NETAJI SUBHAS UNIVERSITY

SYLLABUS AND SCHEME OF EXAMINATION FOR

DIPLOMA

IN

Computer Science and Engineering

(CSE)

(Effective from academic session: 2021-22)

First Year

Subject Code	SEMESTER 1	Subject Code	SEMESTER 2
DIP101	Basic Physics	DIP201	Communication Skills-II
DIP102	Basic Chemistry	DIP202	Engg. Mathematics-I
DIP103	Basic Mathematics	DIP203	Applied Science
DIP104	Communication Skill-I	DIP204	Engg. Mechanics
DIP105	Engg. Graphics	DIP205	Engg. Drawing
DIP106	Computer Fundamentals	DIP206	Basic Workshop Practice
DIP107L	Basic Physics LAB	DIP207L	Engineering Drawing LAB
DIP108L	Computer Fundamentals LAB	DIP208L	Chemistry LAB

Second Year

Subject Code	SEMESTER 3	Subject Code	SEMESTER 4
DIP301	Engg.Mathematics-II	DIP4CS01	OOPS using C++
DIP3CS02	Computer Programming Through 'C'	DIP4CS02	Database Management System
DIP3CS03	Introduction to Software Package	DIP4CS03	Data Structure Using 'C'
DIP3CS04	Digital Electronics	DIP4CS04	Introduction to Software Engineering
DIP3CS05	Operating System	DIP4CS05L	Database Management System LAB
DIP3CS06L	Computer Programming through C LAB	DIP4CS06L	Data Structure LAB
DIP3CS07L	Introduction to Software Package LAB	DIP4CS07L	C++ LAB

Third Year

Subject Code	SEMESTER 5	Subject Code	SEMESTER 6
DIP5CS01	Web Technology	DIP6CS01	Computer Graphics
DIP5CS02	Introduction to Java	DIP6CS02	Introduction to Python
DIP5CS03	Environmental Science	DIP603	Industrial Management
DIP5CS04	Data Communication & Networking	DIP6CS04	Elective (Any One)

DIP5CS05L	JAVA LAB	DIP6CS05	Project & viva (SIP)
DIP5CS06L	Web Technology LAB	DIP6CS06L	PYTHON LAB
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Elective - (i) Artificial Intelligence & Expert System
(ii) Multimedia
(iii) Software Project Management and Quality Assurance

SEMESTER - 1

THEORY		PERIOD			Evaluation Scheme			Credit	Hours
CODE	NAME OF THE PAPER	LECTURES	TUTORIALS	PRACTICALS	IA	ESE	SUB-TOTAL		
DIP101	Basic Physics	3	1	0	30	70	100	4	4
DIP102	Basic Chemistry	3	1	0	30	70	100	4	4
DIP103	Basic Mathematics	3	1	0	30	70	100	4	4
DIP104	Communication Skill-I	3	0	1	30	70	100	4	4
DIP105	Engg. Graphics	3	1	0	30	70	100	4	4
DIP106	Computer Fundamentals	3	0	1	30	70	100	4	4
DIP107L	Basic Physics LAB	0	0	2	15	35	50	2	2
DIP108L	Computer Fundamentals LAB	0	0	2	15	35	50	2	2
							Total Credits:	28	

Basic Physics (DIP101)

Contents (Theory)		Hrs/week
Unit -1 **UNITS AND MEASUREMENTS**	**1.1** Need of Measurement in engineering and science, unit of a Physical quantity, requirements of standard unit, systems of units-CGS, MKS and SI, classification of physical quantities- Fundamental and Derived with their units. **1.2** Accuracy, Precision of instruments, Errors in measurement, Estimation of errors - Absolute error, Relative error and percentage error, significant figures. (Simple Problems). **1.3** Basic Measuring instruments - Vernier Caliper, Micrometer screwgauge, inner & outer caliper thermometer,spherometer, ammeter, voltmeter with their least count, range, accuracy and precision. Standard reference surfaces used in engineering measurements- surface plate, angle plate, V- block, Engineer's square.	**05**
Unit -2 **GENERAL PROPERTIES OF MATTER**	**2.1 Elasticity :** Deforming force, Restoring force, Elastic and plasticbody, Stress and strain with their types, Hooke's law, Stress strain diagram, Young's modulus, Bulk modulus, Modulus of rigidity and relation between them(no derivation), (simple problems). (Simple problems). Stress strain diagrams of H.T. Steel, Cast iron, Aluminum and Concrete, Ultimate and breaking stress, Factor of safety.	**05**

	2.2 Surface Tension: Forces—cohesive and adhesive, angle of contact, shape of liquid surface in a capillary tube, capillary action with examples, relation between surface tension, capillary rise and radius of capillary (no derivation), (simple problem), effect of impurity and temperature on surface tension. **2.3 Viscosity :** Velocity gradient, Newton's law of viscosity, coefficient of viscosity, streamline and turbulent flow, critical velocity, Reynold's number, (simple problems), Stokes law and terminal velocity (no derivation), buoyant (up thrust) force, effect of temperature & adulteration on viscosity of liquid.	**03** **03**
Unit – 3 **HEAT**	**3.1Transmission of heat and expansion of solids:** Three modes of transmission of heat - conduction, convection and radiation, good and bad conductor of heat with examples, law of thermal conductivity, coefficient of thermal conductivity (simple problems), expansion of solids-linear, aerial and cubical and relation between them. **3.2Gas laws and specific heats of gases:** Boyle's law, Charles's law, Gay Lussac's law, absolute temperature, Kelvin scale of temperature, general gas equation(no derivation) (simple problems), molar or universal gas constant, universal gas equation, standard or normal temperature and pressure (N.T.P.), specific heat of gases, relation between two specific heat (simple problems), thermodynamic variables, first law of thermodynamics (statement & equation only), isothermal, isobaric, isochoric & adiabatic processes (difference among these processes and equations of state) (simple problems).	**03** **04**
Unit – 4 **LIGHT**	**4.1 Properties of light:** Reflection and refraction, Snell's law, physical significance of refractive index (simple problems), Total internal reflection, dispersion, diffraction and polarization of light (only introduction). **4.2 Wave theory of light & Interference:** Newton's corpuscles theory of light, Huygens's wave theory, wave front, Types of wave front-spherical, cylindrical and plane Huygens's principle of propagation of wave front, Principle of superposition of waves, Interference of light, constructive and destructive interference, Young's experiment. Analytical treatment of interference, conditions for stationary interference pattern. **4.3 Laser:** Light amplification by stimulated emission of radiation, properties of laser, spontaneous and stimulated emission, population inversion, pumping methods, He-Ne laser- construction & working, recording and reconstructing of hologram by using He-Ne laser.	**03** **04** **04**
Unit – 5 **MODERN PHYSICS**	**5.1 Photo electricity :** Plank's hypothesis, properties of photons, photo electric effect, laws and characteristics of photoelectric effect, Einstein's photoelectric equation,(simple problems), construction and working of photoelectric cell, applications of photoelectric cell. **5.2 X-rays: Production** of X-rays, types of X-ray spectra-continuous and characteristics, X-ray wavelength (simple problems), properties of X-rays, applications of X-rays-engineering, medicine and scientific research work.	**03** **03**
	Total	**40**

Text Books

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Physics –I	V. Rajendran	Tata McGraw- Hill raw- Hill publication, New Delhi
(ii)	Applied Physics	Arthur Beiser.	Tata McGraw- Hill raw- Hill publication, New Delhi
(iii)	Engineering. Physics	R.K. Gaur & S.L. Gupta.	Dhanpat Rai Publication, New Delhi.
(iv)	Physics	Resnick and Halliday	-
(v)	Concept of Physics Part-I&II	H. C. Verma	-
(vi)	Basic Physics	Roshan Kr. Sinha	Foundation Publishing House

Basic Chemistry (DIP102)

Contents (Theory)		Hrs/week
Unit -1	**Atomic Structure :** Definition of Atom, Fundamental Particles of Atom – their Mass, Charge, Location, Definition of Atomic no, Atomic Mass no., Isotopes & Isobars, & their distinction with suitable examples, Bohr's Theory, Definition, Shape & Distinction between Orbits & Orbitals, Hund's Rule, Filling Up of the Orbitals by Aufbau's Principles (till Atomic no. 30), Pauli's exclusion principle, Valency – Definition, types (Electrovalency &Covalency), Distinction, Octet Rule, Duplet Rule, Formation of Electrovalent & Covalent Compounds e.g. Nacl, $CaCl_2$, MgO, $AlCl_3$, CO_2, H_2O, Cl_2, NH_3, C_2H_4, N_2, C_2H_2.	**06**
Unit -2	**Electrochemistry :** Definition Ionisation & Electrolytic Dissociation, Arrhenius Theory of Ionisation, Significance of the Terms Involved in Electrolysis. Such as Conductors, Insulators or Dielectrics, Electrolyte, Non Electrolyte, Electrolysis, Electrolytic Cell, Electrodes, Current Density, Temperature, Mechanism of Electrolysis – Primary & Secondary Reactions at Cathode & Anode, Electrochemical Series for Cations& Anions, Electrolysis of $CuSO_4$ Solution by using Cu Electrode & Platinum Electrode, Electrolysis of NaOH solution & fused NaCl, Faraday's first & second law of Electrolysis &Numericals, Electrochemical Cells & Batteries, Definition, Types (Primary & Secondary Cells), e.g. Construction, Working & Applications of Dry Cell / Laclanche Cell & Lead – Acid Storage Cell, Applications of Electrolysis such as Electroplating & Electro refining, Electrometallurgy & electrotyping Conductivity of Electrolyte – Ohms Law, Definition & Units of Specific Conductivity, Equivalent Conductivity, specific resistance.	**08**

Unit -3	**Metals & Alloys Metals :** Occurrence of Metals, Definition Metallurgy, Mineral, Ore, Gangue, Flux & Slag, Mechanical Properties, Processing of Ore, Stages of Extraction of Metals from its Ores in Detail i.e. Concentration, Reduction, refining. Physical Properties & Applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Co, Ag, W. **Alloys: Definition** of Alloy, Purposes of Making alloy Preparation Methods, Classification of Alloys such as Ferrous & Non Ferrous, examples. Composition, Properties & Applications of Alnico, Duralumin, Dutch Metal, German Silver / Nickel Silver, Gun Metal, Monel metal, Wood's Metal, Babbitt Metal.	**08**
Unit -4	**Non Metallic Materials Plastics :** Definition of Plastic, Formation of Plastic by Addition & Condensation Polymerisation by giving e.g. of Polyethylene & Backelite plastic Respectively, Types of Plastic, Thermo softening& Thermosetting Plastic, with Definition, Distinction &e.g. Compounding of Plastics – Resins, Fillers, Plasticizers, Accelerators, Pigments, Engineering Applications of Plastic based on their Properties. **Rubber:** Natural Rubber: Its Processing, Drawbacks of Natural Rubber, Vulcanisation of Rubber with Chemical Reaction. Synthetic Rubber: Definition, & e.g., Distinction Between Natural & Synthetic Rubber. **Thermal Insulating Materials: Definition**, Characteristics & Applications of Glass, Wool, Thermocole, Asbestos, Cork.	**08**
Unit – 5	**Environmental Effects (Awareness Level):** Introduction, Definition, Causes of Pollution, Types of Pollution, Such as Air & Water Pollution. **Air Pollution :** Definition, Types of Air Pollutions their Sources & Effects, Such as Gases, Particulates, Deforestation, Radio Active Gases, Control of Air Pollution, Air Pollution Due to Internal Combustion Engine & Its Control Methods, Causes & Effects of Ozone Depletion & Green House Effects**.** **Water Pollution :** Definition, Causes & Methods of Preventing Water Pollution, Types of Waste such as Domestic Waste, Industrial Waste, their Physical & Biological Characteristics, BOD, COD, Biomedical Waste & E–Waste, their Origin, Effects & Control Measures. Preventive Environmental Management (PEM) Activities.	**10**
	Total	**40**

Text Books:-

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Engineering Chemistry	Jain & Jain	Dhanpat Rai and Sons
(ii)	Engineering Chemistry	S.S. Dara	S. Chand Publication
(iii)	Industrial Chemistry	B.K. Sharma	Goel Publication
(iv)	Environmental Chemistry & Pollution Control.	S.S. Dara	S. Chand Publication

Basic Mathematics (DIP103)

Contents (Name of Topics)		Hrs/week
Unit -1	**ALGEBRA**	
	1.1 REVISION : 1.1.1 Laws of Indices 1.1.2 Formula of factorization and expansion ((a^2-b^2), $(a+b)^2$ etc.) 1.1.3 Laws of logarithm with definition of Natural and Common logarithm.	**01**
	1.2 PARTIAL FRACTION : 1.21 Definition of polynomial fraction proper & improper fractions and definition of partial fractions. 1.2.2 To Resolve proper fraction into partial fraction with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors. 1.2.3 To resolve improper fraction into partial fraction.	**04**
	1.3 DETERMINANT AND MATRICES : **Determinant** 1.3.1 Definition and expansion of determinants of order 2 and 3. 1.3.2 Cramer's rule to solve simultaneous equations in 2 and 3 unknowns. **Matrices** 1.3.3 Definition of a matrix of order m x n types of matrices. 1.3.4 Algebra of matrices such as equality, addition, Subtraction, scalar multiplication and multiplication. 1.3.5 Transpose of a matrix. 1.3.6 Minor, cofactor of an element of a matrix, adjoint of matrix and inverse of matrix by adjoint method. 1.3.7 Solution of simultaneous equations containing 2 and 3 unknowns by matrix inversion method.	**10**
	1.4 BINOMIAL THEOREM : 1.4.1 Definition of factorial notation, definition of permutation and combinations with formula. 1.4.2 Binomial theorem for positive index. 1.4.3 General term. 1.4.4 Binomial theorem for negative index. 1.4.5 Approximate value (only formula)	**03**
Unit -2	**TRIGONOMETRY.** **2.1 REVISION :** 2.1.1 Measurement of an angle (degree and radian). Relation Between degree and radian. 2.1.2 Trigonometric ratios of 0^0, 30^0, 45^0 etc. 2.1.3 Fundamental identities.	**02**
	2.2 TRIGONOMETRIC RATIOS OF ALLIED, COMPOUND, MULTIPLE & SUBMULTIPLE ANGLES (Questions based on numerical computations, which can also be done by calculators, need not be asked particularly for allied angles).	**06**
	2.3 FACTORIZATION AND DEFACTORIZATION FORMULAE :	**02**

	2.4 INVERSE TRIGONOMETRIC RATIOS : 2.4.1 Definition of inverse trigonometric ratios, Principal values of Inverse trigonometric ratios. 2.4.2 Relation between inverse trigonometric ratios.	**02**
	2.5 PROPERTIES OF TRIANGLE 2.5.1 Sine, Cosine, Projection and tangent rules (without proof) 2.5.2 Simple problems.	**02**
Unit -3	**COORDINATE GEOMETRY** **3.1 POINT AND DISTANCES :** 3.1.1 Distance formula, Section formula, midpoint, centriod of triangle. 3.1.2 Area of triangle and condition of collinearity.	**04**
	3.2 STRAIGHT LINE : 3.2.1 Slope and intercept of straight line. 3.2.2 Equation of straight line in slope point form, slope-intercept form, two-point form, two-intercept form, normal form. General equation of line. 3.2.3 Angle between two straight lines condition of parallel and perpendicular lines. 3.2.4 Intersection of two lines. 3.2.5 Length of perpendicular from a point on the line and perpendicular distance between parallel lines.	**04**
	3.3 CIRCLE : 3.3.1 Equation of circle in standard form, centre – radius form, diameter form, two – intercept form. 3.3.2 General equation of circle, its centre and radius.	**04**
Unit-4	**VECTORS** 4.1 Definition of vector, position vector, Algebra of vectors (Equality, addition, subtraction and scalar multiplication) 4.2 Dot (Scalar) product with properties. 4.3 Vector (Cross) product with properties.	**04**
	4.4 Applications 4.4.1 Work done and moment of force about a point & line	**02**
	Total	**50**

Text Books:-

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Mathematics for Polytechnic	S.P. Deshpande	Pune Vidyarthi Griha
(ii)	Trigonometry	S.L. Lonely	S. Chand Publication
(iii)	Higher Algebra	H.S. Hall & S.R. Knight	Metric edition, Book Palace, New Delhi
(iv)	College Algebra	Frc. G. Valles	Charotar Publication
(v)	Matrices	Aryes.	Schuam series, McGraw Hill
(vi)	Higher Engineering Mathematics	B.S. Grewal	Khanna Publications New Delhi
(vii)	Engineering Mathematics	S.S. Sastry	Prentice Hall of India
(viii)	Basic Mathematics	Sindhu Prasad	Foundation Publishing House

Communication Skill-I (DIP104)

Contents : Theory		Hrs/week
Unit -1	Introduction: Definition, Objectives, Stages of Communication, Essentials of Good/Effective Communication, Benefits of Good Communication, Gaps in Communication, Communication and Information Technology. Business Correspondence: Structure of a Letter, Inquiry Letter, Sales Letter, Order Letter, Complaints, Complaint Handling, Telemarketing.	08
Unit -2	Government Correspondence: Noting, Routine Letter, Demi-Official Letter Memorandum, Circular, Telegrams, Newsletter. Writing Skills: Report Writing, Scientific Paper Writing, Writing Small Paragraphs & Essays.	08
Unit -3	2-3 classic short stories, 2-3 great short stories by Indian writers. Preparation for Job: Writing Applications for Jobs, Preparing Curriculum Vitae, Preparing for Interviews, Preparing for Group Discussions.	08
Unit -4	**Grammar:** Sentence Structure, Idiomatic Usage of Language, Tenses, Direct & Indirect Parts of Speech, Active & Passive Voice, Vocabulary.	08
Unit -5	**Preparation for Job:** Writing Applications for Jobs, Preparing Curriculum Vitae, Preparing for Interviews, Preparing for Group Discussions.	08
	Total	**40**

Text Books:

1. Organizations - Structures, Processes and Outcomes; Richard h Hall; Prentice Hall India.
2. English for the Secretary; Yvonne Hoban; Tata McGraw Hill.
3. Technical Communication: M. Raman & S. Sharma; Oxford University Press.
4. Business Communication Process and Product: M.E. Guffey; Thomson Learning.

Reference Book:

1. Human Behavior at Work; John W Newstorm & Keith Davis; Tata McGraw Hill.
2. The Most Common Mistakes in English Usage; Thomas Elliot Berry, Tata McGraw Hill
3. Business Communication: R.K. Madhukar; Vikas Publication.

Engg. Graphics (DIP105)

Contents (Theory)		Hrs/week
Unit -1	**Drawing Instruments and their uses :** 1.1 Letters and numbers (single stroke vertical) 1.2 Convention of lines and their applications. 1.3 Scale (reduced, enlarged & full size) plain scale and diagonal scale. 1.4 Sheet layout. 1.5 Introduction to CAD (Basic draw and modify Command). 1.6 Geometrical constructions.	**06**
Unit -2	**Engineering curves & Loci of Point:** 2.1 **To draw an ellipse by :** 2.1.1 Directrix and focus method 2.1.2 Arcs of circle method. 2.1.3 Concentric circles method. 2.2 **To draw a parabola by :** 2.2.1 Directrix and focus method 2.2.2 Rectangle method 2.3 **To draw a hyperbola by :** 2.3.1 Directrix and focus method 2.3.2 passing through given points with reference to asymptotes. 2.3.3 Transverse Axis and focus method. 2.4 **To draw involutes of circle & polygon (up to hexagon)** 2.5 **:** To draw a cycloid, 21 picycloids, hypocycloid To draw Helix & spiral. 2.6 Loci of Points: 2.7 Loci of points with given conditions and examples related to simple mechanisms. 2.7.1	**12**
Unit – 3	**Orthographic projections :** 3.1 Introduction to Orthographic projections. 3.2 Conversion of pictorial view into Orthographic Views (First Angle Projection Method Only). 3.3 Dimensioning technique as per SP-46.	**06**
Unit – 4	**Isometric projection :** 4.1 Isometric scale. 4.2 Conversion of orthographic views into isometric View/projection (Simple objects) 4.3 Projection of Straight Lines and Planes. (First Angle Projection Method only).	**08**
Unit – 5	5.1 Lines inclined to one reference plane only and limited to bothends in one quadrant. 5.2 Projection of simple planes of circular, square, rectangular, rhombus, pentagonal, and hexagonal, inclined to one reference plane and perpendicular to the other.	**08**
	Total	**40**

Text Books:-

	Titles of the Book	Name of Authors.	Name of the Publisher
(i)	Engineering Drawing	N.D. Bhatta	Charotar Publishing House
(ii)	Engineering Drawing & Graphics +Auto CAD	K. Venugopal	New Age Publication
(iii)	Engineering Drawing	R.K. Dhawan	S. Chand Co.
(iv)	Engineering Drawing	P.J. Shah	-
(v)	Engineering Graphics	K.R. Mohan	Dhanpat Rai and Publication Co.
(vi)	Engineering Graphics	Dharmendra Kumar	Foundation Publishing House

Computer Fundamentals (DIP106)

Contents : Theory		Hrs/week
Unit -1	Evolution of computer, Data and Information, Characteristics of computers, Various fields of application of computers, various fields of computer (Hardware, Software, Human ware and Firmware), Advantages and Limitations of computer, Block diagram of computer, Function of different units of computer, Classification of computers Types of software (System and Application), Compiler and Interpreter, Generation of language (Machine Level, Assembly, High Level, 4GL).	08
Unit -2	Input and Output Devices, **Computer Memory:** & **Number System (Logic gates)** Primary Memory (ROM and it's type – PROM, EPROM, EEPROM, RAM) Secondary memory- SASD, DASD Concept, Magnetic Disks – Floppy disks, Hard disks, Magnetic Tape, Optical disks – CD ROM and it's type (CD ROM, CD ROM-R, DVD, Flash Memory. Introduction to Number System, Conversion of Number System, Signed and Unsigned Numbers, Binary Coding, Logic gates, Boolean algebra, Combination of Logic Gates.	08
Unit -3	**Operating System Concept:** Introduction to operating system; Function of OS, Types of operating systems, Booting Procedure, Start-up sequence, Dos – History, Files and Directories, Internal and External Commands, Batch Files	08
Unit -4	**Editors and Word Processors 5** Basic Concepts: MS-Word, Introduction to desktop publishing **Spreadsheets and Database packages:** Purpose, usage, commands - MS-Excel Creation of files in MS-Access, MS – PowerPoint	08
Unit -5	Concept of Data Communication and Networking: Networking Concepts, Types of networking (LAN, MAN AND WAN), Communication Media, Mode of Transmission (Simplex, Half Duplex, Full Duplex), Analog and Digital Transmission. Synchronous and Asynchronous Transmission, Different Topologies	08
	Total	**40**

Text Books:

1. Leon and Leon; Introduction to Information Technology, Leon Tech World.
2. Microsoft Office-2000 Complete- BPB Publication.
3. Sinha, Kr. Pradeep and Preeti Sinha; Foundations of Computing, BPB Publication.
4. Jain, V.K.; Computers and Beginners

SEMESTER - 2									
THEORY		PERIOD			Evaluation Scheme			Credit	Hours
CODE	NAME OF THE PAPER	LECTURES	TUTORIALS	PRACTICALS	IA	ESE	SUB-TOTAL		
DIP201	Communication Skills-II	3	1	0	30	70	100	4	4
DIP202	Engg. Mathematics-I	3	1	0	30	70	100	4	4
DIP203	Applied Science	4	0	0	30	70	100	4	4
DIP204	Engg. Mechanics	4	0	0	30	70	100	4	4
DIP205	Engg. Drawing	2	0	2	30	70	100	4	4
DIP206	Basic Workshop Practice	0	0	4	30	70	100	4	4
DIP207L	Engineering Drawing LAB	0	0	2	15	35	50	2	2
DIP208L	Chemistry LAB	0	0	2	15	35	50	2	2
							Total Credits:	28	

Communication Skills-II (DIP201)

Contents Theory		
	Name of the Topic	Hrs/Week
Unit -1	**Introduction to communication :** 1.1 Definition , CommunicationCycle/Process, 1.2 Theelementsofcommunication:sender-message- channel-Receiver -Feedback &Context. 1.3 Definition of Communication Process. 1.4 Stages inthe process : definingthe context, knowingthe audience, designing the message, encoding , selecting proper channels, transmitting, receiving, decoding and giving feedback.	**08**
Unit -2	**Types of communication :** **2.1** Formal- Informal, Verbal- Nonverbal, Vertical- Horizontal- Diagonal.	**04**
Unit - 3	**Principals of effective communication :** 3.1 Definition of EffectiveCommunication. 3.2 Communication Barriers & how to overcome them. 3.3 Developingeffectivemessages: Thinkingaboutpurpose, knowing theaudience,structuring themessage, selectingproper channels, minimizing barriers & facilitating feedback.	**06**

Unit - 4	**Non verbal- graphic communication**: 4.1 Noun- verbal codes: A- Kinesics , B- Proxemics , C - Haptics D-Vocalics , E- Physical appearance. F -Chronemics , G -Artifacts Aspects of Body Language Interpreting Visuals & illustrating with Visuals like Tables, Charts & graphs.	**06**
Unit - 5	**Formal written skills :** 5.1 Office Drafting: Circular, Notice , and Memo. 5.2 Job Application with resume. 5.3 Business correspondence: Enquiry, Order letter, Complaint letter, and Adjustment letter. 5.4 Reportwriting:Accidentreport,fallinproduction,Progress / Investigative. 5.5 Defining & describing objects & givingInstructions.	**06**
	Total	**30**

Text Books :-

	Tilles of the Book	Name of Authors.	Name of the Publisher
(i)	Developing Communication Skills	Krushna Mohan, Meera Banerji	Macmillan
(ii)	Communication Skills	Joyeeta Bhattacharya.	Reliable Series
(iii)	Every ones guide to effective writing	Jayakaran	Apple Publishing
(iv)	Communication Skills-II	Kajari Guha	Foundation Publishing House
(v)	Effectual Communication Skills	Bhupender Kour	S.K. Kataria & Sons.
(vi)	The Functional Aspects of Communication Skills	Dr. P. Prasad	S.K. Kataria & Sons.
(vii)	Communication Skills	Leena Sen	Prentice Hall of India Pvt.Ltd.
(viii)	Professional Communication	Dr. Raavee Tripathi	S.K. Kataria & Sons.
(ix)	Technical Communication for Engineers	Shalini Verma	Vikas Publishing Home Pvt. Ltd.

Engg. Mathematics-I (DIP202)

Contents theory		Hrs/week
Unit -1	**Function and Limit :** **1.1 Function** 1.1.1 Definitionsofvariable,constant,intervalssuchasopen,closed, semi-open etc. 1.1.2 DefinitionofFunction,valueofafunctionandtypesoffunctions, Simple Examples. **1.2 Limits** 1.2.1 Definition of neighborhood, concept and definition limit. 1.2.2 Limits of algebraic, trigonometric, exponential and logarithmic functions with simple examples.	**03** **06**

Unit -2	**Derivatives :** 2.1 Definition of Derivatives, notations. 2.2 Derivatives of Standard Functions 2.3 RulesofDifferentiation.(Withoutproof).SuchasDerivativesofSum or difference, scalar multiplication, Product and quotient. 2.4 Derivatives of composite function (Chain rule) 2.5 Derivatives of inverse and inverse trigonometric functions. 2.6 Derivatives of Implicit Function 2.7 Logarithmic differentiation 2.8 Derivatives of parametric Functions. 2.9 Derivatives of one function w.r.t another function 2.10 Second order Differentiation.	**12**
Unit - 3	**Statistics And Probability :** **3.1 Statistics** 3.1.1 Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. 3.1.2 Graphical representation (Histogram and Ogive Curves) to find mode and median. 3.1.3 Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations. **3.2 Probability** 3.2.1 Definition of random experiment, sample space, event, Occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). 3.2.2 Definition of Probability, addition and multiplication theorems of Probability	**08** **04**
Unit - 4	**4.1 Applications Of Derivative** 4.1.1 Geometrical meaning of Derivative, Equation of tangent and Normal. 4.1.2 Rates and Motion 4.1.3 Maxima and minima 4.1.4 Radius of Curvature **4.2 Complex number** 4.2.1 Definition of Complex number. Cartesian, polar, Exponential forms of Complex number. 4.2.2 Algebra of Complex number(Equality, addition, Subtraction, Multiplication and Division) 4.2.3 De-Moivre's theorem(withoutproof)andsimpleproblems. Euler'sformofCircularfunctions,hyperbolicfunctions andrelations between circular &hyperbolicfunctions	**05** **04**
	Total	**42**

Text Books :-

	Tilles of the Book	Name of Authors.	Name of the Publisher
(i)	Mathematics for Polytechnic	S.P. Deshpande	Pune Vidyarthi Griha Prakashan Pune.
(ii)	Calculus single Variable	Robert T Smith	Tata McGraw Hill
(iii)	Advanced Engineering Mathematics	Dass H.K.	S. Chand Publication, New Delhi
(iv)	Fundamentals of Mathematical Statistics	S.C. Gupta and Kapoor	S. Chand Publication New Delhi
(v)	Higher Engineering Mathematics	B.S. Grewal	Khanna Publication, New Delhi
(vi)	Applied Mathematics	P.N. Wartikar	Pune Vidyarthi Griha Prakashan, Pune.
(vii)	Engineering Mathematics	Sindhu Prasad	Foundation Publishing House

Applied Science (DIP203)

(A) PHYSICS Contents		Hrs/week
Unit-1	**1. Kinematics** **1.1 Rectilinear Motion** Equations of Motions- $v = u+at$, $S = ut+1/2at^2$, $V^2 = u^2+2as$ (only equation), Distance traveled by particle in n^{th} second, Velocity Time Diagrams-uniform velocity, uniform acceleration and uniform retardation, equations of motion for motion under gravity. **1.2 Angular Motion** Definition of angular displacement, angular velocity, angular acceleration, Relation between angular velocity and linear velocity, Three equations of circular motion (no derivation) angular distance traveled by particle in n^{th} second (only equation), Definition of S.H.M. and S.H.M. as projection of uniform circular motion on any one diameter, Equation of S.H.M. and Graphical representation of displacement ,velocity, acceleration of particle in S.H.M. for S.H.M. starting from mean position and from extreme position.	**14**
Unit-2	**2. Kinetics** **2.1** Definitions of momentum, impulse, impulsiveforce, Statements of Newton's laws of motion and with equations, Applications of laws of motion—Recoil of gun, Motion of two connected bodies by light inextensible string passing over smooth pulley, Motion oflift. **2.2 Work, Power, Energy** Definition of work, power and energy, equations for P.E. K.E., Work energy principle, Representation of work by using graph, Work done by a torque(no derivation).	
Unit -3	**3. Non -destructive testing of Materials.** **3.1 T**esting methods of materials -Destructive and Nondestructive, Advantages and Limitations of N.D.T., Names of N.D.T. Methods used in industries, Factors on Which selection of N.D.T. dependents, Study of Principle, Set up, Procedure. **3.2** Working,Advantages,limitations,ApplicationsandApplicationcode of following N.D.T. methods -Penetrant method, Magnetic particle method, Radiography, Ultrasonic, Thermography.	**05**

Unit -4	**Acoustics and Indoor Lighting of Buildings** **4.1 Acoustics** Weber and Fetcher's law, limit of intensity and loudness, echo, Reverberation and reverberation time (Sabine's formula) ,Timbre (quality of sound), Pitch or Frequency of sound. Factors affecting Acoustical planning of auditorium-- echo, reverberation, creep, focusing, standing wave, coefficient of absorption, sound insulation, noise pollution and the different ways of controlling these factors. **4.2 Indoor lighting** Definition ofluminous intensity, intensity ofillumination with their SI units, Inverse square law and Photometric equation, Bunsen's photometer– ray diagram, working and applications, Needofindoor lighting, Indoor lighting schemes and Factors Affecting Indoor Lighting.	**05**
	Total	**24**

Text/Reference Books :-

	Tilles of the Book	**Name of Authors.**	**Name of the Publisher**
(i)	Physics –I	V. Rajendran	Tata McGraw - Hill
(ii)	Applied Physics	Arthur Beiser	Tata McGraw - Hill
(iii)	Engineering Physics	R.K. Gaurand and S.L. Gupta	Dhanpatrai
(iv)	Phyiscs	Resrie and Holliday	-
(v)	Concept of Physics Part-I, II	H.C. Verma	-
(vi)	Applied science	Roshan Kr. Sinha	Foundation Publishing House

(B) CHEMISTRY **Contents :Theory**		Hrs/ week
Unit -1	**Electrochemistry** Definition of Electrolyte & Conductor, Differencebetween Metallic & Electrolytic Conduction, Ionisation, Degree of Ionisation & Factors Affecting Degree of Ionisation, Conductivity of Electrolytes. Definition of Electrochemical Cell, Battery, Charge, Discharge, Closed Circuit Voltage, Open Circuit Voltage, EMF, Internal Resistance, Separator, Classification of Batteries such as Primary, Secondary & Reserve with Examples. Industrial Application of Electrolysis - Metallic or Protective Factors for Selection of Method of Coating, Process of Electroplating, Electrorefining, Electrometallurgy (Applications of Electroplating), Impregnated Coating or Cementation on Base Metal Steel - Coating Metal Zn (Sheradizing),Cr (Chomozing), Al (Colorizing), Applications, Advantages & Disadvantages.	**05**
Unit -2	**Non Metallic Engineering Materials** (Plastic, Rubber, Insulators, Refractories, Composite Material, Ceramics) 1. **Engineering Plastic:** Special Characteristics & Engineering Applications of Polyamides or Nylons, Polycarbonates (Like Lexan, Merlan), Polyurethanes (Like Perlon - U), Silicons, Polyacetals, Teflon, Laminated Plastic, Thermocole, Reinforced Plastic. 2. **Ceramics:** Definition, Properties & Engineering Applications, Types - Structural Ceramics, Facing Material, Refractories, Fine Ceramics, Special Ceramics. 3. **Refractories:** Definition, Properties, Applications & Uses of Fire Clay, Bricks, Silica Bricks. 4. **Composite Materials:** Definition, Properties, Advantages, Applications & Examples.	**05**

Unit -3	**Metals & lloys** **Metals** - Metallurgy of Iron, Terms Involved in Metallurgy, Indian Resources of Fe, Imp Ores, Extraction, Smelting in Blast Furnace, Chemical Reactions in Blast Furnace, Products of Blast Furnace, their Composition, Application, Commercial Forms of Iron, (Pig Iron / Cast Iron, Wrought or Malleable Steel), their Composition, Properties & Applications, Types of Casting (Chilled Casting, Centrifugal Casting & Malleable Casting), Heat Treatment, Heat Treatment of Cast Iron &Steel. **Alloys** - Definition, Types, Ferrous Alloys - Steel, Composition, Properties & Applications of Plain Carbon Steel (Low Carbon, Medium Carbon, High Carbon & Very Hard Steel) & Alloy Steels, (Heat Resisting, Shock Resisting, Magnetic, Stainless, Tool Steel & HSS), Effect of Various Alloying Elements (Cr, W, V, Ni, Mn, Mo, Si) etc. on Steel. Non-Ferrous Alloys - Copper Alloy - Brass, Bronze, Nickel Silver or German Silver, their Composition, Properties & Applications, Aluminium Alloy - Duralumin, Bearing Alloy - Babbitt Metal, Solders - Soft Solder,Brazing Alloy, Tinamann's Solder, Nickel Alloy - Monel Metal, Low Melting Alloys - Woods Metal.	**08**
Unit -4	**Corrosion** Definition, Types, Atmospheric or Chemical Corrosion, Mechanism, Factors Affecting Atmospheric, Corrosion & Immersed Corrosion or Electrochemical Corrosion, Mechanism, Protection of Metals by Purification of Metals, Alloy Formation, Cathode Protection, Controlling the External Conditions & Application of Protective Coatings i.e. Galvanising, Tinning, Metal Spraying, Sherardizing, Electroplating, Metal Clodding, Cementation or Diffusion Method, their Definition, Procedure, Uses,Advantages&Disadvantages,Examplesof Non Corrosive Materials, Protectionof Corrosion by the Useof Organic CoatingLikePaint,Lacquer, Enamels,EmulsionPaints,SpecialPaints, their Properties & Uses. Special Paints - Heat Resistant, Cellulose Paint, Coaltar Paint, Antifouling Paint their constituents & applications.	**05**
Unit -5	**Lubricant** Lubricant, Types, Lubrication Mechanism by Fluid Film, Baundary, Extreme Pressure, Physical Characteristics of Lubricants Such as Viscosity, Viscosity Index, Oilness, Volatility, Flash & Fire Point, Cloud & Pour Point, Chemical Characteristics such as Acid Value or Neutralization Number, Emulsification, Saponification Value, Selectionof Lubricants for Various Types of Machineries.	**03**
	Total	**26**

Text Books :-

	Tilles of the Book	**Name of Authors.**	**Name of the Publisher**
(i)	Engineering Chemistry	Jain & Jain	Dhanpat Rai and Sons
(ii)	Engineering Chemistry	S.S. Dara	S. Chand Publication
(iii)	Industrial Chemistry	B.K. Sharma	Goel Publication
(iv)	Environmental Chemistry & Pollution Control	S.S. Dara	S. Chand Publication
(v)	Applied science	Sanjay Kumar, Rahul Kumar	Foundation Publishing House

Engg. Mechanics (DIP204)

Contents Theory		Hrs/week
Unit -1	**Force** a. **Fundamentals: -** Definitions of mechanics, statics, dynamics. Engineering Mechanics, body, rigid body, mass, weight, length, time, scalar and vector, fundamental units, derived units, S.I. units. b. **Force**: - Definition of a force, unit force, Newton, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility. c. **Resolution of a force:** Definition, Method of resolution, Types of component forces, Perpendicular components and Non-perpendicular components. d. **Moment of a force: -** Definition, measurement of momentofa force, S. I. unit, geometrical meaning of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments Varignon's theorem of moment and it's use, couple - definition, S.I. unit, measurement of a couple, properties of couple. e. **Force system: -** Definition, classification of force system according to plane and line of action f. **Composition of Forces**: - Definition, Resultant force, methods of composition offorces, I - Analytical method:- (i) Trigonometric method (law of parallelogram of forces) (ii) Algebraic method (method of resolution), II - Graphical method: - Introduction, space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent, non-concurrent and parallel force system by analytical and graphical method.	**14**

Unit -2	**Equilibrium:** 2.1 Definition, conditions of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram. 2.2 Lami's Theorem - statement and explanation, Application of Lami's theoremforsolvingvarious engineeringproblems. 2.3 Equilibrant - Definition, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system. 2.4 Beams - Definition, Types of beams (cantilever, simply supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged, roller), classification of loads, point load, uniformly distributed load. Reactions of a simply supported and over hanging beam by analytical and graphical method.	**10**
Unit - 3	**Friction:** 3.1 Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction angle of repose and coeff. Of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction. 3.2 Equilibrium of bodies on level plane -external force applied horizontal and inclined up anddown. 3.3 Equilibrium of bodies on inclined plane - external forces is applied parallel to the plane, horizontal and incline to inclined plane. 3.4 Ladder friction, Wedge andblock.	**08**
Unit - 4	**Centroid and Centre Of Gravity:** 4.1 **Centroid:** Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure. 4.2 **Centerofgravity:** Definition, centerofgravity. Of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids.	**08**
Unit - 5	**Simple Machines:** 5.1 Definitions of simple machine, compound machine , load , effort , mechanical advantage , velocity ratio , input onamachine ,output of a machine ,efficiency of a machine , expression for mechanical advantage , velocity ratio and efficiency of a machine. Ideal machine, ideal effort and ideal load, friction in machines, effort lost in friction and frictional load. 5.2 Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self-locking machine.	**08**
	Total	**48**

Text Books :-

	Tilles of the Book	Name of Authors.	Name of the Publisher
(i)	Engineering Mechanics	Beer-Johnson	Tata McGraw Hill, Delhi
(ii)	Engineering Mechanics	Basu	Tata McGraw Hill, Delhi
(iii)	Vector Mechanics for Engineers Vol. - I & II	Joslph F. Shelley	Tata McGraw Hill, Delhi
(iv)	Engg. Mechanics	Ram Manohar Pandey	Foundation Publishing House

Engg. Drawing (DIP205)

Contents (Theory)		Hrs/week
Unit -1	**Sectional Views.** 1.1 Types of sections 1.2 Conversionof pictorial view into sectionalorthographic views (First Angle Projection Methodonly)	**04**
Unit -2	**Missing Views.** 2.1 Draw missingview from the given Orthographic views- simple components (First Angle Projection Method only)	**04**
Unit - 3	**Isometric Projection** 3.1 Conversion of Orthographic Views into Isometric view/projection (Including rectangular, cylindrical objects, representation of slots on sloping as well as plane surfaces).	**05**
Unit - 4	**Projections of Solids.** 4.1 Projections of Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube with their axes inclined to one reference plane and parallel to other.	**08**
Unit - 5	**Sections of Solids.** 5.1 Solids:-Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube. 5.2 Cone,Pyramid andTetrahedronrestingontheirbaseonHorizontal Plane. 5.3 Prism, Cylinder: -a)Axis parallel to both the reference plane b) Resting on their base on HP. 5.4 Section planeinclined toonereferenceplaneand perpendicular to other.	**05**
Unit - 6	**Developments of Surfaces.** Developments of Lateral surfaces of cube, prisms, cylinder, pyramids, coneandtheirapplicationssuchas tray,funnel,Chimney,pipebends etc.	**06**
Unit - 7	**Free Hand Sketches** 7.1 Freehandsketches ofnuts, bolts, rivets, threads, split pin, foundation bolts,	**08**
	Total	**40**

Text Books :-

	Tilles of the Book	Name of Authors.	Name of the Publisher
(i)	Engineering Drawing	N.D. Bhatta	Charotkar Publishing House
(ii)	Engineering Drawing	R.K. Dhawan	S. Chand Co.
(iii)	Engineering Drawing	P.J. Shah	-
(iv)	Machine Drawing	N.D. Bhatta	Charotkar Publishing House
(v)	Engineering Drawing and Graphics + Auto CAD	K. Venugopal	New Age Publication
(vi)	Engineering Graphics	K.R. Mohan	Dhanpat Rai and Publication Co.
(vii)	Machine Drawing	R.K. Dhawan	S. Chand Co.
(viii)	Engineering Drawing	Dharmendra Kumar	Foundation Publishing House

SEMESTER - 3									
THEORY		PERIOD			Evaluation Scheme			Credit	Hours
CODE	NAME OF THE PAPER	LECTURES	TUTORIALS	PRACTICALS	IA	ESE	SUB-TOTAL		
DIP301	Engg. Mathematics-II	4	0	0	30	70	100	4	4
DIP3CS02	Computer Programming Through 'C'	4	0	0	30	70	100	4	4
DIP3CS03	Introduction to Software Package	4	0	0	30	70	100	4	4
DIP3CS04	Digital Electronics	4	0	0	30	70	100	4	4
DIP3CS05	Operating System	4	0	0	30	70	100	4	4
DIP3CS06L	Computer Programming Through C LAB	0	0	2	15	35	50	2	2
DIP3CS07L	Introduction to Software Package LAB	0	0	2	15	35	50	2	2
							Total credit:	24	

Engg.Mathematics-II (DIP301)

	Name of the Topic	Hours
UNIT-01	Integration: 1.1Definition of integration as anti-derivative. Integration of standard function. 1.2Rules of integration (Integrals of sum, difference, scalar multiplication). 1.3 Methods of Integration. 1.3.1 Integration by substitution 1.3.2 Integration of rational functions. 1.3.3 Integration by partial fractions. 1.3.4 Integration by trigonometric transformation. 1.3.5 Integration by parts. 1.4Definite Integration. 1.4.1 Definition of definite integral. 1.4.2 Properties of definite integral with simple problems.	10

	1.5 Applications of definite integrals. 1.5.1 Area under the curve. Area bounded by two curves, 1.5.2Volume of revolution. 1.5.3 Centre of gravity of a rod, plane lamina. 1.5.4 Moment of Inertia of uniform rod, rectangular lamina 1.5.5Theorems of parallel and perpendicular axes.	08
UNIT-02	Differential Equation 2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant. 2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations. 2.3 Applications of Differential equations. 2.3.1 Rectilinear motion (motion under constant and variable acceleration) 2.3.2 Simple Harmonic Motion.	10
UNIT-03	Probability Distribution 3.1Binomial distribution. 3.2Poisson's distribution. 3.3 Normal distribution 3.4Simple examples corresponding to production process.	08
UNIT-04	Numerical Methods 4.1 Solution of algebraic equations Bisection method, Regulafalsi method and Newton – Raphson method. 4.2 Solution of simultaneous equations containing 2 and 3 unknowns Gauss elimination method. Iterative methods- Gauss Seidal and Jacobi's methods.	06 06
	Total	48

Text Books:		
Name of Authors	Titles of the Book	Name of the Publisher
Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
Calculus: single variable	Robert T. Smith	Tata McGraw Hill
Laplace Transform	Lipschutz	Schaum outline series.
Fourier series and boundary value problems	Brown	Tata McGraw Hill
Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Dehli
Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

Computer Programming through 'C' (DIP3CS02)

Contents : Theory			Hrs/week
Unit -1	**INTRODUCTION TO PROGRAMMING** The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.		03
Unit -2	**ALGORITHM FOR PROBLEM SOLVING** Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,		08
Unit -3	**INTRODUCTION TO 'C' LANGUAGE**		08
	03.01	Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.	
	03.02	Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.	
	03.03	Simple assignment statement. Basic input/output statement.	
	03.04	Simple 'C' programs of the given algorithms	
Unit -4	**CONDITIONAL STATEMENTS AND LOOPS**		07
	04.01	Decision making within a program	
	04.02	Conditions, Relational Operators, Logical Operator.	
	04.03	If statement, if-else statement.	
	04.04	Loop statements	
	04.05	Break, Continue, Switch	
Unit -5	**ARRAYS** What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.		07
Unit -6	**FUNCTIONS** Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.		07
Unit -7	**STRUCTURES AND UNIONS** Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,		04
Unit -8	**POINTERS** Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.		06
		Total	**50**

Text / Reference Books:

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India.- R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill.- E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education.- A. Kamthane
5. Pointers in C, BPB publication, New Delhi.- Yashwant Kanetkar

Introduction to Software Package (DIP3CS03)

Contents :Theory		Hrs/week
Unit -1	**WORD PROCESSING PACKAGE (MS-WORD):** 01.01 Features of Word Processing Package MS-Word, Menu Options-File, Edit, View, Insert, Format, Tools-spelling and grammar, language, mail- merge, options; table. 01.02 Creating, editing and saving a document, Opening a document, password protection for file. 01.03 Setting page margins, tab setting, ruler and indenting. 01.04 Formatting a document- using different fonts; changing font size and colour; changing the appearance through bold/italic/underline; highlighting text; change case; use of sub script and superscript. 01.05 Alignment of text in a document and justification, use of bullets and numbering. 01.06 Paragraph formatting, inserting page breaks and column breaks. 01.07 Use of headers, footers, footnote and end note. Use of Comments, inserting date, time, and special symbols, importing graphical images and use of drawing tools 01.08 Creating table, formatting cells, using different border styles, shading in tables, merging of cells, and partition of cells, inserting and deleting a row/column in a table. 01.09 Print preview, zoom, page setup, print options. 01.10 Use of tools such as spell checker, help, mail-merge, and use of macros.	**16**
Unit -2	**SPREADSHEET PACKAGE (MS-EXCEL):** 02.01 Features of Spreadsheet package such as MS Excel, Menu Options-File; edit; view; insert; format; tools- spelling, auto correct, protection, options; data. 02.02 Concepts of cell and cell-addressing. 02.03 Creating, operating and saving worksheet. 02.04 Entering text, numeric information and formula 02.05 Formatting numbers and text, protection cells, printing worksheet. 02.06 Using data management functions-mathematical, statistical and financial functions. 02.07 Creating different types of charts, graphs and balance worksheet and displaying 3-D Charts, printing and resizing charts. Importing files and graphics.	**16**

Unit -3	**PRESENTATION PACKAGE (MS-POWER POINT):** 03.01 Features of Presentation Package MS-Power Point, Menu options-File; edit, view; insert; format; tools-spelling, language, auto clipart, slide show 03.02 Status bar, tool bar, customized tool bar, slide view, outline view, slide sorter view, notes page view, slide show view 03.03 Creating and saving slides, opening and editing slides, changing layout of a slide, deleting of slide, changing layouts of a slide, deleting of slide, changing the order of slides, animation. 03.04 Working with objects: selecting, grouping, ungrouping and regrouping of objects, moving, aligning, cutting, copying, pasting, and duplicating objects. 03.05 Putting text on slides: selecting and editing text, finding and replacing text. 03.06 Creating graphs and importing files. 03.07 Creating tables. 03.08 Use of data sheet view and design view.	**13**
Unit -4	**ANTI VIRUS PACKAGES:** 05.01 Introduction to Virus. 05.02 Virus Protection, Deletion & Removal Utilities Anti Virus Packages to prevent, detect & delete Viruses.	**02**
	Total	**50**

Books Recommended:-

1.	MS office 2000 for Everyone, Vikash Publications, New Delhi	-	Sanjay Saxena
2.	MS office 2000, Addison Wesley(Singapore) Pvt. Ltd., New Delhi	-	Sagman
3.	MS office 2000 8-in-1, Prentice Hall of India, New Delhi	-	Habraken
4.	MS office, BPB Publications, New Delhi	-	Ron Mansfield
5.	MS Word 2000 in a Nutshell, Vikash Publishing House, New Delhi.	-	Sanjay Saxena
6.	MS Excel 2000 in a Nutshell, Vikash Publishing House, New Delhi.	-	Sanjay Saxena
7.	A Quick Course in Power Point and A Quick Course for Windows, Galgotia Publications Pvt. Ltd., Daryaganj New Delhi.	-	Cox

Digital Electronics (DIP3CS04)

Contents : Theory		Hrs/week
Unit -1	**INTRODUCTION OF NUMBER SYSTEM:** Decimal, binary, octal and hexadecimal number systems, Conversion from one system to another, binary arithmetic, signed numbers Codes: BCD, Excess-3, Gray.	02
Unit -2	**LOGIC FAMILIES AND CIRCUITS:** 2.1 TTL, logic family 2.2 NAND gates 2.3 7400 and 5400 series of IC logic families: RTL, TTL, MOS and CMOS.	04

Unit -3	**LOGIC GATES AND FLIP FLOPS:** 3.1 Definitions, symbols and truth table of NOT, OR, AND, NAND, NOR, XOR, XNOR gates, De Morgan's theorems; Karnaugh-map. 3.2 Logical diagram, truth table; timing diagram and operation of following latches and flip flops: NOR latch, RS, T, D, JK, Master/ Slave JK flip flops, encoders, decoders.	07
Unit -4	**REGISTERS:** 4.1 Shift Registers 4.2 Serial in Serial out 4.3 Serial in Parallel out 4.4 Parallel in Parallel out 4.5 Parallel in Serial out	04
Unit -5	**COUNTERS:** 5.1 Synchronous and Asynchronous counters Decade counter and its application	04
Unit -6	**ARITHMETIC CIRCUITS:** 6.1 Half adder and full adder circuit, design and implementation , Half and full subtracted circuit, design and implementation	04
Unit -7	**A/D AND D/CONVERTERS:** Analog to digital conversion	04
Unit -8	**SEMICONDUCTOR MEMORIES:** 8.1 Memory Unit 8.2 Concept of memories using registers 8.3 Read only Memory (ROM) 8.4 Random Access Memory (RAM) 8.5 Static and Dynamic Memory	06
Unit -9	**MULTIPLEXERS AND DE-MULTIPLEXERS:** Basic functions and Block diagram of MUX and DEMUX.	04
	Total	**50**

Books Recommended:-

Text Books:-

1.	Digital Electronics and Applications, McGraw Hills Publishers.	-	Malvino Leach
2.	Digital Logic and Computer Design, Prentice Hall of India Ltd., New Delhi.	-	Morries Marrow
3.	Digital Integrated Electronics, Prentice Hall of India Ltd., New Delhi	-	Herbert Raub and Donals Sachilling
4.	Digital Electronics, Prentice Hall of India Ltd., New Delhi	-	Rajaraman
5.	Microelectronics, McGraw Hill, 1987	-	J. Millman and A. Grabel
6.	Linear Integrated Circuits, Wiley Eastern, 1991	-	D. Roychaudhuri and S.B. Jani

Reference Books:

1.	Digital Principles, Latest Edition, 2000, Tata McGraw Hill Publishing Company Ltd., New Delhi	-	Malvino & Leach
2.	Modern Digital Electronics, Second Edition, 2000, Tata McGraw Hill Publishing Company Ltd., New Delhi	-	R.P. Jain
3.	Digital Electronics, First Edition, 2000, Tata McGraw Hill Publishing Company Ltd., New Delhi	-	V.K. Puri
4.	Electronics Circuits and Systems, 1992, Tata McGraw Hill Publishing Company	-	Y.N. Bapat

Operating System (DIP3CS05)

CONTENTS : Theory		Hrs/week
Unit-1	**INTRODUCTION** Evaluation of Operating Systems, Types of Operating Systems, Different views of the Operating Systems, OS concepts	**6**
Unit-2	**PROCESSES** The Process Concept, The Operating System view of Processes, Operating System Services for Process Management, Process Scheduling, Performance Evaluation.	**6**
Unit-3	**COMPUTER SYSTEM & OS STRUCTURE** Operation, I/O Structure, Storage Structure, Storage Hierarchy, OS Components, OS Services, System Calls, System Program, System Design and implementation, System Generation	**6**
Unit-4	**CPU SCHEDULING** Basic Concepts, Scheduling Criteria, Scheduling Algorithm	**6**
Unit-5	**MEMORY MANAGEMENT** **4.1 Contiguous Allocation** Single Process Monitor, Partitioned memory allocation static, Partitioned memory allocation-Dynamic, segmentation **4.2 Non-contiguous Allocation** Paging, Virtual Memory(allocation policies and replacement policies)	**8**
Unit-6	**FILE MANAGEMENT** File Concept, Access Method, Directory Structure, Protection	**5**
Unit-7	**CASE STUDY** 7.01 **LINUX OPERATING SYSTEM** Introduction to Linux Operating System. Linux features & Benefits: - **Introduction to Linux**:- Systems characteristics and requirements with Linux. **Getting Started**:-System manger, Password, Log in, Log out, running the System.	**03**

	7.02 **UNIX OPERATING SYSTEM** Introduction to Unix Operating System. Unix features &Benefits :- **Introduction to Linux**:- Systems characteristics and requirements with Linux. **Getting Started**:-System manger, Password, Log in, Log out, running the system. **File in the Unix System**:- File structure in Unix, Working with file structures, removable file volumes. **Unix Command Shells**:- Issuing commands, Input handling by the shells, The shell programming language, Running the Unix shells, Pipes, Version of Unix Systems. **The System Kernel**:- Nature of the Kernel, Process Co-ordinations and Management, Input and Output Operations. and Output Operations.	**6**
Total		**46**

Books /Reference Books-

1. Operating System Concepts, Addition-Wesley Publishing Company, 1989. **James L. Paterson, Abraham Silberschatz**
2. Modern Operating Systems, Prentice-Hall of India Private Ltd., 1995. **Andrew S. Tanenbaum**
3. First Course in Computers, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. **Sanjay Saxena**

SEMESTER - 4

THEORY		PERIOD			Evaluation Scheme			Credit	Hours
CODE	NAME OF THE PAPER	LECTURES	TUTORIALS	PRACTICALS	IA	ESE	SUB-TOTAL		
DIP4CS01	OOPS using C++	4	0	0	30	70	100	4	4
DIP4CS02	Database Management System	4	0	0	30	70	100	4	4
DIP4CS03	Data Structure Using 'C'	4	0	0	30	70	100	4	4
DIP4CS04	Introduction to Software Engineering	4	0	0	30	70	100	4	4
DIP4CS05L	Database Management System LAB	0	0	4	30	70	100	4	4
DIP4CS06L	Data Structure LAB	0	0	2	15	35	50	2	2
DIP4CS07L	C++ LAB	0	0	2	15	35	50	2	2
							Total credit:	24	

OOPS using C++ (DIP4CS01)

Contents : Theory		Hrs/week
Unit -1	Basics of Object Oriented programming and software design	06
Unit -2	C++ object-oriented programming	08

Unit -3	C++ & ANSI standard C, Predefined classes in C++	04
Unit -4	Building objects with classes, Introduction to Constructor, Destructor	08
Unit -5	Defining operations on objects, Using Inheritance in C++, Concepts of Overloading ,Virtual functions and Polymorphism Using C libraries in C++ programs, Using commercial class libraries (Standard template library)	12
Unit -6	Advanced Topics in C++ (Templates, Exception Handling, file handling, Streams)	08
	Total	**46**

Books:

1. Object Oriented Programming and C++, Balaguruswamy, TMH
2. Programming in C++, Shah & Thakker, ISTE/EXCEL
3. C++ Programming Today, Johnston,PHI
4. Revolutionary Guide to Object Oriented Programming Using C++,Olshevsky,SPD/WROX

Database Management System (DIP4CS02)

Contents : Theory		Hrs/week
Unit -1	**INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS (DBMS):** Why Database, Characteristics of Data in Database, DBMS, What is database Advantage of DBMS	05
Unit -2	**DATABASE ARCHITECTURE AND MODELLING:** Conceptual, physical and logical database models, Role of DBA, Database Design	05
Unit -3	**ENTITY RELATIONSHIP MODEL:** Components of ER Model, ER Modeling Symbols, Super Class and Sub Class types	06
Unit -4	**RELATIONAL DBMS:** Introduction to Relational DBMS	06
Unit -5	**RELATIONAL ALGEBRA AND RELATIONAL CALCULUS:** Relational Algebraic operations, Tuple Relational Calculus	06
Unit -6	**INTRODUCTION TO SQL:** History of SQL, Characteristics of SQL Advantages of SQL, and SQL in Action SQL data types and Literals, Types of SQL commands, SQL Operators and their precedence, Queries and Sub queries Aggregate functions, Insert, Update and Delete operations. Joins, Unions	06
Unit -7	**DATABASE NORMALISATION:** Keys, Relationships, First Normal Form, Functional dependencies, Second Normal Form, Third Normal Form,	08
Unit -8	**BACK UP AND RECOVERY:** Database backups; why plan backups? Hardware protection and redundancy, Transaction logs. Importance of backups, Database recovery	03

Unit -9	**DATABASE SECURITY AND INTEGRITY:** Types of Integrity constraints, Restrictions on Integrity constraints, Data security risks, Data security requirements, Database users, Protecting data within the database, Granting and revoking privileges and roles.	05
Concepts of DBMS will be implemented by using the popular relational DBMS package such as ORACLE/ MS-SQL.		
	Total	**50**

Text Books /Books Recommended:-

1.	Database Management Systems, First Edition, 2002, Vikas Publishing House	-	A. Leon & M. Leon
2.	Fundamentals of Database Systems, Third Edition, 2000, Addison Wesley	-	R. Elmasri, S. Navathe
Reference Books:-			
1.	Database System Concepts, Third Edition, 1997, McGraw-Hill Internation	-	H. Korth, A. Silberschatz
2.	An Introduction to Database Systems, Galgotia Publication	-	B. Desai
3.	Database Processing: Fundamentals, Design Implementation, Prentice Hall of India.	-	D.K. Kroenke
4.	Database Management Systems, First Edition, 1996, McGraw Hill	-	P. Bhattacharya and A.K. Majumdar
5.	Database System Concepts, Fourth Edition, 1997, Tata McGraw Hill	-	Abraham Silberschtz, Henry Korth & S. Sudarshan

Data Structure Using 'C' (DIP4CS03)

Contents : Theory		Hrs/week
Unit -1	**BASIC CONCEPTS OF DATA REPRESENTATION:** Abstracting data types: Fundamental and derived data types, Primitive data structures.	03
Unit -2	**INTRODUCTION TO ALGORITHM DESIGN AND DATA STRUCTURES:** Design and analysis of algorithm: Algorithm definition, comparison of algorithms, Analysis of Algorithm; Frequency count, Complexity measures in terms of time and space.	05
Unit -3	**ARRAYS:** Representation of arrays: single and multidimensional arrays. Address calculation using column and row major ordering. Various operations on Arrays, Application of arrays: Matrix multiplication.	06
Unit -4	**STACKS AND QUEUES:** Representation of stacks and queues using arrays and linked-lists, Circular queues, Priority Queue	06
Unit -5	**LINKED LISTS:** Singly linked list; operations on list. Linked stacks and queues, Circular linked lists, doubly linked lists	08
Unit -6	**TREES:** Binary tree traversal methods: Preorder, In-order, Post-order traversal. Recursive and non-recursive Algorithms for above mentioned Traversal methods. Representation of trees and its applications: Binary tree representation of a tree.	07
Unit -7	**SEARCHING, SORTING AND COMPLEXITY:** Searching: Sequential and binary searches Sorting: selection, bubble, Quick, merge.	08

Unit -8	**GRAPHS:** Graphs representation: Adjacency matrix, Adjancy lists, Traversal Schemes: Depth first search, Breadth first search.	07
	Implementation of Strategies: - To implement the methods of data structure, C is found to be appropriate language. - The student/teacher has to study/teach data structures and their methods using C.	
	Total	**50**

Books Recommended:-

1	Data Structure Using C and C++, Second Addition, 2000, Prentice Hall of India.	-	Y. Langsam, M. J. Augustein and A. M. Tanebaum
2	Data Structure Using C and C++, Second Addition, 2000, Prentice Hall of India.	-	R. Kruse, C. L. Tonodo and B. Leung
3	Data Structure through "C" Language, First Edition, 2001, BPB Publication	-	S. Chottopadhyay, D. Ghoshdastidar & M. Chottopadhyay
4	Data Structures, Algorithms and Object Oriented Programming, First Edition, 2002, Tata McGraw Hill.	-	G. L. Heileman
5	Fundamental of Data Structes in C++, 2002, Galgotia Publication 2002	-	E. Horowitz, Sahni and D. Mehta

Introduction to Software Engineering (DIP4CS04)

Contents : Theory		Hrs/week
Unit -1	**Introduction to Software Engineering:** Characteristics, Emergence of Software Engineering, Software Metrics & Models, Process & Product Metrics.	03
Unit -2	**Software Life Cycle Models:** Waterfall, Prototype and Spiral Models and their Comparison.	05
Unit -3	**Software Project Management:** Size Estimation- LOC and FP Metrics, Cost Estimation-Delphi and Basic COCOMO.	06
Unit -4	**Software Requirements Specification:** SRS Documents, their Characteristics and Organization.	06
Unit -5	**Software Design:** Classification, Software Design Approaches, Function Oriented Software Design, Structured Analysis- Data flow Diagrams and Structured Design, Introduction to Object Oriented Design.	08

Unit -6	**Coding and Testing of Software:** Unit Testing, Block Box Testing, White Box Testing, Debugging, Program Analysis Tools, System Testing. **Software Quality Assurance:** ISO 9000 and SEI CMM and their Comparison.	07
Unit -7	**Software Maintenance:** Maintenance Process Models and Reverse Engineering, Estimation of Maintenance Costs. **Software Development Tools:** Introduction to "Rational Rose".	08
	Total	**50**

Text Book:

1. Rajib Mall -Fundamentals of Software Engineering, Prentice Hall of India, New Delhi, 2005

Reference Book:

1. PankajJalote- An Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House, New Delhi,2005
2. Richard Fairley- Software Engineering Concepts, Tata McGraw Hill, New Delhi, 2006.

SEMESTER - 5									
THEORY		PERIOD			Evaluation Scheme			Credit	Hours
CODE	NAME OF THE PAPER	LECTURES	TUTORIALS	PRACTICALS	IA	ESE	SUB-TOTAL		
DIP5CS01	Web Technology	4	0	0	30	70	100	4	4
DIP5CS02	Introduction to Java	4	0	0	30	70	100	4	4
DIP5CS03	Environmental Science	4	0	0	30	70	100	4	4
DIP5CS04	Data Communication & Networking	4	0	0	30	70	100	4	4
DIP5CS05L	JAVA LAB	0	0	4	30	70	100	4	4
DIP5CS06L	Web Technology LAB	0	0	4	30	70	100	4	4
							Total credit:	24	

Web Technology (DIP5CS01)

Contents : Theory		Hrs/week
Unit -1	**Introduction to HTML:** HTML, HTML Tags, Commonly Used HTML Commands, Title and Footers, Text Formatting, Text Style, Lists, Adding Graphics to HTML Documents, Tables, Linking Documents, and Frames.	10

Unit -2	**Java Script: Java** Script in Web Pages, Advantages of Java Script, Advantages of Java Script, Data Types and Literals, Type Casting, Java Script Array, Operators and Expression, Conditional Checking, Function, User Defined Function.	10
Unit -3	**Understanding XML:** SGML, XML, XML and HTML, Modeling XML Data, Styling XML with XSL, XHTML	10
Unit -4	**Creation of Dynamic Web pages using JSP:** Dynamic Web Page, Introduction of JSP, Pages Overview, JSP Scripting, Standard Action, Page Directive, Include Directive	10
	Total	**40**

Text Books:

1. Ivan Bay Ross- Web Enable Commercial Application Using HTML, DHTML, BPB Publication
2. Michel Morrison -HTML and XML for Beginners, PHI, New Delhi- 2001
3. H.M Dietal and P.J Dietal -Java How to Program, PHI, New Delhi- 2005

Reference Book:

1. Java Server Side Programming -WROX Publication

Introduction to Java (DIP5CS02)

Contents : Theory		Hrs/week
Unit -1	**Java Evolution and Overview of Java Language:** How Java differs from C and C++, Java and Internet, Java and World Wide Web, Introduction, Simple Java Program, More of Java, An Application with Two Classes, Java Program Structure, Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, and Programming Style.	06
Unit -2	**Constants, Variables, and Data Types:** Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values of Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values.	05
Unit -3	**Operators and Expressions:** Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evolution of Expressions, Precedence of Arithmetic Operators, Type Conversion in Expressions, Operator Precedence and Associativity, Mathematical Functions.	07
Unit -4	**Decision Making and Branching:** Introduction, Decision Making with if Statement, Simple If Statement, The if... else Statement, Nesting of if ... else Statements, The else if Ladder, The switch Statement, The? Operator. **Decision Making and Looping:** Introduction, The while Statement, The do Statement, The for Statement, Jumps in Loops, Labelled Loops.	07

Unit -5	**Classes, Objects and Methods:** Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a. Class, Overriding Methods, final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control.	08
Unit -6	**Arrays, String and Vectors:** Arrays, One-Dimensional Arrays, Creating an Array, Two- Dimensional Arrays, Strings, Vectors, Wrapper Classes. **Interfaces:** Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, implementing Interfaces, Accessing Interface Variables.	07
Unit -7	**Packages:** Putting Classes Together: Introduction, Java API Packages, Using system Packages, Naming Conventions, Creating Packages, Accessing a Packages, Using a Package, Adding a Class to a Package, Hiding Classes.	05
Unit -8	**Multithreaded Programming:** Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, and Synchronization.	05
Unit -9	**Managing Errors and Exceptions:** Introduction, Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.	05
	Total	**55**

Text Book:

1. E. Balagurusamy, Programming with Java, A Primer Second Edition, Tata McGraw Hill, New Delhi.

Reference Books:

1. H.M.Deitel&P.J.Deitel- JA V A- How to Program, 5th Edn, Pearson Education, New Delhi-2004.

2. P.Naughton and H. Schildt-JAVA: The Complete Reference, TMH, New Delhi 2005.

Environmental Science (DIP5CS03)

Contents : Theory		Hrs/week
Unit -1	**Ecosystems and how they work:** Structure and function of an ecosystem**,** Types of Eco-Systems, Producers, Consumers and Decomposers, Food chains, food webs and ecological pyramids, Energy flow in the ecosystem. Introduction, Types, Characteristic features, Structure and Function of Forest ecosystem, Desert ecosystem, Aquatic ecosystems Lithosphere, Biosphere and Hydrosphere, Major issues of Biodiversity, Biosphere reserves, National Parks and sanctuaries.	08

Unit -2	**Concept of sustainability and international efforts for environmental protection**: Concept of Sustainable Development, Emergence of Environmental Issues, International Agreement on Environmental Management. **Human Population Growth and its effects on the environment:** Problem of Population growth, poverty and environment, Population Explosion, Family Welfare Programme.	08
Unit -3	**Renewable and non-renewable resources:** Defining resources, classification of resources, soil and land degradation, economic development and resources use, natural resources accounting. Energy needs, renewable and non-renewable energy resources, Solar energy and its availability, wind power and its potential, hydropower as a clean source of energy, coal, oil, natural gas etc., bio fuel.	08
Unit -4	**Pollution and Public Policy** **Water Pollution:** Water resources of India, Hydrological Cycle, methods of water conservation and management, ground and surface water pollution. Recycling and management of water and wastewater (domestic and industrial). Water borne diseases and health related issues. **Air Pollution:** Air pollution and air pollutants, sources of air pollution, its effect on human health and vegetation. Greenhouse effect, global warming and climate change. Ambient air quality standards, steps taken by Government to control air pollution. **Noise pollution** and its impacts on human health. **Solid Waste**: Municipal Solid Waste Management, segregation, disposal methods, composting, land fill sites etc. Hazardous waste management, biomedical waste management.	08
Unit -5	**Environmental Impact Assessment (EIA) and Environmental Management System** **(EMS)**: Introduction to EIA, its impact and case study, environmental information system (EIS), role of information technology in environment.	06
Unit -6	**Indian Environmental laws**: Legal framework: Constitutional provisions, the Indian Penal Code, Role of Judiciary in Environmental Protection, Wild Life (Protection) Act, 1972, Water (Prevention and Control of Pollution) Act, 1974, Environment (Protection) Act, 1986, Air (Prevention & Control of Pollution) Act, 1981, Forest Conservation Act	07
	Total	**45**

Text Books:

1. Gupta N.C.; Social Auditing of Environmental Law in India, edited book, New Century Publications, Delhi-2003.

2. Divan, Shyam and RosenCeranz; Armin. Environmental Law and Policy in India, Cases, materials and statutes, second edition, Oxford University Press, 2001.

3. Uberoi, N.K.; Environmental Management, Excel Books, New Delhi,2000.

4. Agarwal, A, Narain; S. State of India's Environment, Published by Centre for Science and Environment, New Delhi, 1999.

5. Ambasht, R.S. and P.K. Ambasht; Environment and Pollution-AnEcological Approach, third edition, CBS Publishers, New Delhi, 1999.

Data Communication & Networking (DIP5CS04)

Contents : Theory		Hrs/week
Unit -1	**Data Transmission Basic Concepts and Terminology:** Data Communication Model, Communication Tasks, Parallel & Serial Transmission, Transmission Models, Transmission Channel, Data Rate, Bandwidth Signal Encoding Schemes, Data Compression, Transmission Impairments, Layering and Design Issues, OSI Model, Services and Standards.	08
Unit -2	**Computer Network:** Network Topology, Performance of Network, Network Classification, Advantages & Disadvantages of Network, Transmission Media (guided and unguided), Network Architecture, OSI Reference Model, TCP/IP.	08
Unit -3	**Data Line Devices:** Modems, DSL, ADSL.	04
Unit -4	**Data Link Layer:** Need for Data Link Control, Frame Design Consideration, Flow Control & Error Control (Flow control mechanism, Error Detection and Correction techniques) Data Link Layer Protocol, and HDLC.	07
Unit -5	**Network Layer:** Routing, Congestion control, Internetworking principles, Internet Protocols (IPv4 packet format, Hierarchal addressing sub netting, ARP, PPP), Bridges, and Routers.	08
Unit -6	**Physical Layer:** Function and interface, physical layer standard, null modem.	07
Unit -7	**Network Security:** Security Requirement, Data encryption strategies, authentication protocols, Firewalls. **Basic Applications:** Telnet, FTP, NFS, SMTP, SNMP and HTTP.	08
	Total	**50**

Text Book:

1. Prakash C. Gupta -Data Communications & Computer Networks, PHI, New Delhi.

Reference Books:

1. William Stallings- Data & Communications, 6th Edition, Pearson Education.
2. Tanenbaum- Computer Networks, 3rd Edition, PHI, New Delhi.

SEMESTER - 6									
THEORY		PERIOD			Evaluation Scheme			Credit	Hours
CODE	NAME OF THE PAPER	LECTURES	TUTORIALS	PRACTICALS	MSE	ESE	SUB-TOTAL		
DIP6CS01	Computer Graphics	4	0	0	30	70	100	4	4
DIP6CS02	Introduction to Python	4	0	0	30	70	100	4	4
DIP603	Industrial Management	4	0	0	30	70	100	4	4
DIP6CS04	Elective (Any One)	4	0	0	30	70	100	4	4
DIP6CS05	Project & viva (SIP)	0	1	0	0	0	100	4	0
DIP6CS06L	PYTHON LAB	0	0	2	15	35	50	2	2
DIP6CS07L	Computer Graphics LAB	0	0	2	15	35	50	2	2
							Total credit:	24	
	Total Credits=152								

Computer Graphics (DIP6CS01)

Contents : Theory		Hrs/week
Unit -1	**Overview of Graphics Systems:** Video Display Devices, Refresh Cathode Ray Tubes, Raster-Scan and Random-Scan Systems, Input Devices, Hard-Copy Devices and Graphics Software.	08
Unit -2	**Output Primitives:** Points, Line Drawing Algorithms (DDA and Bresenham's Line Drawing Algorithm), Circle- Generating Algorithms (Bresenham's and Midpoint Circle Algorithms), Ellipse-Generating Algorithms (Midpoint Ellipse Algorithm only), Filled-Area Primitives: Scan –Line Polygon Fill Algorithm, Boundary-Fill Algorithm, Flood-Fill Algorithm.	08
Unit -3	**Two Dimensional Geometric Transformations:** Basic Transformations, Matrix 13 Representations and Homogeneous Coordinates, Composite Transformations, Reflection and Shear, Transformations between Coordinates Systems, Raster Methods for Transformations.	08
Unit -4	**Two-Dimensional Viewing:** The Viewing Pipeline, Viewing Coordinate Reference Frame, Window-to-View Port Coordinate Transformation, Clipping- Point, Line (Cohan-0Sutherland Line Clipping and Liang –Barsky Line Clipping and Nicholl-Lee-Nicholl Line Clipping) and Polygon Clipping(Sutherland- Hodgeman Polygon Clipping, Weiler-Atherton Polygon Clipping).	08
Unit -5	**Three Dimensional Geometric Transformations:** Translation, Rotation, Scaling, Reflection and Shears, Composite Transformations, Modeling and Coordinate Transformations. **Three Dimensional Viewing:** Viewing Pipeline, Viewing Coordinates, Projections and Clipping.	08
	Total	**40**

Text Books:

1. D. Hearn & M. P. Baker -Computer Graphics C Version, 2nd Edn, Pearson Education, New Delhi, 2006
2. J. F. KoegelBuferd -Multimedia Systems, Pearson Education, New Delhi, 2006

Reference Books:

1. R.A. Plastock et.al.- Computer Graphics(Schaums Outline Series), 2nd Edn, TMH, New Delhi, 2006.
2. J.D.Foley- Computer Graphics, 2nd Edn, Pearson Education, New Delhi, 2004

Introduction to Python (DIP6CS02)

Contents : Theory		Hrs/week
Unit -1	**Fundamentals of Python** • Introduction to Python • Running Python Programs • Writing Python Code	05
Unit -2	**Working with Data** • Data Types and Variables • Using Numeric Variables • Using String Variables	05
Unit -3	**Input and Output** • Printing with Parameters • Getting Input from a User • String Formatting	05
Unit -4	**Making Decisions** • Logical Expressions • The "if" Statement • Logical Operators • More Complex Expressions	05
Unit -5	**Finding and Fixing Problems** • Types of Errors • Troubleshooting Tools • Using the Python Debugger	05
Unit -6	**Lists and Loops** • Lists and Tuples • List Functions • "For" Loops • "While" Loops	05
Unit -7	**Working with Strings** • Character Data • String Functions • Input Validation with "try / except"	05
Unit -8	**Functions** • Writing and Calling Functions • Function Inputs and Outputs • Local and Global Scope	05

Unit -9	**Python Classes** • Thinking about Objects • Class Variables and Methods • Managing Class Files	05
	Total	**45**

Text Books and Reference Books:

1. Chun, J Wesley, Core Python Programming, Second Edition, Pearson, 2007 Reprint 2010
2. Barry, Paul, Head First Python, 2nd Edition, O Rielly, 2010
3. Lutz, Mark, Learning Python, 4th Edition, O Rielly, 2009

Industrial Management (DIP6CS03)

	Name of the Topic	Hrs/week
Unit -1	**Overview Of Business:-** **1.1. Types ofBusiness** • Service • Manufacturing • Trade **1.2. Industrialsectors** **Introduction to** • Engineering industry • Process industry • Textile industry • Chemical industry • Agro industry **1.3 Globalization** • Introduction • Advantages & disadvantages w.r.t. India **1.4 Intellectual Property Rights (I.P.R.)**	06
Unit -2	**Management Process:-** **2.1 What is Management?** • Evolution • Various definitions • Concept of management • Levels of management • Administration & management • Scientific management by F.W.Taylor **2.2 Principles of Management (14 principles of Henry Fayol)** **2.3 Functions of Management** • Planning • Organizing • Directing • Controlling	07

Unit - 3	**Organizational Management** **3.1 Organization :-** • Definition • Steps inorganization **3.2 Types of Organization** • Line • Line &staff • Functional • Project **3.3 Department** • Centralized &Decentralized • Authority &Responsibility • Span ofControl **3.4 Forms of Ownership** • Propriotership • Partnership • Joint stock	07
Unit – 4	**Human Resource Management** **4.1 Personnel Management** • Introduction • Definition • Functions **4.2 Staffing** • Introduction to HR Planning • Recruitment Procedure **4.3 Personnel– Training & Development** • Types oftraining ➢ Induction ➢ Skill Enhancement **4.4 Leadership &Motivation** • Maslow's Theoryof Motivation **4.5 Safety Management** • Causes ofaccident • Safety precautions **4.6 Introduction to–** • Factory Act • ESI Act • Workmen CompensationAct • Industrial DisputeAct	08

Unit – 5	**Financial Management:-** **5.1. Financial Management- Objectives & Functions** **5.2. Capital Generation &Management** • Types of Capitals • Sources of raising Capital **5.3. Budgets and accounts** • Types of Budgets ➢ Production Budget (including Variance Report) ➢ Labour Budget • Introduction toProfit& LossAccount (onlyconcepts); Balance Sheet **5.4 Introductionto–** • **Excise Tax** • **Service Tax** • **Income Tax**	08
Unit – 6	**Materials Management** **6.1. Inventory Management (No Numericals)** • Meaning & Objectives **6.2 ABC Analysis** **6.3 Economic Order Quantity** • Introduction & Graphical Representation **6.4 Purchase Procedure** • Objects of Purchasing • Functions of Purchase Dept. • Steps in Purchasing **6.5 Modern Techniques of Material Management** • Introductory treatment to JIT / SAP/ ERP	08
	Total	44

Titles of the Book	**Name of Authors**	**Name of the Publisher**
Industrial Engg & Management	Dr. O.P. Khanna	Dhanpal Rai & sons New
Business Administration & Management	Dr. S.C. Saksena	Sahitya Bhavan Agra
The process of Management	W.H. Newman E.Kirby Warren Andrew R. McGill	Prentice- Hall
Industrial Management	Rustom S. Davar	Khanna Publication
Industrial Organisation & Management	Banga & Sharma	Khanna Publication
Industrial Management	Jhamb & Bokil	Everest Publication , Pune
The fundamental of design management	Kathryn Best	

Elective (Any One) (DIP6CS04)

(i) Artificial Intelligence & Expert System

Contents : Theory		**Hrs/week**
Unit -1	**Overview of A.I:** Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.	10

	Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem **Heuristic search techniques:** Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction	
Unit -2	**Knowledge Representation:** Definition and importance of knowledge, Knowledge representation, Various approaches used in knowledge representation, Issues in knowledge representation. **Using Predicate Logic:** Represent ting Simple Facts in logic, Representing instances and is a relationship, Computable function and predicate.	10
Unit -3	**Natural language processing:** Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing. **Learning:** Introduction learning, Rote learning, Learning by taking advice, Learning in problem solving, Learning from example-induction, Explanation based learning.	10
Unit -4	Expert System: Introduction, Representing using domain specific knowledge, Expert system shells.	10
	Total	**40**

Suggested Readings

1. David W. Rolston: Principles of Artificial Intelligence and Expert System Development, McGraw Hill Book Company.
2. Elaine Rich, Kevin Knight: Artificial Intelligence, Tata McGraw Hill.
3. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999.
4. Nils J Nilsson, "Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.

(ii) Multimedia

	Contents : Theory	Hrs/week
Unit -1	Definitions - CD-ROM and the Multimedia Highway - where to use Multimedia - introduction to Making Multimedia: The stages of a Project - What you need - Multimedia Skills and Training: The terms - Macintosh and Windows Production Platforms: Macintosh Verses PC - The Macintosh Platform - The Windows Multimedia PC platform - Networking Macintosh and Windows Computers - Hardware Peripherals Connection - Memory and Storage Devices - Input Devices - Output Hardware - Communication Devices.	10
Unit -2	Text Editing and Word Processing Tools - OCR Software - Painting and Drawing Tools - 3-D Modeling and Animation Tools - Image - Editing Tools - Sound Editing Tools - Animation, Video and Digital Movies Tools - Helpful Accessories - Making Instant Multimedia: Linking Multimedia Objects - Office Suites - Word Procçssors - Spread sheets - Databases - Presentation Tools. Multimedia Authoring Tools: Types of Authoring Tools - Card and page Based Authoring Tools - Icon - Based Authorised Tools - Time Based Authoring Tools - Object - Oriented Authoring Tools - Cross - Platform Authoring Notes.	10

Unit -3	The Power of Meaning - About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext - Sound: The Power of Sound - Multimedia System Sounds - MIDI Versus Digital studio - Digital Audio - Making MIDI Audio - Audio File Formats - Working with Sound on the Macintosh - Notation Interchange File Format (NIFF) - Adding Sound to Your multimedia Project - Toward professional Sound - The Red Books standard production tips.	10
	Total	**30**

Text Books:

1. Tay Vaughan - Multimedia: Making it work - Fourth Edition - Tata McGraw-Hill Edition - 1999.

2. Walterworth John A - Multimedia Technologies and Application - Ellis Horwood Ltd. - London- 1991.

(iii) Software Project Management and Quality Assurance

Contents : Theory		Hrs/week
Unit -1	**Introduction and Software Project Planning** Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.	08
Unit -2	**Project Organization and Scheduling** Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.	08
Unit -3	**Project Monitoring and Control** Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.	08

Unit -4	**Software Quality Assurance and Testing** Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.	08
Unit -5	**Project Management and Project Management Tools** Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.	08
	Total	**40**

Books:

1. Software Project Management by M. Cotterell
2. Information Technology Project Management
3. Management Information and Control by
4. Software Project Managemnet by S. A. Kelkar