. Atomic and crystal structure of germanium and silicon atoms, covalent bonds, generation of electrons and holes, recombination. Mechanism of holes contributing to conductivity, energy level diagrams of conductor, insulators and semi-conductors, doping, P and N type semi-conductors, their conductivity. Majority and minority charge carriers, immobile ions. Drift and diffusion currents. Effect of temperature on extrinsic and intrinsic semi-conductors.

Unbiased PN Junction, mechanism of current flow, depletion layer, potential barrier. Behavior 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 (Boltzmans' equation). Diode ratings and specification. Problems.

UNIT-III
Applications: Diode as rectifier, half wave rectifier, full-wave center tapped and bridge rectifier, construction, operation, output frequency and peak inverse voltage. Average values and rms. Values of output voltage and load current, ripple factor efficiency and regulation. Problems.

Filter Circuits: Shunt capacitor, series inductor, choke input LC filter, - filter, bleeder resistor, physical explanation of working of the filters, expression of ripple in each case and application of each type.

Special Diodes: Brief description, construction, working and application of Zener diode, Tunnel diode, Varactor diode, Point contact diode, Schottky diode.

UNIT-IV
Bipolar Junction Transistor:
Concept of bipolar 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.

AC, DC load lines, its equation and drawing it on the output characteristic. Determination of small signal voltage and current gain of the amplifier using output characteristics and load line. 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.

Simple design problem on potential divider biasing circuits.

DIGITAL ELECTRONICS
DEL - 101

Unit – I

Number System:

The Binary system, binary to decimal conversion and decimal to binary conversion. Octal and hexadecimal system, negative numbers: signed magnitude representation, 1's compliment and 2's complement representation. Binary codes: BCD code, grey code and excess-3 code.

Logic Gates:

Symbols and truth tables of inverter, AND, OR, NAND, NOR, EX-OR, EX-NOR, Application of NAND and NOR as universal gate. Laws and theorems of Boolean algebra and their application. DeMorgan's theorem, logic families: DTL, TTL, ECL, I^2L, Basic difference and their characteristics.

Unit – II

Combinational Circuits

Half and full adder, half and full substractor, multiplexure and demultiplexure circuits, encoder and decoder circuits, Parity bit generator.

Flip flop Circuit:

Difference between combination and sequential circuits, working and application of RS and JK flip flop, Master – Slave JK flip flop, D-type and T-type flip flop.

Unit – III

Counters:

Asynchronous counters: four stage binary ripple counter. Decade counter, Up down counter, 5-Bits synchronous counter with series carry, up down synchronous counter with parallel carry. Application of counters.

Unit – IV

Shift Registers:

Buffer register, serial and parallel shift register.

Semiconductor Memories:

ROM, RAM circuits and their applications, Introduction of PROM, EPROM and EEPROM

Unit – V

Display Systems:

Seven segment display system, dot matrix display system: 3x5 dot matrix and 5x7 dot matrix, Nixie tube, LED, LCD.

A/C and D/C converters:

A/D converters: parallel comparator type ADC, counter type ADC, successive approximation type and dual slope integration type ADC.

DA converters: binary weight resistance DAC, ladder network DAC.

Application of ADC and DAC.

ENGINEERING DRAWING
DME – 108

Unit-I

Basic Concepts:

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

Unit-II

Plane Geometry:

Construction of plane geometrical figures, parabola, ellipse, hyperbola cycloid, epi-cycloid, hypoercycloid, involute of base circle.

Unit-III

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

Unit-IV

(a) Building Drawing : Plan and elevation of a simple building.

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

DATA STRUCTURE & ALGORITHMS
DCO-201

Unit – 1

Concepts of data type and data structure, difference between data type and Data Structure, view of data structure at logical level, implementation level and application level. Building data structure and user defined data structures. Various operations on data structures. Criteria for selection of data structure. Built in data structure like arrays, records.

Unit – 2

Concepts of dynamic variables, difference between static and dynamic variables. Concept of Pointer variables. Implementation of user defined data structure using static and dynamic variables. User defined data structure like stack, queue, circular queue.

Unit – 3

Study of the following data structures at the logical, implementation and application level :

I) Linked list, circular linked list, double linked list.

II) Implementation of stacks and queues using linked list.

Unit – 4

Non linear data structure: Graphs, trees, terminology of trees, concepts and application of binary trees, tree traversals techniques and algorithm.

Unit – 5

Sorting and searching algorithm and their efficiency consideration.

COMMUNICATION ENGINEERING
DEL-203

Unit 1 :
Need of Radio Communication, Overview of various of various types of Communication systems, Block diagram of a communication system. Need of Modulation & Demodulation.
Type of Modulation – Brief description & typical application of AM(DSB-FC, DSB-SC, SSB, ISB, Demodulation schemes), FM (Varactor diode FM, Armstrong FM, Pre-emphasis, De-emphasis, Demodulation schemes), PM(Expression of PM, Comparison with FM), No mathematical derivation.

Unit 2 :
Digital Communication : Block diagram of digital communication system, information, information capacity; Concept of Bandwidth, Noise & Channel capacity; Sampling and quantization; Brief Description of PAM, PPM, PWM, PCM and Delta modulation, PSK & DSK.

Unit 3:
Introduction to Physical layer of OSI model, Transmission media – Coaxial cable, twisted pair & fibre optics; Transmission of binary data - simplex, half-duplex, full duplex, two and four line system of transmission, TDM & FDM, Multiplexing & Demultiplexing, Synchronous & Asynchronous mode of Transmission.

Unit 4:
Wireless transmission – Electromagnetic spectrum, radio, microwave, infrared, millimeter and light wave transmission; ISDN – Narrow band ISDN, it's services, System architecture and interface; Broadband ISDN and ATM.
Cellular , Radio and Satellite Communication.

Unit 5 :
Handshake mode of communication RS-232C/IEEE488, centronic parallel interface, Types & working principles of modem, (asynchronous & synchronous), Transmission techniques – Circuits switching, Packet switching and Message switching; Introduction to various error detection & correction techniques.

APPLIED MATHEMATICS – 2
DMA-202

Unit – 1

Solution of simultaneous linear equations, Guass's Scheme, Determinants (Up to 3^{rd} order only), minor cofactor, Laplace expansion, rule of sarrus, Properties of determinants, Solution of linear simultaneous equation (upto 3 equations) by cramer's rule, Matrix addition, subtraction, multiplication and inverse of matrix. Solution of linear simultaneous equation (upto 3 equations) using matrix method.

Unit – 2

Complex Numbers, representation (Argand diagram), rectangular, polar and exponential forms and conversion from one form to other. De Morivre's theorem, root of a complex number.
Differential Equations: Solution of linear differential equation of first order first degree.
Solution of linear differential of second order with constant co-efficient including particular integral of the form e^{ax}, $\sin^{ax}$, $\cos^{ax}$, x^n, e^{ax} sine bx, e^{ax} cos bx, e^{ax} x^n.

Unit – 3

Fourier Analysis, Periodical Functions, Mathematical equations of a square, sawtooth, triangular, half and full rectified waves, super position of sinusoidal waves, Fourier series, Even and odd functions, Fourier cosine and sine series, Fourier expansion of square, saw tooth, triangular half and full rectified waves, Fourier transform.
Definition of Laplace transformation, General Laplace transforms of Algebraic, trigonometric and other functions, Inverse laplace transformation. Application of Laplase Transform in solving differential equations of 2^{nd} order.

Unit – 4

Set Theory: sets and basic operation on set, product sets, relation and its properties. Partially ordered sets.

Unit – 5

Basic Counting techniques, Permutation, Combination and their application of ${}^nC_r$, ${}^nP_r$, Graph Theory: Introduction to graphs, directed graph, undirected graph, paths in relations and directed graphs.

OBJECT ORIENTED PROGRAMMING
DCO-202

Unit – 1: Object Oriented paradigm
Structured verses Object Oriented Development, Elements of Object Oriented Programming, Introduction to Objects, Classes, Encapsulation and data abstraction, Inheritance, Polymorphism, Overloading. C++ Data types, variables, operators and expressions. Statements and Blocks, if-statement, if-else statement, loops, switch statements.

Unit – 2: Classes and Objects
Introduction, Classes, Class definition, Class member, member function, Public and Private variables, Derived classes, Constructors and Destructors.

Unit – 3: Object Oriented Features – I
Scope of variables, Inline function, Friend function, Friend class, Parameter passing. Inheritance, types of inheritance.

Unit – 4: Object Oriented Features - II
Polymorphism, Overloading, Operator Overloading of Unary and Binary operators, Function Overloading. Templates.

Unit – 5: Advanced Concepts
Graphics, File handling, Virtual Function, Exception handling.

DATABASE MANAGEMENT SYSTEM
DCO-203

Unit – 1: Introduction
Database, Purpose of database, data abstraction, instances and scheme, data independence, data definition languages, data manipulation language, data control, facility, database manager, database administration, data models.

Unit – 2: Data System Architecture
Introduction, three level of architecture, the external level, the conceptual level, the internal level, mapping, Client-Server Architecture, Distributed processing.

Unit – 3: Entity relationship model
Entity and entity sets, relationships and relationship sets. Mapping constraints, Candidate Key, Primary Key, Foreign Key and Alternate Key, E-R diagram, reducing E-R diagram to tables.

Unit – 4: Relational Model
Concepts of relational model, integrity constraints, extension and intention, Relational algebra, Relational Calculus, Query language, modifying the Database, Comments on relational model.

Unit – 5: Database Design
Introduction, basic definitions, functional dependencies, mutivalues dependencies. Normalisation- 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, transaction management, security.

μP, PROGRAMMING & INTERFACING
DEL-200

Unit 1 : Architecture and Programming Model
Architectural block diagram, Timing and Machine Cycle, Registers and Flags, Addressing Modes, Interrupts, Main feature of 8085. Address space, address decoding, partitioning, Memory maps, Concepts of stacks.

Unit 2 : Instruction Sets
Instruction classification, Instruction format in mnemonics, assembly language and machine language formats, Detailed instruction, Execution sequence of data, Transfer group, Arithmetic and Logic group, Stacks, Control Transfer Group instruction and Flags. Assembly language programming concepts. Programming exercises.

Unit 3 : Interrupts and I/O
Programming I/O, Synchronous and Asynchronous data transfer, Baud rate generation, Maskable and non-maskable Interrupts, Interrupts subroutines, Example exercises.
Architecture and Organisation of microprocessor based system, Concept of interfacing and Address decoding, RAM, ROM interfacing, I/O ports and Interrupts, DMA concepts, Interfacing slow peripherals.

Unit 4 : Micro Controller and peripheral interface chips
Features, block diagram, operating modes, micro controller 8031, PPI 8255, keyboard and display Interface chips 8279, Programmable Interval Timer 8253, USART 8251, DMA controller 8257, CRT controller 6845, FDC 8272, HDC 8264, Programmable interrupt controller 8259.

Unit 5 : Interfacing Real World Signals
ADC and DAC concepts, Interfacing 8/12 bit ADC, interfacing 8/12 bit DAC, Pulse Width measurement.
Development tools : MDS and its role in system development, Logic analyser and its uses.

COMPUTER ORGANIZATION & ARCHITECTURE
DCO-204

Unit – 1: Processor Organisation

General structure of CPU–register, stacks, ALU and Control Unit. Instruction types, formats, instruction sets and addressing modes. Basic mathematical operations- fixed point addition, subtraction, multiplication and division. Implementation of fixed point operation and ALU design. Floating point operation and their implementation. Algorithm for addition, subtraction, multiplication and division for fixed and floating point operations, H/W addition.

Parallel processing, classification (SISD, SIMD, MISD, MIMD), principles of Array and pipeline processors.

Unit – 2: Design of Controllers

Principles of instruction, decoding and implementation, hardwired and micro-instruction based control unit, Horizontal and Vertical classes of micro-instructions. Identifying micro-instructions, minimizing micro instructions size, parallelism in micro instruction, encoding control instructions, timing cycles and clock generation. Concepts of RISC and comparison with CISC processors.

Unit – 3: Memory Organisation

Types of memory, serial access, random access and semi random access. Core, Semiconductor and bubble memories, memory devices, memory characteristics- Density, access time, cost, destructive and non-destructive read out, static memories, dynamic memories and memory refresh.

Unit – 4: Memory expansion

Main memory, memory hierarchy, memory references, address mapping, relocation mechanism, concept of memory compaction. Principle of virtual memory, segmentation and paging, Interleaved memories and principles of address interleaving, Associative memories word, Organised associative memories, Cache memory, masking.

Unit – 5: I/O Organisation

Memory mapped and I/O mapped I/O. Polled, interrupt and DMA mode of data transfer, Multiple I/O daisy chaining, polling and parallel priority control. I/O processors, Concept of channel

ELECTRONICS DEVICES & APPLICATIONS - 2
DEL -201

Unit – 1

Construction, operation, characteristics and parameters of junction FET.
Construction, operation and characteristics of MOSFET in depletion and enhancement modes. Comparison of JFET with bipolar transistor. Comparison between JFET and MOSFET.CMOS advantages and applications. Simple FET amplifier circuit and its working principles. Problems.

Unit - 2

Single Stage Amplifier: Single stage transistor amplifier with proper biasing components. Explanation of phase reversal of the output voltage with respect to input voltage. Hybrid parameters and their physical significance. Development of transistor herbed low frequency model in CE configuration. Expressions for voltage gain, current gain, input and output impedance's. Decibels and its significance. Problems.

Multi-Stage Amplifier: Need of multi-stage amplifier. Gain of multistage amplifier. Different coupling schemes used in amplifiers. RC coupled multistage amplifier, its working, advantages, disadvantages and applications. Calculations of voltage gain. Frequency response curve. Definition and significance of terms Bandwidth, Upper and lower cut-off frequencies. Direct coupled amplifier and its working, advantages, disadvantages and applications. Frequency response curve. Difference amplifier, typical circuit diagrams and it's working.

Transistor Audio Power Amplifier: Need for power amplifier. Difference between voltage and power amplifier. Classification of power amplifiers (class A, B, AB & C). Importance of impedance matching. Working principle of push-pull amplifier circuits. Construction and working of class A and class B push-pull amplifier, Crossover distortion in class B operation and its reduction. Different driver stages for push-pull amplifier circuits. Working principle of complementary symmetry push-pull amplifier circuits and its advantages. Transformer -less class B push-pull amplifier and their typical applications. Problems.

Unit -III

Feedback amplifiers: Basic principle and types of feedback. Derivation of expression for the gain of an amplifier employing feedback. Effect of negative feedback on gain, stability, distortion and bandwidth of the amplifier. Physical explanation. Typical practical feedback circuits.

RC coupled amplifier circuit with emitter by-pass capacitor removed. Emitter follower and its application. Simple mathematical analysis for voltage gain, current gain, input and output impedance of the above circuits. Problems.

Sinusoidal Oscillators: Classification of oscillators, damped and UN-damped oscillations, basic oscillatory circuit. Use of positive feedback Bark-Hausen criterion for oscillation. Frequency stability of an oscillator.

Hartley, Colpitt, Phase-shift, Wein-bridge and Crystal oscillator and their working principles. Applications of oscillators.

Non-Sinusoidal Oscillators: Transistor as a switch, explanation-using CE output characteristics. Transistor switching times, use of speed up capacitor (physical explanation only) Collector coupled BI -stable, mono-stable and stable multivibrator, circuit operation using wave shapes at collector and base terminals and expressions for the time period. Operation of Schmidt Trigger, calculation of upper and lower trigger potentials. Applications of multi-vibrator and Schmitt trigger.

Unit - IV

Operational Amplifiers: Operational amplifier, symbols, Terminals and pin configuration.

Characteristics of an ideal op-am. Inverting and non-inverting circuits. Differential voltage gain input and outs put voltages, offset voltage and current, common mode rejection ratio, slew rate. (Brief explanation). Method of offset and null adjustment.
Op- amp as differential amplifier, inverter, adder, subtractor, differentiator, integrator, multiplier and divider. Bi-stable, mono-stable and as-table circuits. Schimitt trigger. Triangular wave and sine wave generator.

Opto -Electronic Devices: Working principles and characteristics of photo resistors photo- diode, photo transistors, LED, LCD, Laser diode and opto -couplers. Simple application of opto- electronics devices.

ICs: Difference between SSI, MSI, LSI, and VLSI. Fabrication process of ICs (Brief explanation)

DIGITAL SYSTEM DESIGN
DEL-209

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, Design of combinational circuits. using MUX, & decoder, Design of MUX, decoder, parity generator, code converter, Magnitude comparator using 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, I^2L, 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.

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, PLC, FPGA, and their application.

Unit 4 : Sequential Circuits

Essential sequential circuits. Synchronous and asynchronous sequential circuits, classification of sequential circuit, (Meely & 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.

Unit 5 : Asynchronous Sequential circuits

Design of fundamental mode asynchronous sequential circuits, Realization using D-tyupe and JK flip flop. Design of pulse mode asynchronous sequential circuits. Problem in asynchronous circuits. Synchronization of asynchronous inputs, spikes in O/P & their removal. Definition of cycles, races & hazards.

COMPUTER GRAPHICS & IMAGE PROCESSING
DCO - 301

Unit-I

Introduction to Computer Graphics : Introduction, Fundamentals, Classification, Advantages and representative users of Computer Graphics. Display Devices – CRT, Storage Tube – DVST silicon target tube, Plasma panel, Laser scan display, beam penetration and shadow mask color display.

Unit-II

Point plotting techniques, Incremental methods, Line drawing algorithms, Criteria for good computer generated lines, Simple and symmetric DDA, Bresenham algorithms, Generation of other curves and circle generators, Cohen – Sutherland line clipping algorithm, Polygon clipping algorithm of Sutherland and Hodgman

Unit-III

Transformation : Transformation, Rotation and Scaling, Matrix formulation of transformation and 3-D transformation and their matrix representation, Viewing Transformation.

Unit-IV

Simple Computer Graphics package, ground rule for Graphics software design, functional domain and function sets, graphics primitives, windowing a graph plotting program.

Unit-V

Introduction to image processing, properties of digitized images, Fourier transform, image processing, extracting information, segmentation, shape extraction, object recognition, image compression (Jpeg/Mpeg).

COMPUTER NETWORK
DCO – 302

Unit-I

Introduction to Computer network : Goals, applications, topologies, types, architecture, services primitives, models, reference models (OSI and TCP/IP), X.25

Unit-II

Data link layer : functions, services, framing, error control, flow control.

Protocols : stop and wait, Sliding window, Channel allocation : static, dynamic. Multiple access protocol : aloha, carrier sense multiple access, collision free, limited contention; IEEE standard 802 for LAN and WAN.

Unit-III

Network layer : functions, services, virtual circuit, datagram, comparison of datagram and virtual circuit subnet, router.

Routing algorithm : adaptive, non adaptive, multi-path, centralized, isolated, backward learning, flooding, distributed, shortest path, broadcasting, multicasting, Congestion, congestion control, choke packet, deadlock, internetworking, bridges, gateways, hardware connectivity devices, NICs, hubs, repeaters, fragmentation, firewalls, IP address.

Unit-IV

Transport layer : Functions, services, quality of service, service primitives, addressing, establishing a connection, releasing a collection, flow control, and buffering, crash recovery, protocols : TCP, UDP, SPX.

Unit-V

Session layer : Function, services, application, dialog management, token management, Synchronization.

Presentation layer : Function, services, application, network security, domain name system, simple network management protocol, ftp, http, email, world wide web, web browsing, multimedia file transfer, remote login, document printing, database transaction, internet, type of internet connection and account, Network management, administration, administration and troubleshooting.

SMALL COMPUTER ARCHITECTURE & PERIPHERAL INTERFACING
DEL – 300

Unit-I
Salient features and Block diagram of 8086, 80286, 80386, 80486, Pentium.

Unit-II
Important support chips for the above processors.
Bus standard and Architectures : ISA, EISA, VESA and PCI.

Unit-III
Interface standards : RS232C, IDE, EIDE, SCSI, Fast and Wide SCSI, IEEE 488.

Unit-IV
Architecture of 8086, 286, 386, 486, and Pentium systems. Introduction to RISC processors. Design of RISC processor based computer systems.

Unit-V
Bus Architecture of Mini Computers : VME aqnd Multi Bus, FSB, AGP ports.

SYSTEM ANALYSIS & DESIGN
DCO - 303

Unit-I

Overview of System analysis and design – An overview, System development life cycle, Software crisis, Role of System Analyst.

Project Selection – System Projects, Project requisites, Project review and Selection, preliminary investigation. Problem definition and Classification.

Feasibility Study – Different range of feasibility, Investigative study, Cost/Benefit Analysis, Fact finding.

System Requirement Specification and Analysis – DFD, Data Dictionary , HIPO, Decision Tree.

Unit-II

Structured System design – System Design considerations, Design methodologies, Structured design, Modularisation, Design Process, Prototype design.

Input Design Control – Process transaction data, Elements of Input data, Input design guidelines, Input verification and control, Terminal screen layout.

Output screen design – Types of output, output devices and design considerations, Design of output reports, Design of screen output and Menu etc, Form design and control.

File and Database design – Types of files, File organisation, File design, Database design, types of Database.

Unit-III

System development – Tasks of system development, prototype installation, H/W and S/W selection, Benchmark testing, Preparing s/w development life cycle.

System control and Quality assurance – Quality assurance in s/w life cycle, levels of quality assurance, Design objectives, Maintenance issues, Testing practice and Plans, Levels of Tests, Special System tests, Designing test data, system control, Audit trail.

Documentation – Characteristics of a good documentation, Types of documentation, s/w design and documentation tools, Need for documentation, Format for preparing documentation.

System implementation – Training of personnel, Training methods, conversion methods, conversion and operation plans, review plans system maintenance , H/W acquisition, Criteria for vendor selection.

Unit-IV

Introduction to MIS – MIS definition , History, Computer system and MIS, Organisational System and MIS, Logical foundation of MIS.

Technology Component – Overview of computing technology, Overview of communication technology, database technology, decision support system, knowledge base system.

Organisational impact of MIS – Information as a resource, Information for competitive advantage , Organisation, information and decision, MIS as a profession.

Building Management Information System – System Analysis, Techniques of System analysis – Requirement Analysis, Diagramming techniques, Data Dictionary, Feasibility report, Detailed Design, Database design, system implementation.

Unit-V

Case Studies .

OPERATING SYSTEM & SYSTEM SOFTWARE
DCO - 304

Unit-I

Introduction :

Introduction to O.S., Evolution of O.S., Types of Operating System. Batch processing, Multiprogramming, Multiprocessing, Multitasking, Introduction to Unix, Shell commands, Redirection and Piping, Communication in Unix.

Unit-II

Introduction System Software :

Compiler, Compilation Phases, Assembler, Interpreter, Loader and Linker.

Unit-III

Memory Management : Memory Management, Contiguous allocation, Fixed partition, Dynamic partition, Segmentation, Non contiguous memory management, paging, Virtual memory, Virtual memory management. File concepts, File support, Access methods, Allocation methods, indexed allocation, Directory system, single level, two level, tree structure, Tree Structure. Disk management.

Unit –IV

Processor Management : Processor overview, Process states, multiprogramming. Process : Process concepts, Process control blocks, concurrency, Mutual Exclusion, Semaphores, Deadlocks, Avoiding deadlocks. Scheduling – Types of schedulers, scheduling algorithms. Device Management.

Unit-V

Case Study : Case study of UNIX, Linux, Windows NT. Unix Shell Programming, System Administration.

WEB DEVELOPMENT & INTERNET
DCO - 305

Unit-I

Introduction to Internet, Application of Internet, How internet works, Internet protocol address, Internet addressing conventions, Domain Name System (DNS), Configuring PC software for Internet, Getting connected to Internet, Internet Accounts, Terminal Account, TCP/IP Account, Web Browsers http, ftp.

Unit-II

HTML and its application, HTML basics, Document tags, Container and Empty tags, Working with HTML text, emphasizing text, using list in Web documents, Nested ordered, Un-ordered list, Menu list, Directory list, definition list, Working with Links, Tables, Frames and Forms, Cascade Style Sheets (CSS).

Unit-III

Introduction to HTML / XML / VRML: Introduction to Microsoft Front Page, Components of Front Page, Building new Web sites. Editing an existing web page using front page editor, Creating links, adding images and processing/editing locally, Scripting Languages, Using the image composer.

Unit-IV

Basic concept of CGI-Bin Programming, Perl, PHP, Java Script / VB Script, Animations in Web pages.

Unit-V

Web Server - UNIX, Windows & Apache, Introduction to ASP, Hosting of Web pages on the Web Server, Maintenance of web site, Concept of firewall, Secured Socket Layer (SSL), Proxy Server.

ADVANCE RDBMS & DEVELOPMENT TOOLS
DCO-306

UNIT I

Introduction to DBMS, Types of Databases & different Database Models, Distributed Databases and Client Server System, SQL & Query Process, Recovery and Concurrency Management, Security, Integrity and Control, Visual Programming Language, Introduction to Various Visual Tools.

UNIT II

Relational Database, RDBMS, Data Normalization, SQL: - DDL, DML, DCL statements, Sequences, Indexing, Views, Cursors, PL-SQL / T-SQL: - Variables, Control Statements, Triggers, Functions and procedures. Introduction to Oracle / SQL Server.

UNIT III

Database Administration, DBA and its Role, SQL Server / Oracle Architecture, Planning and Managing table spaces, Physical Database Layout, Managing Developing Process, Transaction, Backup and Recovery Option, Database Security and Auditing.

UNIT IV

Visual IDE, Development Environment, Properties, Events, Forms, Event Finding Order, Global System Objects, VB Language Syntax, Data Type and Data Typing, Understanding Scope- dim, Private, Public, Constants, Enumerations, Subs and functions, Arguments- ByVal and ByRef, Objects, Life Cycle and Declaration of Objects, Form- Interfacing and programming, Handling form Events, VB Control Objects binding to Forms, Class Modules, ActiveX Components, Error Handling- Compile-Time, Run-Time, Logical Errors, **.**exe Format and Properties.

UNIT V

Introduction to Data Access, ODBC, RDO, OLE DB, DAO, ADO- Model, Connection, Command and Record set Objects, Properties Methods & events, Cursor Type, Updating and Batch Updating, Transaction Process, Retrieving and Displaying Data using Forms & Grid, Data forms and reports.

ENTREPRENEURSHIP DEVELOPMENT & INDUSTRIAL MANAGEMENT
DME –309

Unit – I

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

Unit – II

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

Unit – III

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

Unit – IV

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

Unit – V

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