Faculty of Engineering & Technology

Syllabus

For

Diploma in Engineering

Computer Science (CS)

(Program Code: ET0131CS)

(2023-24)

Approved by the Academic Council vide resolution no ……

INDEX

1. INTRODUCTION

Technical Education plays a vital role in Human Resource Development of the country by creating skilled man power, enhancing Industrial productivity. Diploma in Engineering 3 year (6 Semester) programme is a professional course for learning of fundamental concepts. It helps to provide trained man power to carry out various trades in engineering. It also promotes entrepreneurial skills among the students. Jagan Nath University presently offers 3-Year Diploma programme in (i) Civil Engineering, (ii) Computer Science Engineering, (iii) Electrical Engineering and (iv) Mechanical Engineering with Choice Based Credit System (CBCS).

2. DURATION OF THE DIPLOMA PROGRAM

(a) There shall be a 3-Year (6 Semester) Program leading to the diploma of engineering

(b) Each Academic Year shall be divided into two Semesters, i.e. July to November / December and January to May / June.

(c) Each Semester shall consist of minimum 18 weeks.

3. TYPES OF COURSES

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
HS	Humanities & Social Sciences Courses
BS	Basic Science Courses
ES	Engineering Science Courses
PC	Program Core Courses
PE	Program Elective Courses
OE	Open Elective Courses
SI	Summer Internship
PR	Project
SE	Seminar

4. PROGRAM STRUCTURE DIPLOMA IN ENGINEERING (CIVIL ENGINEERING)

SEMESTER I

THEORY PAPERS		Type	No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIP101	Applied Physics -I	BS	3	1	-	30	70	100	4
DIP102	Computer Fundamental	ES	3	1	-	30	70	100	4
DIP103	Applied Mathematics-I	BS	3	1	-	30	70	100	4
DIP104	English and communication Skills	HS	3	1	-	30	70	100	4
DIP105	Applied Chemistry	BS	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIP106	Physics Lab-I	BS	-	-	2	60	40	100	1
DIP107	Computer Fundamental Lab	ES	-	-	2	60	40	100	1
DIP108	Engineering Drawing Lab	ES	-	-	2	60	40	100	1
DIP109	Basic Workshop Practice Lab – I	ES	-	-	2	60	40	100	1
DIP110	Chemistry Lab	BS	-	-	2	60	40	100	1
DIP111	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
TOTAL			**15**	**5**	**10**	**550**	**550**	**1100**	**26**

SEMESTER II

THEORY PAPERS		Type	No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIP201	Applied Physics II	BS	3	1	-	30	70	100	4
DIP202	Advanced English	HS	3	1	-	30	70	100	4
DIP203	Engineering Mechanics	ES	3	1	-	30	70	100	4
DIP204	Applied Mathematics II	BS	3	1	-	30	70	100	4
DIP205	Environmental Sciences	BS	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIP206	Physics Lab-II	BS	-	-	2	60	40	100	1
DIP207	English and Communication Lab	HS	-	-	2	60	40	100	1
DIP208	Basic Workshop Practice Lab - II	ES	-	-	2	60	40	100	1
DIP209	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
TOTAL			**15**	**5**	**6**	**430**	**470**	**900**	**24**

SEMESTER III

Theory Papers		Type	No. of Teaching hours			Marks Allocation			
Code	**Subject/paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIPCS301	Programming & Problem Solving Through 'C'	PC	3	1	-	30	70	100	4
DIPCS302	Computer System Architecture	PC	3	1	-	30	70	100	4
DIPCS303	Operating System Principles	PC	3	1	-	30	70	100	4
DIPCS304	Internet and Web Technologies	PC	3	1	-	30	70	100	4
DIPCS305	Basics of Digital Electronics	PC	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIPCS306	C Programming Lab	PC	-	-	2	60	40	100	1
DIPCS307	Internet & Web Technology Lab	PC	-	-	2	60	40	100	1
DIPCS308	Digital Electronics Lab	PC	-	-	2	60	40	100	1
DIPCS309	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
Total			**15**	**05**	**06**	**430**	**470**	**900**	**24**

SEMESTER IV

Theory Papers		Type	No. of Teaching hours			Marks Allocation			
Code	**Subject/paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIPCS401	Data Communication	PC	3	1	-	30	70	100	4
DIPCS402	Data Base Management System	PC	3	1	-	30	70	100	4
DIPCS403	Data Structure & Algorithm	PC	3	1	-	30	70	100	4
DIPCS404	Microprocessor and Interfacing	PC	3	-	-	30	70	100	3
DIPCS405	PC Maintenance and Trouble Shooting	PC	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIPCS406	DBMS Lab	PC	-	-	2	60	40	100	1
DIPCS407	DSA Lab	PC	-	-	2	60	40	100	1
DIPCS408	Microprocessor and Interfacing Lab	PC	-	-	2	60	40	100	1
DIPCS409	PC Maintenance and Trouble Shooting Lab	PC	-	-	2	60	40	100	1
DIPCS410	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
Total			**15**	**04**	**08**	**490**	**510**	**1000**	**24**

SEMESTER V

Theory Papers		Type	No. of Teaching hours			Marks Allocation			
Code	**Subject/paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIPCS501	Basics of Electronic Devices and Circuits	PC	3	-	-	30	70	100	3
DIPCS502	Object Oriented Programming Through C++	PC	3	1	-	30	70	100	4
DIPCS503	Unix, Shell Programming and Administration	PC	3	-	-	30	70	100	3
DIPCS504	Software Engineering	PC	3	-	-	30	70	100	3
DIPCS505	Dot Net Technology	PC	3	-	-	30	70	100	4
DIPCS506	Personality Development Skills	HS	3	-	-	30	70	100	3
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIPCS507	EDC Lab	PC	-	-	2	60	40	100	1
DIPCS508	OOPS Lab	PC	-	-	2	60	40	100	1
DIPCS509	Unix & Shell Programming Lab	PC	-	-	2	60	40	100	1
DIPCS510	S.E. Lab	PC	-	-	2	60	40	100	1
DIPCS511	.Net Lab	PC	-	-	2	60	40	100	1
DIPCS512	Minor Project	PC	-	-	1	60	40	100	1
DIPCS513	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
Total			**15**	**01**	**11**	**640**	**660**	**1300**	**27**

SEMESTER VI

Theory Papers		Type	No. of Teaching hours			Marks Allocation			
Code	**Subject/paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIPCS601	Computer Network	PC	3	1	-	30	70	100	3
DIPCS602	Data warehouse and mining	PC	3	1	-	30	70	100	4
DIPCS603	Introduction to Network Security and Cryptography	PC	3	1	-	30	70	100	3
DIPCS604	Java Tools	PC	3	1	-	30	70	100	3
DIPCS605	PHP & MySql	PC	3	1	-	30	70	100	4
DIPCS606	GD & PI	HS	3	-	-	30	70	100	3
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIPCS607	Core Java Lab	PC	-	-	2	60	40	100	1
DIPCS608	Core PHP Lab	PC	-	-	2	60	40	100	1
DIPCS609	Major Project	PR	-	-	2	60	40	100	3
DIPCS610	Seminar	SE	-	-	1	60	40	100	1
DIPCS611	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
Total			**18**	**05**	**07**	**520**	**580**	**1100**	**27**

Note-: The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports. Seminar related to the project should be delivered one after starting of semester .The progress will be monitored through seminars and progress reports.

- The Total Number of credits of the Diploma in Computer Science program=152.
- The award of the degree a student shall be required to earn the minimum of 152 credits

5. DETAILED SYLLABI OF DIPLOMA IN ENGINEERING (CS)

SEMESTER I

THEORY PAPERS		Type	No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIP101	Applied Physics -I	BS	3	1	-	30	70	100	4
DIP102	Computer Fundamental	ES	3	1	-	30	70	100	4
DIP103	Applied Mathematics-I	BS	3	1	-	30	70	100	4
DIP104	English and communication Skills	HS	3	1	-	30	70	100	4
DIP105	Applied Chemistry	BS	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIP106	Physics Lab-I	BS	-	-	2	60	40	100	1
DIP107	Computer Fundamental Lab	ES	-	-	2	60	40	100	1
DIP108	Engineering Drawing Lab	ES	-	-	2	60	40	100	1
DIP109	Basic Workshop Practice Lab – I	ES	-	-	2	60	40	100	1
DIP110	Chemistry Lab	BS	-	-	2	60	40	100	1
DIP111	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
TOTAL			**15**	**5**	**10**	**550**	**550**	**1100**	**26**

DIP101: APPLIED PHYSICS-I

Course Contents:

Unit I: **Measurement:** Physical Quantities, Units for Measurement, Fundamental and Derived Units, Systems of Units, SI Units, Dimensional Analysis, Uses of Dimensional Analysis, Limitations of Dimensional Analysis, Accuracy in Measurement, Errors in Measurement, Combination of Errors, Order of Magnitude, Significant Digits.

Unit II: **Motion and Force:** Distance and Displacement, Speed and Velocity, Relative Velocity, Acceleration and Retardation, Uniformly Accelerated Motion, Equations of Motion, Force and Inertia, Momentum, Impulse, Newton's Law of Motion with examples, Law of Conservation of Momentum, Friction, Laws of Friction, Sliding and Rolling Friction.

Unit III: **Gravitation:** Law of Universal Gravitation, Acceleration due to Gravity, Variation in the value of 'g', Inertial and Gravitational Mass, Gravitational Field, Gravitational Potential Energy, Gravitational Potential, Escape Velocity, Artificial Satellite, Geostationary Satellite, Polar Satellite, Weightlessness in Satellites, Kepler's Laws of Planetary Motion.

Unit IV: **Properties of Matter:** Elasticity, Stress, Strain, Hooke's Law, Young's Modulus, Bulk Modulus, Modulus of Rigidity, Poisson's Ratio, Surface Tension, Surface Energy, Cohesive and Adhesive Force, Angle of Contact, Capillarity, Stream Line and Turbulent Flow, Viscosity, Coefficient of Viscosity, Reynold's Number.

Unit V: **Transfer of Heat:** Modes of Heat Transfer, Isothermal Surface and Temperature Gradient, Coefficient of Thermal Conductivity, Black Body, Reflecting Power, Absorbing Power, Transmitting Power and Emissive Power, Kirchhoff's Law, Wein's Displacement Law, Stefan's Law, Planck's Law of Radiation, Newton's Law of Cooling.

Reference books:

1. Applied Physics Vol. I & II, TTTI Publication Tata McGraw Hill, Delhi
2. Basic Applied Physics by R K Gaur; Dhanpat Rai Publications
3. Simple Course in Electricity and Magnetism by C L Arora, S Chand and Co, New Delhi
4. Fundamental Physics- Vol. I and II by Gomber and Gogia; Pardeep Publications, Jalandhar
5. Concepts in Physics by HC Verma, Bharti Bhawan Ltd., New Delhi
6. Physics XI &XII, NCERT, New Delhi
7. Physics XI &XII Rajasthan Board, Ajmer

DIP102: COMPUTER FUNDAMENTALS

Course Objective:

- To give the basic knowledge of Computer hardware and application software to the students.
- Students able to learn how computers work and how they can be used to make your work more efficient.
- Also Course the basic utilization of the MS Office software package.

Course Contents:

Unit I: Computer System: Basics of computer systems, history, types and Generation of computer, capability and limitations of computer systems. Hardware organization: Anatomy of a digital computer; Internal architecture of CPU.

Unit II: Memory Units: Memory Hierarchy, Primary Memory, Secondary Memory, cache memory. Storage Devices, Input and Output Devices.

Unit III: Number system & Conversions: decimal, binary, octal and hexadecimal number systems and their inter conversions, 1's and 2's complement representation, Binary Arithmetic operations: addition, subtraction, multiplication, division.

Unit IV: Word processor: Introduction to MS-Word, Starting MS-Word, Opening Document, Typing and Editing, Copying, Inserting, Moving, Deleting, Copying from One Document to Others, Undo, Redo, Spell Check, Find and Replace, Formatting, Characters and Fonts, Spacing, Removing Characters Formatting, Inserting Symbols, Paragraphs, Page Setting, Header and Footer, Page Breaks, Borders and Shading, Print Preview and Printing; Tables and Columns

Unit V: Electronic Spread Sheet: Introduction to MS-Excel, Working with Spread Sheet, Editing the Worksheet, Worksheet Formatting, Formula Entering, Saving and Printing Work Book

References:

1. Sinha, P.K. Computer Fundamentals (BPB Publications).
2 Niranjan Mansal and Jayshri Saraogi Computer Made Easy For Beginners (Hindi)
3 Satish Jain, Shashank Jain and Madhullika Jain. It Tools and Applications (BPB Publications)
4 MS Office 2000. Joe Habraken
5 Rapidex Computer Course (Pustak Mahal)
6 Davinder Singh Minhas- Dynamic Memory Computer Course (Fusin Books), New Delhi

DIP103: APPLIED MATHEMATICS-I

Course Contents:

Unit-I: **Introduction to Different Types of Expansion:** Factorial Notation, Meaning of C(n, r), P(n, r), Binomial Theorem for Positive Index, any Index, Exponential Theorem, Logarithm Theorem, Complex umber: Definition of Complex Number, Operations on Complex Number (Add., Sub., Multiplication, Division), Conjugate Complex Number, Modulus and Amplitude of a Complex Number, Polar form of a Complex Number

Unit-II: **Trigonometry:** Allied Angle(sin (180±A), sin (90±A) etc., Sum and Difference Formula (without proof) and their Application Product Formula and C-D Formula, T-Ratios of Multiple and Sub-Multiple Angles (2A, 3A, A/2), Solution of Trigonometric Equations: sin X = 0, tan X = 0, cos X = 0, sin X=A, cos X =A & tan x = A

Unit-III: **Matrices and Determinants:** Definition and Properties of Determinants, Definition and Types of Matrix, Transpose of a Matrix, Symmetric, Skew Symmetric Matrices, Orthogonal matrices,, Minors and Cofactors, Adjoint and Inverse of a Matrix, Cramer's Rule, Solution of Simultaneous Linear Equations by Inverse Matrix Method. Numerical Integration: Trapezoidal Rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule, Newton - Raphson Rule

Unit-IV: **Two Dimensional Coordinate Geometry:** General Introduction, Distance Formula and Ratio Formula, Co-ordinate of Centroid, In-Centre, Ortho-Centre and Ex-Centre of a Triangle, Area of Triangle, Straight Line, Slope form, Intercept form, Perpendicular form, One Point Slope form, Two Point form & General form, Angle between Two Lines, Perpendicular Distance of a Line from a Point

Unit- V: **Conic:** Definition and Standard Equations, Equations of Tangent and Normal at a Point (simple problems), Parabola: Definition and Standard Equations, Equations of Tangent and Normal at a Point (Simple problems), Ellipse and Hyperbola: Definition and Standard Equations, Equations of Tangent and Normal at a Point (simple problems)

Reference Books:

1. Mathematics XI & XII — NCERT, New Delhi
2. Mathematics XI & XII — Rajasthan Board, Ajmer
3. Polytechnic Mathematics — H. K. Dass

DIP104: ENGLISH AND COMMUNICATION SKILLS

Course Contents:

Unit I: Grammar

1. Usage of Tense.
2. Articles (A, an, the)
3. Active & Passive voice
4. Direct & Indirect Speech.
5. Modal Verbs.

Unit II: Comprehension

1. The Luncheon: W.S. Maugham
2. How Much Land Does a Man Need?: Leo Tolstoy
3. The Last Leaf: O. Henry
4. If: Rudyard Kipling

Unit III: Composition

1. Paragraph Writing.
2. Letter Writing.
3. E-Mails
4. Resume Writing.

Unit IV Elements of Communication

1. Communication: Meaning, Importance and Process
2. Functions/Objectives of Communication
3. Barriers to Communication**.**
4. Qualities of good Communication

Unit V Types of Communication

1. Verbal and Non- Verbal Communication
2. Formal and Informal Communication
3. Professional Communication
4. Interpersonal Communication and Methods to Improve It.

Recommended Books:

1. English for Competitive Examinations, Prof. R.P.Bhatnagar, Macmillan Publications.
2. "Current English Grammar and Usage with Composition" by R.P. Sinha, Oxford University Press (New Delhi).
3. Effective Technical Communication By M Ashraf Rizvi Tata McGraw-Hill Companies, New Delhi.
4. Communication Skills by sanjay kumar & Pushp Lata. Oxford University Press (New Delhi)

DIP105: APPLIED CHEMISTRY

Course Contents:

Unit-I **Atomic Structure**: Constituents of the Atom**,** Bohr's Model of the Atom, Quantum Number and Electronic Energy Levels, Aufbau's Principle, Pauli's Exclusion Principle, Hund's Rule, $n + l$ Rule, Electronic Configuration of Elements (s,p,d Block Elements)

Development of Periodic Table: Modern Periodic Law, Long form of Periodic Table.Study of Periodicity in Physical and Chemical Properties with special reference to: - Atomic and Ionic Radii, Ionisation Potential. Electron Affinity. Electronegativity. Variation of Effective Nuclear Charge in a Period. Metallic Character.

Unit-II **Carbon Chemistry:** Definition of Organic Chemistry. Difference between Organic and Inorganic Compounds. Classification and Nomenclature - Open Chain and Closed Chain Compounds, IUPAC System of Nomenclature. (upto C5). **New Engineering Materials:** Superconductors, Organic Electronic Materials, Fullerences, Optical Fibres

Unit-III **Metals and Alloys:** General Principles and Terms listed in Metallurgy, Metallurgy of Iron and Steel, Different forms of Iron, Effect of Impurities on Iron and Steel, Effect of Alloying Elements in Steel. Extraction of Fe, Cu, Al and their important ores.

Kinetic Theory of Gases: Postulates of kinetic Theory, Ideal Gas Equation, Pressure and Volume Corrections, Vender Walls Equations, Liquefaction of Gases, Critical Pressure and Critical Temperature for Liquefaction. Liquefaction of Gases by Joule – Thomson Effect, Claude's Method and Linde's Method

Unit-IV **Water:** The sources of water, common Impurities, soft and hard water, Hardness of water, degrees of hardness and its effects, determination of hardness by various techniques, Municipal Water supply, requisites of drinking water, purification of water by sedimentation, filtration, reverse osmosis (RO), sterilization, chlorination. treatment by preheating, lime-soda process, permutit de-ionizer or demineralization.

Unit-V **Electrochemistry:** Redox reactions; conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells. Relation between Gibbs energy change and EMF of a cell, fuel cells;

Reference Books:

1. Engineering Chemistry II- Mathur and Agarwal
2. Chemistry of Engineering Materials C.V. Agarwal
3. Engineering Chemistry P.C. Jain and Monika
4. Engineering Chemistry M.M. Uppal
5. Engineering Chemistry V.P.Mehta Jain Bros. Jodhpur
6. Hand book of Technical Analysis Bannerji Jain Bros.Jodhpur
7. Inorganic Chemistry Shivhare & Lavania.
8. Organic Chemistry Kumar & Mehnot
9. A Text book of Engineering Chemistry S. K. Jain & K. D. Gupta
10. Engineering Chemistry Dr. K.L. Menaria & Dr Praveen Goyal

DIP106: PHYSICS-I LAB

List of Experiments:

1. To study of least count, error analysis and curve fitting.
2. Conversion of a Galvanometer into an Ammeter.
3. Conversion of a Galvanometer into Voltmeter.
4. To determine the acceleration due to gravity by using a simple pendulum.
5. To determine the diameter of given material using Screw gauge.
6. To determine the internal diameter, outer diameter and depth of a calorimeter by using Vernier caliper.
7. To determine the height of given spherical surface by using Spherometer.
8. To determine the wavelength of He -Ne Laser beam.
9. To determine minimum deviation angle for different light using prism and spectrometer

DIP107: COMPUTER FUNDAMENTAL LAB

Course Objective:

- To Understand the Basics of Operating systems
- To Undestand how to use software packages in day to day activities.
- To to identify word processing terminology and concepts, Create technical documents, Animation and Design document, format and edit documents, use simple tools and utilities, Mail merge,Graph,Chart, Reports and Mathematical expressions.

List of Experiments:

1. Create simple news letter in ms word.
2. Create greeting card in ms word.
3. Create a mail merge letter in MS Word.
4. Create a cover page of the project report.
5. Create a simple presentation in MS Power Point to list simple dos commands, hardware, software.
6. In Power Point create an animation with video and sound.
7. In MS Excel create a report containing the pay details of the employee with followings:

   It contains: sl no, name, employee id

   Enter the following formula to calculate the respective values.

   da (60% of basic)

   hra (7.5% of basic)
8. Create a student result sheet.
9. Create a pie chart for a sample data and give legends
10. Create a macro which creates a line chart using the data in the worksheet.

DIP108: ENGINEERING DRAWING

List of Experiments:

Preparation of following on Imperial Size Drawing Sheet:

1.1 Lines, Letters and Scales

1.2 Geometrical Constructions and Engineering Curve

1.3 Projection of Lines

1.4 Projection of Planes

1.5 Projection of Solids

1.6 Orthographic Projections of Simple objects

1.7 Section and Development of Surfaces of Solids
i.e. Cone, Cylinder, Sphere etc.

Preparation of following Drawings in Sketch Book (Home Assignment):

2.1 Lettering (On Graph Sheet)

2.2 Projections of Points in Different Quadrants

2.3 Isometric Projections of Various Planes

DIP109: BASIC WORKSHOP PRACTICE - I

Electrical Workshop

1. Study of the various electrical symbol.
2. Study of the tools used in electrical works with diagram.
3. Study of the electrical apparatus, multimeter, ammeter, voltmeter, and wattmeter.
4. Study the various type of electrical wiring (1) Batten wiring (2) Casing- capping wiring (3) C**on**duit wiring
5. Study of the electrical iron and electrical rod.
6. Study of the electrical fan.
7. Study of the electrical heater.
8. Study of the various type of lamps.
9. Study of the florescent lamp.

10 Study of the electrical energy meter (single phase).

Electronic Workshop

1. Explain and measurement of the resistant.
2. Study and measurement of the electronic component and symbols.
3. Study of the types of switches.
4. Study of the function generator.
5. Study of the cathode Ray oscilloscope.
6. Practice of the soldering-de soldering iron.

DIP110: CHEMISTRY LAB

List of Experiments:-

1. To determine the strength of a given unknown copper sulphate solution (Iodometrically) with titrate Hypo (sodium thiosulphate) solution.
2. To determine the strength of a given unknown FAS solution with titrate potassium dichromate solution using N-phenyl anthranilic acid (internal indicator).
3. To determine the viscosity and viscosity index of a given sample of lubricating oil using Redwood viscometer No.1
4. To determine the flash and fire point of a given sample of lubricating oil using Pensky Marten's apparatus.
5. Determine the cloud and pour point of a given sample of lubricating oil.
6. Determination of hardness of water by complexometric method (using EDTA).
7. To estimation the amount of sodium hydroxide and sodium carbonate in the given alkali mixture solution (or in water sample) by titrating against an intermediate hydrochloric acid using phenolphthalein and methyl orange indicator.
8. Determine the pH of an acid (strength of an acid) pH – metrically.
9. Determine the strength of a given unknown HCl solution by titrating it against NaOH solution (Conductometric analysis).
10. To determine the moisture and ash content in a given sample of coal by proximate analysis**.**

DIP111: Social Outreach, Discipline & Extra Curricular Activities

This course aims to cultivate self-confidence, leadership, and community responsibility. It influences academic and personal development, fostering civic responsibility. Students grasp the value of social work and discipline's significance. They contribute to social up-gradation through engagement in organizations, blood donation, awareness programs, and personality development initiatives.

SEMESTER II

THEORY PAPERS		Type	No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIP201	Applied Physics II	BS	3	1	-	30	70	100	4
DIP202	Advanced English	HS	3	1	-	30	70	100	4
DIP203	Engineering Mechanics	ES	3	1	-	30	70	100	4
DIP204	Applied Mathematics II	BS	3	1	-	30	70	100	4
DIP205	Environmental Sciences	BS	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIP206	Physics Lab-II	BS	-	-	2	60	40	100	1
DIP207	English and Communication Lab	HS	-	-	2	60	40	100	1
DIP208	Basic Workshop Practice Lab - II	ES	-	-	2	60	40	100	1
DIP209	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
TOTAL			**15**	**5**	**6**	**430**	**470**	**900**	**24**

DIP201: APPLIED PHYSICS-II

Course Contents:

Unit I: **Electrostatics and Magnetism:** Electric Charge, Conservation of Charge, Coulomb's Law, Principle of Superposition, Electric Field and Potential, Electric Field and Potential due to Point Charge, Electrostatic Potential Energy, Current, Resistance, Ohm's Law, Magnetic Field, Biot-Savart's Law and its Applications.

Unit II: **Semiconductor Physics:** Solids, Energy Bands in Solids, Conductors, Insulators and Semiconductors, Intrinsic and Extrinsic Semiconductors, Conductivity and Resistivity of Semiconductors, P-N Junction Diode, Biasing and Characteristic Curves, Rectifier, Solar Cell, Zener Diode, LED.

Unit III: **Alternating Current:** Peak Value, Average Value and Root Mean Square Value of Alternating Voltage and Current, Reactance and Impedance, AC Circuits containing R, C, L, R-C, R-L, L-C and L-C-R, Resonant Circuits and their Characteristics, Power of an AC Circuit, Choke Coil, Transformer, Dynamo, D. C. Motor, Starter.

Unit IV: **Optics:** Reflection and Refraction of Light, Laws of Refraction, Critical Angle, Total Internal Reflection,Refraction of Light at a Spherical Surface, Image, Mirrors, Lenses and Prism, Formation of Image by Lenses, Lens Formula, Linear Magnification, Refractive Index of medium of Prism, Dispersion of Light, Spectrum, Angular Dispersion.

Unit V: **Oscillation and Waves:** Periodic Motion, Simple Harmonic Motion, Displacement Equation, Phase and Phase difference, Velocity, Acceleration and Energy of SHM, Simple Pendulum, Wave Motion, Transverse and Longitudinal Waves, Progressive and Stationary Waves, Principle of Superposition of Waves, Sound Waves, Interference of Sound Waves.

Reference books:

1. Applied Physics Vol. I & II, TTTI Publication Tata McGraw Hill, Delhi

2. Basic Applied Physics by R K Gaur; DhanpatRai Publications

3. Simple Course in Electricity and Magnetism by C L Arora, S Chand and Co, New Delhi

4. Fundamental Physics – Vol. I and II by Gomber and Gogia; Pardeep Publications, Jalandhar

5. Concepts in Physics by HC Verma,BhartiBhawan Ltd., New Delhi

6. Physics XI &XII, NCERT,New Delhi

7. Physics XI &XII Rajasthan Board,Ajmer

DIP202: ADVANCED ENGLISH

Course Contents:

Unit-I (Grammar)

1. Modal
2. Preposition
3. Conjunction

Unit-II (Composition)

1. Resume writing
2. Report writing
3. Advertisement

Unit-III (Personality)

1. Define Personality
2. Types of Personality
3. How to develop one's personality

Unit-IV (Elements of Communication)

1. Meaning
2. Barriers to communication
3. Functions / Objectives of Communication

Unit-V (Poems)

1. 'No men are foreign' – by James Kirk up
2. 'Death, Be not Proud' – by John Donne

DIP203: ENGINEERING MECHANICS

Course Contents:

Unit I **Force System:** Introduction, force, principle of transmissibility of force, resultant of a force system, resolution of a force, moment of force about a line. Varigon's theorem, Lami's theorem. Force body diagram.

Unit II **Centroid & Moment of Inertia:** Location of centroid and center of gravity, Moment of inertia, Parallel axis and perpendicular axis theorem, Radius of gyration, M.I of composite section, Polar Moment of inertia, Lifting Machines: Mechanical advantage, Velocity Ratio,

Unit III **Friction:** Types of Friction, Laws of friction, Angle of friction, Angle of repose, Ladder, Wedge, Belt Friction. Belt Drive: Types of belts, Types of belt drives, Velocity ratio, Effect of slip on Velocity ratio, Length of belt, Ratio of tensions and power transmission by flat belt drives.

Unit IV **Kinematics of Particles and Rigid Bodies:** Velocity, Acceleration, Types of Motion, Equations of Motion, Rectangular components of velocity and acceleration, Angular velocity and Angular Acceleration, Radial and transverse velocities and accelerations,

Unit V **Work, Energy and Power:** Work of a force, weight, spring force and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservative and Nonconservative Force, Conservation of energy.

References Books:

1. Vector Mechanics for Engineers, Beer and Johnston, Tata McGraw-Hill.
2. Engineering Mechanics, Hibbeler, Pearson Education.
3. Engineering Mechanics, Meriam and Kraige, John Wiley & Sons.
4. Engineering Mechanics, Timoshenko and Young, Tata McGraw-Hill.
5. Engineering Mechanics, Shames, Pearson Education.
6. Engineering Mechanics, Boresi and Schmidt, CL-Engineering.
7. Engineering Mechanics, Andrew Pytel & Kiusalas, Cengage Learning.

DIP204: APPLIED MATHEMATICS-II

Course Contents:

Unit-I **Function:** Definition of Function, Range and Domain of Function, Types of Function, Absolute Value Function, Exponential value Function, Identity Function, Reciprocal Function, Rational and Irrational Function, Increasing and decreasing Function, Limits, Concept of Limit, L.H.L., R.H.L., Limit of Standard Functions, Concept of Continuity and Differentiability at a Point (simple Problems)

Unit-II: **Differential Calculus:** Standard Formulae (Except Hyperbolic Function) Derivative of Sum, difference, Multiplication and Division of two Functions,Differentiation of Function of a Function, Logarithmic Differentiation, Differentiation of Implicit Functions, Differentiation of Parametric Functions, Differentiation by Trigonometric Transformations, Differentiation of a Function w.r.t. Another Function, Second Order Derivative

Applications of Differential Calculus: Tangents and Normals, Angle of Intersection between two Curves, Derivative as a Rate Measurer, Maxima and Minima of Function with one Variable

Unit-III: **Integral Calculus:** General Introduction of Integral Calculus, Integration of Sum and difference of Functions, Integration by Simplification, Integration by Substitution, Integration by Parts, Integration of Rational and Irrational Functions,Integration of Trigonometric Functions, Definite Integral and its Properties

Unit IV: **Differential Equations:** Definition of differential Equation, Order, Degree and Solution of a differential Equation, Solution of a differential Equation of First Order and First Degree using: Variable Separable Method, Homogenous Form, Reducible to Homogenous Form, Linear differential Equation, Bernoulli's Equation, Exact differential Equation .

Unit V: Solution of Linear Differential Equation of Higher order with Constant Coefficients, Vector Algebra: Definition, Addition and Subtraction of Vectors, Scalar and Vector Product of two Vectors, Scalar Triple Product and Vector Triple Product, Applications of Vectors in Engineering Problems

Reference Books:

1. Mathematics XI & XII NCERT, New Delhi
2. Mathematics XI & XII Rajasthan Board, Ajmer
3. Polytechnic Mathematics H. K. Dass
4. Text Book on Differential Calculus Chandrika Prasad
5. Text Book on Integral Calculus Chandrika Prasad
6. Differential Calculus M. Ray, S. S. Seth, & G. C. Sharma
7. Integral Calculus M. Ray, S. S. Seth, & G. C. Sharma

DIP205: ENVIRONMENTAL SCIENCE

Course Contents:

Unit-I **Ecosystem: concepts and functions**

Ecosystem- Definition and Introduction of Ecosystem- Abiotic and Biotic components, types of Ecosystems, Food chain, Food web, Ecological pyramids, Energy flow in Ecosystem. Types values, threats and conservation methods of biodiversity.

Unit-II **Environmental Pollutions and Disaster management**

Causes, Effects and Control measures of: Air pollution, Water pollution, Noise pollution, Disaster management: Floods, earthquake, cyclone and landslides.

Unit-II **Solid Waste Management**

Introduction, Classification of solid waste, Composition and characteristics of solid waste, collection, conveyance and disposal methods of solid waste, Reuse, Recycle and Recovery of waste.

Unit-IV **Non-conventional Energy sources**

Introduction, Renewable Sources of Energy: Solar energy, wind energy, Energy from ocean, energy from biomass, geothermal energy and Nuclear Energy.

Unit-V **Social Issues and Environment**

Sustainable development, urban problems related to energy, water shed management and Rain water harvesting, Environmental Education and Public awareness. Environment Protection Act- 1986, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest conservation Act.

Recommended Reference Books:

1. Brunner R.C., Hazardous Waste Incineration, McGraw Hill Inc. 1989.
2. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB).
3. Cunningham, W.P, Cooper, T.H. Gorhani, E & Hepworth, M.T., Environmental Encycolopedia, Jaico Publishing House, Mubmbi, 2001.
4. De. A.K., Environmental Chemistry, Wiley Eastern Ltd.
5. Agarwal, K.C. 2001 Environmental Biology, Nidhi Publ. Ltd. Bikaner.
6. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut.
7. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p.
8. Shikha Agarwal and Suresh Sahu, Environmental Engineering, Dhanpat rai and co. (P) LTD. 2009.

DIP206: PHYSICS LAB -II

List of Experiments:

1. To study of least count, error analysis and curve fitting.
2. To determine the value of ‘g’ with help of Compound Pendulum.
3. To study Zener diode as a constant voltage regulator
4. To Study the inverse square law using photocell.
5. To determine the numerical aperture of optical fiber.
6. To study the charging of a condenser.
7. To study the discharging of a condenser.
8. To determine the Planck’s constant using LED.
9. Study of the variation of magnetic field at the center of coil when radius remains constant and current vary fitted with the compass box.

DIP207: ENGLISH & COMMUNICATION SKILLS LAB

Topics to be covered:

1. Introducing yourself.
2. Role Plays.
3. Words often mis-spelt and Mis- Pronounced.
4. One word for many.
5. Synonyms and Antonyms.
6. Seminar Presentation.
7. Group Discussion.
8. Job Interview.

DIP208: BASIC WORKSHOP PRACTICE Lab - II

Fitting Shop

1. Finishing of two sides of a square piece by filing and to cut a Square notch using hacksaw.
2. To drill three holes and Tapping on the given specimen.

Welding Shop

3. To prepare Lap Joint with the help of Arc welding
4. To prepare Butt Joint with the help of arc Welding
5. Gas welding practice by students on mild steel flat

Machine Shop Practice

6 Job on lathe M/C with centering
7. Job on lathe M/C with step turning
8. Job on lathe M/C with grooving.
9. Study of Shaper M/C.

DIP209: Social Outreach, Discipline & Extra Curricular Activities

This course aims to cultivate self-confidence, leadership, and community responsibility. It influences academic and personal development, fostering civic responsibility. Students grasp the value of social work and discipline's significance. They contribute to social up-gradation through engagement in organizations, blood donation, awareness programs, and personality development initiatives.

Diploma in Computer Science

SEMESTER III

Theory Papers		Type	No. of Teaching hours			Marks Allocation			
Code	**Subject/paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIPCS301	Programming & Problem Solving Through 'C'	PC	3	1	-	30	70	100	4
DIPCS302	Computer System Architecture	PC	3	1	-	30	70	100	4
DIPCS303	Operating System Principles	PC	3	1	-	30	70	100	4
DIPCS304	Internet and Web Technologies	PC	3	1	-	30	70	100	4
DIPCS305	Basics of Digital Electronics	PC	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIPCS306	C Programming Lab	PC	-	-	2	60	40	100	1
DIPCS307	Internet & Web Technology Lab	PC	-	-	2	60	40	100	1
DIPCS308	Digital Electronics Lab	PC	-	-	2	60	40	100	1
DIPCS309	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
Total			**15**	**05**	**06**	**430**	**470**	**900**	**24**

DIPCS 301: PROGRAMMING & PROBLEM SOLVING THROUGH 'C'

Course Contents:

Unit I **Introduction:** Scope of 'C' Language, Distinction and similarities with other HLLs, Special features and Application areas.

Elements of 'C': Character set, Key words, Data types, Constants and Variables, Operators: unary, binary, ternary Operator precedence.

Unit II **Console Input-Output:**

Types of I-O, Console I-O, Unformatted console I-O: getchar(),putchar(), gets(), puts(),getch(),getche(), Formatted I-O: scanf(), printf()

Control Flow: Statements and blocks – if, switch, Loops: for, while, do-while, goto and labels, break, continue, exit, Nesting control statements

Unit III **Arrays:** Basic concepts, Memory representation, One dimensional array, Two dimensional array, Three dimensional array.

Functions: Basic concepts, Declaration and prototypes, Calling, Arguments, Scope rules, Recursion, Storage classes types, Library of functions: math, string, system

Unit IV **Pointers:** Basic concepts, &, * operator, Pointer expression: assignment, arithmetic, comparison, Dynamic memory allocation, Pointer v/s Arrays, Array of pointers, Pointer v/s Functions,

Structure, Union and Enumerated Data Types: Basic concepts, Declaration and memory map, Elements of structures, Structure v/s array, Structure v/s function, Union, Enumerated data types: typedef, enum, Self-referential structures, Low Level Bitwise Operators: &, |, ^

Unit V **File Handling:** Types of files, File organization, Opening, reading, writing, closing, Text and binary file.

Numerical Methods: Numerical Integration: Simpson's 1/3 rule, Simpson's 3/8 rule, Matrix Operation, Matrix Inverse by Gauss – Elimination Method, Matrix Inverse by Gauss – Jordan Method, Matrix Addition, Subtraction, Multiplication

Reference Books:

1. Application Programming in C R.S. Salaria, Khanna Pub. House.
2. Programming with 'C' Schaum's Series, TMH
3. 'C' Programming E.Balguru Swami, TMH
4. 'C' Programming Kernighan & Ritchie, TMH
5. Let us 'C' Yashwant Kanetkar, BPB
6. Computer Oriented Numerical Method R.S. Salaria, Khanna Pub. House.

DIPCS302: COMPUTER SYSTEM ARCHITECTURE

Course Contents:

Unit I **Overview of Computer Organization:** Evolution of computer, Von Neumann architecture, Computer generations, Microprocessors and micro-computers design methodology

Register and Micro -Operations: Register, Register transfer, Arithmetic micro operations, Logic micro operations, Shift micro operations, Control functions.

Unit II **Basic Computer Organization:** Instruction codes, Computer Instructions, Timing and Control, Execution of instructions, I/O and interrupt,

Central Processor Organization: Processor Bus organization, ALU: Simple and floating point, Stack Organisation, Instruction formats modes, Addressing schemes, Data transfer and manipulation, Program control.

Unit III **Arithmetic Processor Organization:** Comparison and subtraction of unsigned binary numbers, Addition and subtraction Algorithm, Multiplication and division Algorithms, Floating point operations.

Unit IV **Input / Output Organization:** Peripheral devices, I/O processors, DMA, Interrupt handling, Data communication, Multiprocessor organizations,

Memory Organization: Concept of primary and secondary memory, Memory hierarchy, Cache memory, Associative memory (CAM), Virtual memory concept, Memory management unit

Unit V **Introduction to Parallel Processing:** Flynn's Classification, Pipelining, Vector Processor, Parallel Processors.

Reference Books:

1. Computer System Architecture Morris Mano, PHI
2. Structured Computer Organization Tanenbaum (PHI)
3. Computer Organization and Architecture Stallings (PHI)
4. Computer Architecture and Organisation John P. Hayes
5. Advanced Computer Architecture Rajeev Chopra, Vikas Pub. House
6. Computer Organization and Design Pal Choudhary (PHI)
7. Introduction to Digital Computer Design V. Rajaraman

DIPCS303: OPERATING SYSTEM PRINCIPLES

Course Contents:

Unit I **Introduction:** What is an operating System, Mainframe, Desktop & Multi processor, Distributed System, Real time Systems, Operating System Services,

Unit II **Process Management and CPU Scheduling:** Process Concept, Process Scheduling, Concept of Threads & Multithreading, Basic Complets – CPU/IU burst, CPU Scheduler, Premptine scheduling dispatcher, Scheduling Criterions, Scheduling Algos: FCFS, SJF, Priority, Round Robin

Unit III **Deadlocks:** What is Deadlock ? Necessary Conditions for deadlock, Resource allocation graph, Deadlock prevention, Deadlock avoidance – Banker's Algo., Deadlock Detection wait for graph and detection algorithm, Deadlock recovery

Memory Management: Structure of computer memory, Logical verses physical address space, Contiguous memory allocation and Fragmentation, Concept of Paging: Basic method & h/w support, Concept of segmentation: Basic Method & h/w support,

Unit IV **Virtual Memory:** Concept of Virtual memory, Concept of Demand Paging, Page replacement Algorithms: FIFO, Optimal, LRU, Allocation Algorithms: equal & proportional allocation, Thrashing: Cause and Solution (working set model)

Unit V **File System:** File concept, File Attributes, File Operations, File Types, File Access: Sequential and Direct, Allocation Methods: Contiguous Allocation, Linked Allocation, Indexed Allocation.

Distributed Operating System (DOS): Introduction, Hardware Concept: Multiprocessor and Multicomputer Systems, Software Concept: Network File System (NFS), Network Operating System (NOS) verses DOS, Design Issues: Transparency, Flexibility, Reliability, Performance, Scalability

Reference Books:

1. Operating System Silber Schaltz, Galvin, Gagne, Wiley Pub.
2. Operating System Tannenbaum.
3. Operating System Godebole
4. Operating System Stallings
5. Distributed Operating System Tannenbaum

DIPCS304: INTERNET AND WEB TECHNOLOGIES

Course Contents:

Unit I **Internet Basics:** Concept, Establishing Connectivity on Internet, Email: POP, SMTP, www, File Transfer, Telnet, IP Address, Brief overview of TCP/IP

HTML: File Creation, Web Server, Web Client, Introduction to HTML, HTML Tags, Structure of HTML Programs, Heading, Titles and Footers, Text Formatting, Text Styles, Text Effects, Color and Backgrounds, Lists, Adding Graphics, Tables, Linking Documents, Frames.

Unit II **Java Script:** Java script in web pages, Advantages of JavaScript, Writing JavaScript into HTML, Programming - Data types and Literals, Type casting, Variables, Arrays, Operators and Expressions, Conditional and Iterative Loops, Functions, Dialog Boxes, Cookies.

Unit III **DHTML:** Introduction to DHTML, Cascading Style sheets (CSS), Font Attributes- Color, Background, Text and Border, List Attributes, Class, The <SPAN>….</SPAN> Tag, Java Script Style Sheet, The <DIV>…..</DIV>Tag,

Unit IV **CGI:** Use of CGI, Working of CGI, Methods of Data Submission (GET and POST), Environment Variables, Process Form Information in CGI Program.

Unit V **Perl:** Basics of Perl, Strings, Scalar variables, Arrays, Hash Array, Arithmetic and Comparison Operators, Control Program Flow, Functions: String, Array, Mathematical and Time, File Handling, STDIN & STDOUT, Concept of Files and Directories, Open and Close Files, Reading and Writing Files

Reference Books:

1. Web Enabled Commercial Application Development Using HTML, DHTML, Java Script Ivan Bayross, BPB
2. Internet and Web Technology Xavier, TMH
3. Web 101, Making the Network for you Wendy Lehnert, PEA
4. Java Script Flamange, (ORA/SPD)
5. Dynamic HTML Goodman, (ORA/SPD)

DIPCS305: BASICS OF DIGITAL ELECTRONICS

Course Contents:

Unit I **Introduction:** Digital signal and its representation, Advantages of digital techniques,

Number System: Decimal, binary, octal and hexa-decimal number system, Conversion of a number from one system to another system, Binary addition, subtraction and multiplication, Representation of positive and negative numbers, 1's complement and 2's complement, Subtraction using 2's complement, Parity bit, Binary codes (Gray, Excess -3, Hamming codes), ASCII code, Floating point number

Unit II **Logic Gates & Families:** Introduction, Symbol and truth table of NOT, AND, OR, NAND, NOR, EX-OR and EX-NOR gates, Universal gates, Positve, negative and tristate logic, Classification of digital ICs. Characteristics of digital ICs.

Boolean Algebra: Historical review - logical statements, logical constants and variables, truth table, Boolean operators, Postulates of Boolean algebra, Laws of Boolean algebra, Duality theorem, De' Morgan's theorem, Simplification of Boolean expressions, Verification of Boolean expressions using truth table

Unit III **Minimization Techniques (K-Mapping):** Representation of Boolean expression - min. and max. Term SOP, POS, Conversion of truth tables in POS and SOP form, Karnaugh map upto 4 variables - implication of logic function with and without don't care conditions, Realization of logic diagrams using NAND/NAND, NOR/NOR gate,

Unit IV **Combinational Logic Design:** Binary half and full adder, Binary half and full subtractor, Binary serial, parallel and BCD adder, Parity bit generator and checker, Binary comparator, Multiplexer, 4 to 1 multiplexer, 16 to 1 multiplexer, Demultiplexer, 1 to 4 Demultiplexer, 1 to 16 Demultiplexer, Encoder, Decimal to BCD, Decoder, BCD to Decimal, BCD to seven segment

Unit V **Sequential Systems:** Introduction, Symbol, logic circuit, truth table of R-S, J-K, M/S J-K,D,T flip-flops, Edge and level triggering, Shift registers,- Left, right and bi-direction, Series and parallel, Universal shift register, Asynchronous and synchronous counters - up, down and up-down, Mod counters - Mod 5, Mod 9, decade counter, Ring counters, Johnson counter, Programmable counters, Use of shift register for simple binary multiplication and division.

Reference Books:

1. Digital Principles & Applications Malvino Leach., TMH
2. Integrated Electronics Millman & Halkias, M. Hill
3. Digital Electronics T.C. Bartee
4. Digital Electronics Practice Using IC’s R.P. Jain. TMH
5. Modern Digital Electronics R.P. Jain,TMH
6. Digital Circuit & Design S. Salivahanan, Vikash Pub.
7. Digital Intregrated Circuit K.R. Botker
8. Digital Design Flloyd
9. Digital Logic Design Morris Mano., PHI

DIPCS 306: C PROGRAMMING LAB

1. Problems based on arithmetic expression, fixed mode arithmetic
2. Problems based on conditional statements and control structures.
3. Problems based on arrays (1-D, 2-D), functions, pointers, files
4. Problems based on string and character manipulation.
5. Problems based on Numerical Methods using 'C' language

DIPCS307: INTERNET AND WEB TECHNOLOGIES LAB

1. Installation of Web server and Web browser
2. Practice for creating web pages/sites using HTML
3. Practice for creating web pages/sites using JavaScript
4. Practice for creating web pages/sites using DHTML
5. Practice for creating web pages/sites using CGI
6. Practice for creating web pages/sites using Perl

DIPCS308: DIGITAL ELECTRONICS LAB

1. Verify the truth tables of NOT, AND, OR, NAND, NOR, EX-OR, EX-NOR gates
2. Design a NOT, AND, OR, EX-OR, EX-NOR gates using universal gates
3. Design a binary half and full adder
4. Design a binary half and full subtractor
5. Study of BCD to 7 segment decoder
6. Verify the truth table of RS, D, J-K, M/S J-K,D,T flip-flops.
7. Study of asynchronous binary ripple up, down and up-down and different mod counters
8. Study of synchronous counters
9. Study of decade counter
11. Study of programmable counter
12. Study of a shift register using flip flops
13. Study of ring counter using flip flops

DIPCS309: Social Outreach, Discipline & Extra Curricular Activities

This course aims to cultivate self-confidence, leadership, and community responsibility. It influences academic and personal development, fostering civic responsibility. Students grasp the value of social work and discipline's significance. They contribute to social up-gradation through engagement in organizations, blood donation, awareness programs, and personality development initiatives.

SEMESTER IV

Theory Papers		Type	No. of Teaching hours			Marks Allocation			
Code	**Subject/paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIPCS401	Data Communication	PC	3	1	-	30	70	100	4
DIPCS402	Data Base Management System	PC	3	1	-	30	70	100	4
DIPCS403	Data Structure & Algorithm	PC	3	1	-	30	70	100	4
DIPCS404	Microprocessor and Interfacing	PC	3	-	-	30	70	100	3
DIPCS405	PC Maintenance and Trouble Shooting	PC	3	1	-	30	70	100	4
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIPCS406	DBMS Lab	PC	-	-	2	60	40	100	1
DIPCS407	DSA Lab	PC	-	-	2	60	40	100	1
DIPCS408	Microprocessor and Interfacing Lab	PC	-	-	2	60	40	100	1
DIPCS409	PC Maintenance and Trouble Shooting Lab	PC	-	-	2	60	40	100	1
DIPCS410	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
Total			**15**	**04**	**08**	**490**	**510**	**1000**	**24**

DIPCS401: DATA COMMUNICATION

Course Contents:

Unit I **Introduction:** Data Communication: Model and Components, Computer Networks, Line Configurations, Topology, Transmission modes, Communication Protocol: Layered Architecture, Reference Models: OSI and TCP/IP

Unit II **Signals and Transmission:** Analog and Digital Forms, Analog Signals: Amplitude, Period and Frequency, Phase, Spectrum and bandwidth, Digital Signals: Bit Interval and Bit Rate, Digital Data Transmission: Parallel and Serial, Asynchronous and Synchronous, Modems .

Unit III **Multiplexing and Communication Hardware:** FDM and TDM, Transmission Media: Guided & Unguided media, Performance factors, Network devices: Repeaters, Bridges, Switches, Routers and Gateways

Unit IV **Data Link Layer:** Introduction, Flow control & Error control, Types of errors: Single bit & burst errors, Error Detection & Correction, VRC, LRC, CRC, Checksum, Hamming Code, Flow control & error control protocols: Stop & Wait 2 Sliding window, ARQ, HDLC, Local Area Networks: Introduction to Ethernet, Token bus, Token Ring & FDDI.

Unit V **Switching and Frame Relay:** Circuit Switching, Packet Switching: Datagram & Virtual Circuit approach, Introduction to Frame relay: Its role, advantages & disadvantages. Frame relay operation, Congestion Control: BECN, FECN, Leaky Bucket Algorithm.

References Books:

1. Data Communications & Networking Behrouz A. Forouzan, TMH
2. Data & Computer Communication William Stallings, PHI
3. Data Communication & Computer N/W Sanjay Pahuja, Std. Publication
4. Data Communication and Networks Godbole, TMH

DIPCS402: DATA BASE MANAGEMENT SYSTEM

Course Contents:

Unit I **An overview of database management system**, Need for DBMS, Components of DBMS, Applications of DBMS, Advantage of DBMS, Database system versus file system, Disadvantages of DBMS, Database System Concepts and Architecture, Application Architecture of DBMS- Two-Tier Architecture, Three-Tier Architecture

Database Models, Hierarchical Database Model, Network Database Model, Relational Database Model, Object-Oriented Database Model, Schema and Instances, Data Independence, Physical Data Independence, Logical Data Independence, Database Language and Interface, Overall Database Structure

Unit II **Data Modeling Using the E-R Model:** E-R Model concepts, Notations of E-R Diagram, Mapping Constraints, One-to-one, One-to-Many, Many-to-One, Many-to-many, Keys, Super key, Candidate Key, Primary key, Composite key, Foreign key, Alternate key, Secondary key, Examples of E-R Diagrams

Unit III **Relational Data Model and Language:** Introduction. Properties of Relational Tables. Differences between DBMS and RDBMS, Codd's Rules of RDBMS, Integrity Constraints, Entity Integrity Constraints, Referential Integrity Constraints, Domain Integrity Constraits, Query Language, Relational Algebra, Relational Calculus

Normalization: Normalization Concepts, Functional Dependencies, Lossless/Lossy Join Decomposition, Normal Forms, First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF), Boyce-Codd Normal Form (BCNF), Multi-valued Dependency & Fourth normal Form, Join Dependency and Fifth Normal Form.

Unit IV **Transaction Processing Concepts:** Transaction System, Properties of Transaction- Atomicity, Consistency, Isolation, Transaction States, Transaction Processing System, Recovery from Transaction Failures, Cascading Rollback, Recoverable Schedule, Log Based Recovery, Check Points, Backup Mechanism, Shadow Paging, Distributed Database, Homogeneous Distributed Database, Heterogeneous Distributed Database, The major Advantages of Distributed DBMS (DDBMS)

Unit V **Deadlock Handling:** Introduction, Deadlock Detection, Recovery from Deadlock, Concurrency Control Techniques: Concurrency Control, Locking Techniques for Concurrency Control, Mode of Locking, Shared Lock,Exclusive Lock, The Two-phase Locking Protocol, Static (or Conservative) Two-phase Locking, Dynamic Two-phase Locking, Strict Two-phase Locking, Time Stamping Protocol for Concurrency Control

References Books:

1. Database management System P.K. Yadav, S.K. Kataria & Sons, Delhi
2. An Introduction to Database System Bipin C. Desai, Galgotia Publications
3. Fundamentals of Database Systems R. Elmastri, S.B. Navathe, Pearson Education
4. An Introduction to Database management System (A-level) Satish jain, BPB Publication
5. Database Ssytems: Concepts, Design & Applications" S.K. Singh, Pearson Education

DIPCS403: DATA STRUCTURE & ALGORITHM

Course Contents:

Unit I **Introduction to Data Structures and Algorithms:** Introduction to data representation, Review of data structures- Array, Pointer, Structure, Lists, Trees, and Graphs,What is an Algorithm, Designing Algorithms, Analyzing Algorithms, Mathematical Notation and Functions, Asymptotic Notation (O,θ,Ω), Performance Measurement

Unit II **Algorithm on Linked List:** Linear Linked List and Operations, Circular Liked List and Operations, Doubly Linked List and Operations, Applications of Linked list: Polynomial representation, Multiple-Precision Arithmetic

Algorithms on Stack: Representation using array and linked list: Operation and Example, Push and Pop Operation, Representation of expressions: Infix, Postfix, Prefix, Inter conversion of the expressions, Evaluation of the expression, Recursion: Tower of Hanoi, Recursive functions

Unit III **Algorithms on Queue:** 4.1 Representation using array and linked list 4.2 Insertion and Deletion Operation 4.2 Circular Queue 4.3 Double Ended Queue 4.4 Priority Queue 4.5 Multiple Queues

Non-Linear Data Structure: Tree 5.1 General Concept 5.2 Sequential and Linked List Representation of Tree 5.3 Binary Tree 5.4 Conversion of General Trees to Binary Trees 5.5 Binary Tree Traversal Algorithms: Recursive and Non-recursive 5.5.1 Preorder Traversal 5.5.2 Inorder Traversal 5.5.3 Postorder Traversal 5.5.4 Backward Inorder 5.6 Binary Search Tree 5.7 Applications of Trees

Unit IV **Non-Linear Data Structure: Graph:** Properties of Graphs, Representation of Graphs, Adjacency Matrix, Adjacency List,Traversal Algorithms- Depth First Search, Breadth First Search, Minimum Cost Spanning Tree: Prims Algorithm, Kruskal's Algorithm, Shortest Path Algorithms, Dijkastra's Algorithm, Bellman-Ford Algorithm, Warshal Algorithm 6.6 Applications of Graphs

Unit V **Sorting and Searching Algorithms and their Analysis:** Internal and External Sorting, Sorting Problems: Selection sort, Bubble sort, Insertion Sort, Merge sort, Quick Sort, Heap sort, Sequential Search, Binary Search, Hashing: Hashing Functions Collision Resolution Techniques

References Books:

1. A practical approach to Data Structures and Algorithms Sanjay Pahuja, New Age International
2. Data Structure Tenenbaum. TMH
3. Data Structure and Program Design Robert L. Kruse, PHI
4. Data Structure using C Y. Kanitkar, BPB
5. Data Sructure Schaums series, TMH
6. Data Structure and Algorithms Horowith sahani, PHI

DIPCS404: MICROPROCESSOR AND INTERFACING

Course Contents:

Unit I **Introduction:** Microprocessor concept, Historical review of microprocessor development, Organization of a micro computer

The 8085 Architecture: Internal block diagram, 8085 signals and their functions, Demultiplexing of buses, Pin configuration and logical diagram.

Unit II **8085 Instructions and Programming:** Instruction format- Mnemonics, Opcode and operand, Instruction length, Classification of instruction - Data transfer, Arithmetic, Logical, Branching, Machine control, Different interrupts of 8085 Microprocessor, Addressing modes, Stack operation and related instructions, Subroutine and related instructions, Machine and assembly language, Assembly language programming, Debugging of programs,

Unit III **Memory and I/O System:** Memory types, Memory organization, Basic concept of memory interfacing and I/O interfacing, Difference between peripheral I/O and memory mapped I/O

Unit IV **Instruction Execution and Timings:** Instruction cycle - machine cycle, T-states, Fetch cycle, Memory read and writes cycle, I/O read and write cycle, Interrupt acknowledge cycle, Bus idle cycle, DMA cycle, Machine cycle with wait states. Programs using delays and counters

Unit V **Interfacing With 8085:** Decoder & Encoder, Memory (RAM & ROM), PPI (8255), PIC (8259), USART (8251), Introduction to x 86 Family (8086): Segment register, Instruction Pointer, Index Register, Stack pointer, Flags, Programmable Registers (8/16 bit), Even & Odd Addressing Techniques, 20 bit address Generation

Reference Books:

1. Microprocessor Architecture, Programming & Application Gaonkar
2. Fundamentals of Microprocessors & MicroComputers B.Ram
3. Assembly Language Programming A.Leventhal, Osborn
4. Theory & Problems of Microprocessor Fundamentals Tokhein
5. Microprocessor & Peripheral Hand book INTEL
6. Computer Architecture & org. J.P Hayes
7. Digital Computer Fundamentals T.C.Bartee
8. An Introduction to Microprocessors A.P.Mathur

DIPCS405: PC Maintenance and Trouble Shooting

Course Contents:

Unit I **Computer Installation:** Site Preparation, Air-Conditioning Requirements, False-Ceiling and False-flooring, Fire-Protection system, Electrical Earthling, Power Supply Requirements, Clean Power Supply, Power Supply Problems, Power Conditioning, Power Protection equipments-Spike Suppressor, CVT, UPS (Online and Off-line), SMPS

Unit II **Safety and Security Measures:** Safety from Natural calamities, Theft and Fire Hazards, Data Security, Security from unauthorized users, Virus Protection Techniques, Firewalls, Folder Locking

Working Principles of peripheral devices - Keyboard: Wired and wireless, Optical Mouse: Wired and Wireless, Scanner, OCR, OMR, MICR and BCR (Bar Code Reader), Printers: Dot-Matrix Printer (DMP), Inkjet Printer, Laser Printer, Modem: Dialup, Wired Broadband, Wireless Broadband, Digital Camera, Web-cam and Microphone (MIC), USB Flash memory (Pen drive)

Unit III **Display Technologies**-Thin Displays, Cathode Ray tube (CRT) Display, Liquid Crystal Display (LCD), Plasma Display. Optical Storage Devices: Optical Storage Media, CD-Drive-Installation and Operation, Digital Versatile Disc (DVD)-Technology,.

Unit IV **I/O Ports:** Serial Port, Parallel Port, Game Port, USB Port, HDMI Port

Hard Disk Drive (HDD)- Working Principle, HDD Controller, HDD Interface types: SCSI, IDE, and SATA, USB External Hard disk

Unit V Windows Components and Tools - Windows Registry, Scandisk and Disk Defragmenter, Disk management, File Systems-FAT16, FAT32, and NTFS,

Memory: RAM, SDRAM, DDR, ROM

Reference Books:

1. Computer Installation and Servicing D Balasubramanian, TMH
2. The Complete Reference PC Hardware Craig Zacker, John Rourke, TMH
3. IBM PC and Clones B. Govidarajalu, TMH
4. The Complete PC Upgrade and Maintenance Guide Mark Minasi, Wiley-India

DIPCS406: DBMS LAB

1. Create the student/employee Table and construct the following requires for the database…
   - 1..1. Create the table for student/employee.
   - 1..2. Find out name of all students.
   - 1..3. Retrieve the list of name and the city of all students.
   - 1..4. List of all students/employee who stay in city “BOMBAY” or city DELHI”.
   - 1..5. List of all students /employee who are located in “MADRAS”.
2. (1)Apply these Operations on employee table
   - 2..1. Insert
   - 2..2. Select
   - 2..3. Update
   - 2..4. Drop
   - 2..5. Delete
   - 2..6. Alter
3. Create table with attributes emp. No., emp. Name, Designation, Salary, and Department no. Construct for following queries…..
   - .1 Display complete information of all the employees working as a manager.
   - .2 Display name of all the employees working as a clerk.
   - .3 Suppose DA for manager is 75% of salary then display name of all managers.
   - .4 Select names and designation whose salary is greater then 15000.
   - .5 Apply key constraints as Primary Key, Foreign Key etc as per requirement.
4. Between operation- list of all Employee Name & DOJ (date of joining) to join the Company in 2010
5. Join operation- list of all the employees along with their department information by using join operation.
6. AND/OR operation- make a table that have an employee Perform AND/ORoperation.

DIPCS407: DSA LAB

PRACTICAL

1. Programs based on linked list.
2. Programs based on stacks and queue.
3. Programs based on tree traversal.
4. Programs based on Graphs
5. Programs based on sorting
6. Programs based on searching.

DIPCS408: MICROPROCESSOR AND INTERFACING LAB

List of Experiments

1. Study the hardware, functions, memory structure and operation of 8085-Microprocessor kit.
2. Program to perform integer division:
   (1) 8-bit by 8-bit
   (2) 16-bit by 8-bit.
3. Transfer of a block of data in memory to another place in memory
4. Transfer of black to another location in reverse order.
5. Searching a number in an array.
6. Sorting of array in:
   (1) Ascending order
   (2) Descending order.
7. Finding party of a 32-bit number.
8. Program to perform following conversion
   (1) BCD to ASCII
   (2) BCD to hexadecimal.
9. Program to multiply two 8–bit numbers
10. Program to generate and sum 15 Fibonacci numbers

DIPCS409: PC MAINTENANCE AND TROUBLE SHOOTING LAB

1. Study and Identify of various parts of a PC
2. Creating Disk Partitions and formatting them.
3. Installation of Windows Operating System.
4. Installation of Linux Operating system.
5. Installation of Operating Systems using VMWARE utility
6. Installation of Network Interface Card (NIC) or LAN card
7. Installation of Local Printer
8. Installation of Network Printer
9. Installation of Scanner
10. Use PING command to verify the TCP/IP connection between two nodes.
11. To login to remote Desktop using TeamViewer utility.
12. To prepare a Straight cable using standard color coding.
13. To prepare a Crossover cable using standard color coding.
14. To connect two PCs using Crossover cable without using a Switch or Router.
15. To use CD writing Software for Copying Files and Disc-to-Disc Copying.

DIPCS410: Social Outreach, Discipline & Extra Curricular Activities

This course aims to cultivate self-confidence, leadership, and community responsibility. It influences academic and personal development, fostering civic responsibility. Students grasp the value of social work and discipline's significance. They contribute to social up-gradation through engagement in organizations, blood donation, awareness programs, and personality development initiatives.

SEMESTER V

Theory Papers		Type	No. of Teaching hours			Marks Allocation			
Code	**Subject/paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIPCS501	Basics of Electronic Devices and Circuits	PC	3	-	-	30	70	100	3
DIPCS502	Object Oriented Programming Through C++	PC	3	1	-	30	70	100	4
DIPCS503	Unix, Shell Programming and Administration	PC	3	-	-	30	70	100	3
DIPCS504	Software Engineering	PC	3	-	-	30	70	100	3
DIPCS505	Dot Net Technology	PC	3	-	-	30	70	100	4
DIPCS506	Personality Development Skills	HS	3	-	-	30	70	100	3
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIPCS507	EDC Lab	PC	-	-	2	60	40	100	1
DIPCS508	OOPS Lab	PC	-	-	2	60	40	100	1
DIPCS509	Unix & Shell Programming Lab	PC	-	-	2	60	40	100	1
DIPCS510	S.E. Lab	PC	-	-	2	60	40	100	1
DIPCS511	.Net Lab	PC	-	-	2	60	40	100	1
DIPCS512	Minor Project	PC	-	-	1	60	40	100	1
DIPCS513	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
Total			**15**	**01**	**11**	**640**	**660**	**1300**	**27**

DIPCS501: BASICS OF ELECTRONIC DEVICES AND CIRCUITS

Course Contents:

Unit I **Semiconductor and PN Junction:** Metal, non metals and semiconductors and their Energy Band Diagram. Intrinsic and Extrinsic Semiconductors. Effect of temperature on extrinsic semiconductor, Energy band diagram of extrinsic semiconductor, Drift and diffusion current, Hall Effect, P-N Junction Diode, Space charge region, Barrier potential and effect of temperature, Energy band diagram, Biasing of diode. V-I characteristics, Static and dynamic resistance, Transition and diffusion capacitance, Zenner and Avalanche breakdown, Working, characteristics and application of 1. Zener diode 2. Varactor diode 3. Photo diode, 4. Light emitting diode (LED), Photo conductors, Cds photo conductive cells and photo voltaic cell.

Unit II **Bipolar Junction Transistor (BJT):** Constructional details of PNP and NPN transistors, Working of a transistor- Charge transport phenomenon, Transistor amplifying action, Relation between different currents in a transistor, Simple problems. Configuration of transistor (CB, CE and CC), Behavior of BJT in Active, Cut off and Saturation regions- 1 Transistor as a switch, 2- Transistor as an amplifier, 3. Transistor

Unit III **Biasing and Bias Stability:** D.C. and A.C. Load line. Operating point and its stability, Factors affecting bias stability, Stability factors, Bias stabilization, Calculation of operating point and stability factor for 1. Fixed Bias Circuit. 2. Collector to base biasing. 3. Voltage Divider biasing (Self bias), Bias Compensation techniques using 1. Diode. 2. Thermistor and Sensistor. Thermal stability and Thermal runaway

Unit IV **Field Effect Transistor:** Construction, operation and characteristics of JFET, E and D MOSFET, Biasing of FET, Small signal model of JFET, Terminology used with JFET, Precaution for handling of MOSFETs

Unit V **Rectifiers:** Working of rectifiers, Half wave rectifier, Centre tape full wave rectifier, Bridge rectifier, Analysis of rectifiers (for all type), Calculations for average and RMS values, PIV of diodes, Ripple factor, Regulation and efficiency, Calculation of ripple factor and working of following filters: 1 Capacitance filter, 2. Inductance filter, 3. L-C and π (Pie) filters, 4. Voltage Multipliers,

Power Supplies & Sensors: SMPS, UPS, Inverter, Thermocouple, Pressure Gauge, Strain Gauge, Displacement Sensor (LVDT, RVDT)

Reference Books:

1. Electronic Devices & Circuits Millman & Halkias, MH
2. Electronic Devices & Circuits V. K. Mehta, S. Chand
3. Electronic Devices & Circuits A.Mottershed PHI
4. Industrial Electronics A.K. Khatri, CBH, Jaipur
5. Electronic Devices & Circuits Sanjeev Gupta, Dhanpat Rai,
6. Electronic Devices & Circuits Floyd, Pearson Education
7. Electronic Devices & Circuits Boylestad, Pearson Education
8. Electronic Devices & Circuits J.P. Gupta, Kataria & Sons

DIPCS 502: Object Oriented Programming Through C++

Course Contents:

Unit I **An Overview of Object Oriented Programming:** The need of object oriented programming, Characteristics of OOPs: Objects, Classes, Inheritance, Reusability, New data types, Polymorphism and overloading, Benefits of OOPs,

Unit II An overview of C++ Programming, Data Types, Operators, Manipulators, "cin" and "cout" usages, Statements: Comments, Assignments, if, switch and loops, Functions and its default arguments, Inline functions

Unit III **Class and its members, Access Specifier:** public, private, protected, Static data member and static functions,Array of objects, Object as function arguments, Constructors and Destructors, Friend function, Copy constructor, Function overloading, Defining operators over loading, Rules of overloading operators, Overloading unary operators, Overloading binary operators, Operator overloading using friend functions

Unit IV **Inheritance:** Using public, private and protected access specifiers, Types of inheritance, Virtual base classes, Virtual and pure virtual functions, Abstract classes, Reusability considerations, Generic functions, Generic classes, Basics of exception handling, Exception handling mechanism, Throwing and catching mechanism, Rethrowing an exception

Unit V C++ streams and stream classes, Unformatted I/O operations, Formatted console I/O operations, Managing output with manipulators, Classes for file stream operations, Opening and closing a file, File modes and file pointers, Put ( ), get ( ), read ( ), and write ( ) functions

Reference Books:

1. Programming in C++ E. Balaguruswamy, TMH
2. Oriented Programming TURBO C++ Robert Lafore, Galgotia Pub.
3. The Complete Reference C++ Herbert Schildt, TMH
4. The C++ Programming Language, B. Stroustrup, Addison wesley/Pearson
5. Let us C++ Y. Kanetkar, BPB
6. Object Oriented Programming and C++ R.Rajaram, New Age

DIPCS503: Unix, Shell Programming and Administration

Course Contents:

Unit I Unix Architecture, Features of UNIX, Command structure and usage, Basics of file, Structure of file systems, File permission, File ownership, Inodes, Partition

Unit II **File management commands:** ls, cat, rm, mv, cp, chmod,cmp,diff, comm, Directory management commands: mkdir, rmdir, cd, pwd, General purpose utilities: more, ps, wc, printf or echo, lp, banner, bc, cal, date, time, who, man, kill

Unit III Three modes, Input mode, Adding and replacing text, Saving text and quitting – The ex mode, The repeat factor, Command mode, Using operators in deleting and copying text, Navigation, Pattern search, Joining lines, Undo, Repeating the last command, Moving text from one file to another file, Search and replace

Unit IV Different types of UNIX shell, Shell interpretive cycle, Command line structure, Meta character, Pattern matching, Escaping, quoting, I/O Redirection, Command arguments and parameters, Command substitution, Shell variables, Shell Script, Dot command, Interactive execution (read), Command line arguments ($1, $2 etc), The && and | | operators, Conditional statements: if, case, Loops: for, while, until, Shell function, Interrupt handling (trap)

Unit V System Administration jobs, Finding files, Mounting file system, File system checking,Compressing files . Backing up files (tar, cpio), User management (add user, modify user,remove user and change password), Understanding /etc/passwd, /etc/shadow, /etc/inittab

Reference Books:

1. UNIX in a Nutshell Stephen G. Kochan, TMH
2. Unix Shell Programming, Yashavant Kanetkar BPB
3. UNIX: The Complete Reference Kenneth Rosen, TMH
4. UNIX: Concepts and Applications, Sumitabha Das,TMH

DIPCS504: Software Engineering

Course Contents:

Unit I Software Engineering evolution and impact, Software Crisis, Program and Software Products, Software Characteristics, Software metrics, Emergence of Software Engineering

Unit II Why use life cycle models? 2.2 Waterfall model 2.3 Prototyping Model 2.4 Evolutionary Model 2.5 Spiral Model 2.6 Comparison of different Life Cycle Model, Requirement Gathering Methods and Analysis 3.2 Feasibility Study

Unit III Software Requirement Specification (SRS):Contents of SRS document, Characteristics of good SRS documents, Organization of SRS document, Techniques for representing complex logic: Decision Tree, Decision Table.

Software Design: What is good Software design?,Cohesion and Coupling, Classification of cohesiveness, Classification of coupling . Software Design Approaches: Function Oriented Design,Object oriented design

Unit IV **Function Oriented Design:** Overview of SA/SD Methodology, Structure analysis, Data Flow Diagram (DFD). Primitive Symbols used for constructing DFD, Balancing DFD,Developing DFD Model of a system:Context diagram,Level 1 DFD, Decomposition,Numbering of Bubbles . Common errors constructing DFD .Shortcomings of DFD model

Data Dictionary, Structure Design: Structure Chart,Transformation of DFD model into structure chart, Detailed design

Unit V **Software Testing:** What is testing?, Verification v/s Validation, Design of Test Cases, Level of Testing,Unit Testing Black Box Testing: Equivalence Class Partitioning, Boundary Value Analysis . White Box Testing:Statement, Branch coverage,Condition, Path coverage, McCabe`s Cyclomatic Complexity Metric, Integration Testing, System Testing

Software Reliability: Hardware v/s Software reliability, Reliability metrics. Software Quality, Software Quality System,ISO 9000: What is ISO 9000 for Software industries?, Why and How to get ISO 9000?, ISO 9000 Requirements, Shortcomings of ISO 9000 certification, SEI Capability Maturity Model (SEI CMM), Six Sigma.

Reference Books:

1. Fundamental of Software Engineering Rajib Mall, PHI
2. Software Engineering KK Aggarwal, Yogesh Singh New Age International Pub
3. Software Engineering Ian Sommerville Addison Wesley
4. Fundamental of Software Engineering Carlo Ghezzi et al. PHI
5. Software Engineering: A Practitioners approach Roger Pressman, MH
6. An Integrated approach to Software Engineering Pankaj Jalote, Springer

DIPCS505: Dot Net Technology

Course Contents:

Unit I Introduction to .NET, Comparison between .NET and Java, Architecture and Advantages of .NET framework, Namespaces, Object Oriented Features, Visual Studio.NET Integrated Development, Elements of IDE, Writing a Simple Application using .NET

Introduction to and Features of VB.NET, Similarities and Differences between Visual Basic and VB.NET, Data types supported in VB.NET, Variables, Scope of Variables, Access Control: Public, Private, Protected, Friend, Protected Friend, Various Operators: Arithmetic, Comparison, Assignment, Logical Operators, Concatenation Operators, Operator Precedence

Unit II **Programming Concepts of VB.NET:** Control Structures: Decision Making Statements, Looping Statements, Other Statements, Arrays: Static, Dynamic Arrays, Array Functions, Procedures and Functions, Parameter Passing: Pass-by-Value, Pass-by-Reference, Optional and Named Agruments, Predefined Functions: MsgBox(), InputBox(), and other functions.

Unit III **Object Oriented Features of VB.NET:** Introduction to OOP Features: Class, Objects, Overloading, Overriding, Structure, Structure: Similarities and Differences with Class, Overloading the Methods, Shared Members,Inheritance, Abstract Base Class, Interfaces: Differences between Interface and Class

Windows FORMS and Controls: Introduction,Windows Forms: Properties and Methods, Events, MDI Forms, Properties and Methods Controls: Label, TextBox, LinkLabel, Button, Radio Button, CheckBox, ListBox, ComboBox, Timer control, Scroll bars, Menus, Exception Handling

Unit IV **Database Connectivity using ADO.NET:** Evolution and Features of ADO.NET, ADO versus ADO.NET,ADO.NET Object Model, Overview of Data Provider, Provider Objects: Connection, Command, Data Adapter, Data Reader, Overview of DataSet, Types of DataSets, Data Object Model and Data Object Model, Namespaces in ADO.NET, Using Command Objects, Data Binding: Simple Binding, Complex Binding

Unit V **ASP.NET:** Introduction, Differences and Similarities between ASP and ASP.NET, Characteristics of ASP.NET, Architecture of ASP.NET, Server Controls, HTML Server Controls, Types of Web Controls, Working with Web Controls & their Properties, Validation Web Server Control, ASP.NET Event Handling, User Controls, Data Access through ASP.NET. Session and Application Objects in ASP.NET, Cookies: properties and limitations.

References Books:

1. Essentials of .NET Programming, C. Komalavalli, Sanjib K Sahu, Ane Books Pvt. Ltd., New Delhi
2. Visual Basic.NET, Shirish Chavan, Pearson Education, New Delhi
3. Introduction to Visual Basic.NET, NIIT (PHI)
4. ASP.NET and VB.NET Web Programming, Matt J. Crouch, Pearson Education, New Delhi
5. Programming VB.NET, Cornell, Gary, IDG

DIPCS506: Personality Development Skills

Course Contents:

Unit I Personality Development and Success

The Concept of Personality- Definition, Dimensions of Personality, the Five Dimensions of Personality: (The Five Factor Model), Significance or Importance of Personality Development

Concept of Success: Definition, Factors Responsible For Success

Unit II Definition of Attitude, Concept of Attitude, Factors Affecting Attitude, Motivation: Motivating Factors, De-motivating Factors

Unit III The Mind - Character Building, Self Esteem, Goal Setting

Unit IV Executive Skills - Writing a profile (Personal/ Company), Group Discussion, Facing an Interview, Business Presentation Skills

Unit V Corporate Look- Office Wear, Meetings/Interviews, Business Presentations

DIPCS507: EDC LAB

List of Experiments

1. Explore the I-V characteristics of a PN junction diode under different biasing conditions.
2. Design and analyze a voltage regulation circuit using a Zener diode.
3. Explore the characteristics of BJT in CB, CE, and CC configurations.
4. Build and test half-wave circuits.
5. Build and test full-wave center-tap, and bridge rectifier circuits.
6. Build and analyze capacitance, inductance, L-C, and π (Pie) filter circuits.
7. Compare and contrast the characteristics of NPN and PNP transistors.
8. Explore the I-V characteristics of a Junction Field Effect Transistor (JFET).

DIPCS508: OOPS LAB

1. Practice for Classes and Object Creation
2. Practice for constructors and deconstructors creation
3. Practice for static and friend functions for a class.
4. Practice for Function overloading
5. Practice for Operator overloading
6. Practice for Copy constructor
7. Practice for inheritance
8. Practice for virtual function
9. Practice for exception handling template
10. Practice for read( ) and write( )

DIPCS509: Unix & Shell Programming Lab

Note:

Following practicals are perform by using UNIX / LINUX operating system.

1. Installing UNIX/LINUX operating system
2. Practice for login, logout, and shutdown operations
3. Practice for Unix commands
4. Practice for vi editor
5. Practice for shell programs using conditional, looping instructions and shell features
6. Practice for finding files
7. Practice for user management
8. Practice for file system checking
9. Practice for Compressing file
10. Practice for user authentication and access rights

DIPCS510: SE LAB

1. Write down the problem statement for a suggested system of relevance.
2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4. To perform the user's view analysis for the suggested system: Use case diagram.
5. To draw the structural view diagram for the system: Class diagram, object diagram.
6. To draw the behavioral view diagram: State-chart diagram, Activity diagram
7. To perform the behavioral view diagram for the suggested system: Sequence diagram, Collaboration diagram

DIPCS511: .NET LAB

1. Practice programs on VB.NET using variables and operators.
2. Practice programs on VB.NET using conditional and control structures.
3. Practice programs on VB.NET using Arrays.
4. Practice programs on VB.NET using Inheritance property.
5. Practice programs on VB.NET using Forms and Controls.
6. Practice programs on Database connectivity using ADO.NET.
7. Practice programs on Data Access through ASP.NET
8. Practice programs on ASP.NET using web controls.
9. Practice programs on ASP.NET using Event-handling.
10. Practice programs on ASP.NET using Cookies.

DIPCS512: MINOR PROJECT

Engaging in a major project is pivotal for diploma engineering students as it provides a hands-on application of theoretical knowledge, enhancing practical skills and problem-solving abilities. This experiential learning fosters critical thinking, teamwork, and project management skills, preparing students for real-world challenges and bolstering their employability in the competitive engineering landscape.

DIPCS513: Social Outreach, Discipline & Extra Curricular Activities

This course aims to cultivate self-confidence, leadership, and community responsibility. It influences academic and personal development, fostering civic responsibility. Students grasp the value of social work and discipline's significance. They contribute to social up-gradation through engagement in organizations, blood donation, awareness programs, and personality development initiatives.

SEMESTER VI

Theory Papers		Type	No. of Teaching hours			Marks Allocation			
Code	**Subject/paper**		**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
DIPCS601	Computer Network	PC	3	1	-	30	70	100	3
DIPCS602	Data warehouse and mining	PC	3	1	-	30	70	100	4
DIPCS603	Introduction to Network Security and Cryptography	PC	3	1	-	30	70	100	3
DIPCS604	Java Tools	PC	3	1	-	30	70	100	3
DIPCS605	PHP & MySql	PC	3	1	-	30	70	100	4
DIPCS606	GD & PI	HS	3	-	-	30	70	100	3
PRACTICALS/VIVA-VOCE			**No. of Teaching Hours**			**Sessional**	**Practical**	**Total**	**Credits**
DIPCS607	Core Java Lab	PC	-	-	2	60	40	100	1
DIPCS608	Core PHP Lab	PC	-	-	2	60	40	100	1
DIPCS609	Major Project	PR	-	-	2	60	40	100	3
DIPCS610	Seminar	SE	-	-	1	60	40	100	1
DIPCS611	Social Outreach, Discipline & Extra Curricular Activities	HS	-	-	-	100	-	100	1
Total			**18**	**05**	**07**	**520**	**580**	**1100**	**27**

DIPCS601: Computer Network

Course Contents:

Unit I **Data Link Layer and Local Area Networks:** Data Link Layer Design Issues:Framing, Error Detection and Correcting Code, Error Control . LAN Protocols: Ethernet and IEEE 802.3 Standard CSMA/CD, IEEE 802.5 LAN Token Ring. PPP: Point to Point Protocol, FDDI: Fiber Distributed Data Interconnect., Network Layer Design Issues: Routing Algorithms, Shortest Path Routing, Flooding, Distance Vector Routing, Hierarchical Routing, Multicast Routing

Unit II **Internet Protocol:** IPv4 Header,IPv4 Address, Subnetting, Internet Control Protocols, IPv6: IPv6 Header, IPv6 Extension Headers, IPv6 Addresses, Routers

Unit III **Transport Layer:** Transport Layer Services, Transport Protocol Mechanisms: Addressing, Multiplexing, Establishment a Connection, Releasing a Connection, Reliable Delivery, Flow Control and Buffering, Connectionless Transport Protocol: UDP,Connection - Oriented Transport Protocol: TCP, TCP Header format, TCP Connection Management, TCP Congestion Control, TCP Timer Management

Unit IV **Application Layer:** Principles of Application Layer Protocols, Domain Name System: DNS, The File transfer Protocol: FTP, Electronics Mail in the Internet: POP, HTTP, IMAP, WWW and HTTP, Network Management SNMP

Unit V **Wireless Networking:** Wireless LANs, IEEE 802.11, BlueTooth, WiMAX IEEE 802.16, Building a Network

References Books:

1. Data Communication and Computer Networks Sanjay Pahuja Standard Publishers
2. Data Communication and Computer Networks B. Froujan TMH
3. Computer Networks Andrew S. Tanenbaum, PHI
4. Computer Networks Peterson & Davie
5. Wireless Communications W. Stallings PHI
6. Computer Networks Black, PHI

DIPCS602: Data Warehouse and Mining

Course Contents:

Unit I **Data Mining:** Introduction to Data Mining, How Data Mining Works, Data Mining Tasks, Data Mining Elements, Data Mining Architecture, Advantages & Disadvantages. Data Pre-Processing: Introduction, Task of Data Pre-processing, Data Cleaning, Data Integration, Transformation., Data Reduction

Unit II **Data Mining Techniques:** Introduction, Decision Tree, Clustering, Genetic Algorithms, Artificial Neural Networks Data Warehouse: Introduction, Definition, Characteristics, Difference between Data Warehouse and Database System, Advantage and Disadvantages, Relationship between Data Mining and Data Warehousing

Unit III **Data Warehouse Architecture:** Data Warehouse Architectures, Overall and Typical Architecture,Three-Tier architecture, Problem in Three-Tier architecture,Goal of Data Warehouse Architecture, Frameworks of Data Warehouse, Data Warehouse back-end Tools and Utilities

Unit IV **Components of Data Warehouse:** Components of Data Warehouse, Meta Data:Introduction,Definition, Types of Meta data, Use of Meta Data, Data Marts, Access Tools, Data Warehouse Database

Unit V **On-Line Analytical Processing:** Introduction, Characteristics of OLAP System 7.3 Motivation for using OLAP 7.4 Multidimensional View and Operations, Guidelines for OLAP Implementation, Difference between OLAP & OLTP, Servers: OLAP, ROLAP, MOLAP

References Books:

1. Data Mining and Data Warehousing, Bharat Bhushan Agarwal, Sumit Prakash Tayal, University Science Press Laxmi Publications
2. Data Mining Data Warehousing and OLAP, Gajendra Sharma, KATSON Books.
3. Data Warehousing & Data Mining & OLAP, Berson: TMH
4. Data Mining Concepts & Techniques, Jiawei Han and Micheline Kamber, Elsevier Pub.
5. Data Mining Techniques, University Press. Arun.K.Pujari,

DIPCS603: Introduction to Network Security and Cryptography

Course Contents:

Unit I **Computer Security:** Introduction, Need of Security, Security approaches, Principle of Securit.

Attacks on Computer: Attacks: A general and technical view, Active and passive attacks, Program that attacks: Virus,Worm, Trojan horse, Applets, ActiveX controls, Cookies, Scripts

Preventing Virus, Specific attacks: Sniffing and Spoofing, Phishing, Pharming or DNS spoofing

Unit II **Cryptographic:** Concepts and Techniques:Plain and Cipher Text, Substitution techniques,Caesar Cipher, Mono-alphabetic Cipher, Polyalphabetic substitution Cipher, Playfair Cipher,Transposition Techniques, Rail Fence Technique, Simple Columnar Transposition Technique, Vernam Cipher (One time pad), Encryption and Decryption

Unit III Symmetric and Asymmetric Key Cryptography, Block and stream cipher, Overview of Symmetric Key Cryptography,Overview of Asymmetric Key Cryptography, Digital signature, Concept of message digests .

Internet Security Protocols: Basic concept, Introduction of TCP/IP, Brief Overview of : Secure socket layer (SSL), Secure Hyper Text Transfer Protocol (SHTTP), Time stamping Protocol (TSP),Secure Electronic Transaction (SET)

Unit IV **E-mail Security:** Introduction, SMTP, Brief Overview of : Privacy Enhanced Mail (PEM), Pretty good privacy (PGP), Secure multipurpose secure Internet mail Extensions (SMIME)

Unit V **Firewall:** Introduction, Types of firewall, Packet filter, Application gateways, Concepts of DMZ, Limitation of firewall, Virtual Private Network (VPN), Intrusion

Reference Books:

1. Cryptography and Network Security Atul Kahate, TMH
2. Cryptography and Network Security Behrouz Forouzan, TMH / MH
3. Network Security Essentials Stallings W Pearson Education Asia
4. Cryptography and Network Security Stallings W Pearson Education Asia
5. Network Security Kaufmann Charlie et al. Pearson Education Asia 6. Network and Internet Security Vijay Ahuja A P Professional

DIPCS604: Java Tools

Course Contents:

Unit I **Java Fundamentals:** Introduction Features of Java, Types of Java programs, Application programs, Applets, Sevlets, Java architecture 1.8 JDK tools Applet: Basics of applet, Applet life cycle, Applet tag, Paint( ), Update( ), Repaint( ), SetBackground( ), SetForeground( ), ShowStatus ( ), Different between applet and application programs

Unit II **Graphics:** Drawing lines, Arc, Drawing rectangles, oval, Drawing ploggon, Polyline, Clipping

AWT and Event Handling: Component, Frame, Button class, Layout managers,Label, Text field, text area, Check box, check box group, Choice, list, menu, Event handling, Adaptor class

Unit III **Swing:** Introduction to JFC, JApplets, JToolTip class, JLabel, JButton, Text components, JList, JCombobox, JTable, JScrollPane 5.7 JCheck box, JTtext area

Unit IV **JDBC:** Database connectivity, JDBC application architecture, Obtaining connection, Statement Object, Working with Result Set, Prepared statements, Query Prepared Statement

Unit V **Servlet:** Java servlet, Servlet container, Servlet life cycle,Servlet interface, Generic servlet, Http servlet class, HttpServletRequest, HttpServletResponse interface, getOutputStream, setHeader methods, Parameter passing to servlet

Reference Books:

1. Internet and Java Programing R.Krishnamurthy,S. Prabhu New age
2. The Complete Reference Java 2 Herbert Schildt, (TMH)
3. Thinking in Java Bruce Eckel, President Mind View Inc
4. Java 2.0 Programming E.Balaguruswami, (TMH)

DIPCS605: PHP & MySql

Course Contents:

Unit I **Overview of PHP:** Static versus Dynamic Websites, Dynamic Contents from Databases,Developing Dynamic Internet Applications, Client-Side scripting versus Server-Side Scripting Advantages and Capabilities of PHP, PHP versus ASP.

Unit II **Basic Scripting, Loop and Conditional Constructs:** PHP Scripting Fundamentals, Primitive Data Types, Defining Constants and Variables, Loop Constructs: While, Do-While, For, Exit & Break, Conditional Constructs: If, Else and ElseIf, Switch/Case Statement, PHP Operators: Logical, Relational, Bitwise, Ternary Operator (?)Arrays in PHP: Usage of Arrays in PHP, Initializing Arrays, Adding and Removing Items from Arrays, One-dimensional and Multidimensional arrays, Array Functions

Unit III **Working with Databases and Forms:** Configuring PHP for Database Support, PHP's Database API's, PHP's SQL API, MySQL vs. Acess, MySQL vs. SQL Server, Database Drivers

Unit IV **Using Cookies with PHP:** Purpose of Cookies,Cookies Myths, Setting Cookies, Retrieving, Expiring and Deleting Cookies, Storing Arrays in Cookie

Unit V **MySQL:** Introduction to MySQL, Creating Databases and Tables, Working on Data and Tables, Retrieving and Modifying Data, SQL Functions, SQL Operators, Data Definition Statements, Data Manipulation Statements, Stored Procedures and Functions, Creating Triggers, Creating simple dynamic report using database

Reference Books:

1. Straight To the Point: PHP, Dinesh Maidasani, Laxmi Publications (Firewall)
2. Straight To the Point: MySQL, Dinesh Maidasani, Laxmi Publications (Firewall)
3. How to Do Everything with PHP & MySQL, Vikram Vaswani, McGraw Hills
4. The Complete Reference MySQL, Vikram Vaswani, TMH
5. Web Database Application with PHP & MySQL, Beighley, SPD/O' Reilly

DIPCS606: GD & PI

Group Discussions (GD) and Personal Interviews (PI) serve as crucial components in the selection process for students pursuing a diploma in computer science engineering. These evaluations go beyond assessing technical knowledge, providing a comprehensive examination of a candidate's communication skills, problem-solving abilities, and interpersonal qualities. In GDs, participants are evaluated on their ability to articulate ideas, collaborate with peers, and discuss topics that may involve technical concepts. On the other hand, PIs delve into individual experiences, probing into academic projects, programming proficiency, and the candidate's approach to problem-solving. Furthermore, these interactions offer insights into a student's personality, teamwork, leadership potential, and overall suitability for the dynamic and collaborative environment within the field of computer science. In essence, GDs and PIs play a pivotal role in identifying candidates who not only possess the requisite technical acumen but also exhibit the communication and interpersonal skills essential for success in the rapidly evolving world of technology.

DIPCS607: CORE JAVA LAB

1. Practice programs on applets
2. Practice programs on graphics
3. Practice programs on awt and event handling
4. Practice programs on swing
5. Practice programs on servlets

DIPCS608: **CORE PHP LAB**

1. Practice programs for Basic Scripting, Loop and Conditional Constructs.
2. Practice programs for Arrays in PHP.
3. Practice programs for Working with MS-Access Database and Forms.
4. Practice programs for Working with MySQL Database and Forms.
5. Practice programs for Working with Using Cookies with PHP.
6. Practice programs in MySQL for creating Databases and Tables
7. Practice programs in MySQL for Retrieving, Modifying, and Deleting Data
8. Practice programs in MySQL based on stored procedures and functions.
9. Practice programs in MySQL for creating triggers.

DIPCS609: Major Project

Engaging in a major project is pivotal for diploma engineering students as it provides a hands-on application of theoretical knowledge, enhancing practical skills and problem-solving abilities. This experiential learning fosters critical thinking, teamwork, and project management skills, preparing students for real-world challenges and bolstering their employability in the competitive engineering landscape.

DIPCS610: **Seminar**

Student seminars in the field of engineering diploma serve multiple purposes. Firstly, they provide a platform for students to showcase their research, projects, and innovative ideas, fostering presentation and communication skills. Additionally, seminars facilitate knowledge exchange, exposing students to diverse perspectives and advancements in the engineering domain. Engaging in seminars enhances critical thinking, research abilities, and overall academic and professional development, preparing students for the challenges and opportunities in their future careers.

DIPCS611 Social Outreach, Discipline & Extra Curricular Activities

This course aims to cultivate self-confidence, leadership, and community responsibility. It influences academic and personal development, fostering civic responsibility. Students grasp the value of social work and discipline's significance. They contribute to social up-gradation through engagement in organizations, blood donation, awareness programs, and personality development initiatives.

6. ATTENDANCE PROVISION FOR END TERM SEMESTER EXAMINATION

6.1 No student shall be allowed to appear in the end term semester examination in a paper if he/ she has not attended minimum of **75%** of the classes held in the paper concerned including tutorials, special lectures, study visits, practical trainings etc. conducted in respect of that paper.

6.2 If a student for any exceptional reason fails to attend **75%** of the classes held in any paper, the Dean / HoD of the department may allow him/ her to take the examination if he/she attended at least 65% of the classes held in the paper concerned and attended 75% of classes in all the papers taken together.

Provided that if the percentage of attendance is deficient on account of:-

(i) Participation in Inter-University, University or Inter-Collegiate Sports tournaments/Youth Festivals /University Level Debates/ Cultural Activities, National and International Tournaments, with the previous sanction of the Dean/HoD of Faculty Engineering & Technology

(ii) Voluntary donation of blood certified by a Government Doctor of Gazetted rank or University medical officer.

(iii) Attendance and/or participation in International/National / State level competitions;

(iv) Attendance at the extension lecture (s) organized by the Faculty of Engineering & Technology.

Credit may be given for the number of days on which lectures were delivered or sessional or sessional/practical work done during the period of attendance or participation aforesaid, provided that the total period of absence shall not exceed 15 days in a semester.

7. CRITERION FOR AWARDING GRADING SYSTEM

7.1 CRITERION for Awarding SGPA and CGPA: The criterion for awarding the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) for the entire professional programme shall be as follows:

a) The criterion for passing in a subject is that a student should secure minimum 40% marks in individual paper.

b) A student obtaining less than pass marks as specified above, in each subject (sum of internal and End-Term examinations) he will be declared fail in that subject and will have to re-appear in a End-Term examination of the course in subsequent odd / even semester end term examination, subject to maximum permissible period of n+2 years / n+4 semesters to complete the course.

c) The University has adopted Absolute Grading System for converting marks into grades. The formula of 10- point grading system for conversion of marks obtained into Letter Grades and converting Letter Grades to Grade Point is given below:

Table 1: Marks, Letter Grades and Grade Points

Marks	Letter Grade	Grade Points
91-100	O (Outstanding)	10
81-90	A+(Excellent)	9
71-80	A(Very Good)	8
61-70	B+(Good)	7
51-60	B(Above Average)	6
46-50	C(Average)	5
40-45	P (Pass)*	4
0-39	F(Fail)	0
-	AB (Absent)	0

***Passing Marks: Diploma- 40% in individual paper**

d) ***While converting the marks into Letter Grade, the rounding off marks must be considered.***

e) A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.

f) For non credit courses "Satisfactory" or Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

7.2 Computation of SGPA and CGPA : The university has adopted UGC recommended procedure for computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA)

a) The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the papers/ courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

SGPA (Si) = Σ (Ci x Gi) / ΣCi

Where Ci is the number of credits of the i^{th} course and Gi is the grade point scored by the student in the i^{th} course. The university shall issue Semester Grade Card to the student.

b) The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

CGPA = Σ (Ci x Si) / Σ Ci

Where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

c) The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration of Computation of SGPA and CGPA and Format for Transcripts

a) Computation of SGPA and CGPA

Illustration for SGPA

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course/Paper 1	3	A	8	3x8=24
Course/Paper 2	4	B+	7	4x7=28
Course/Paper 3	3	B	6	3x6=18
Course/Paper 4	3	O	10	3x10=30
Course/Paper 5	3	C	5	3x5=15
Course/Paper 6	4	B	6	4x6=24
	20			**139**

Thus, SGPA= 139/20= 6.95

b) Illustration for CGPA

Semester-1	Semester-2	Semester-3	Semester-4	Semester-5	Semester-6
Credit: 20 SGPA:6.9	Credit: 22 SGPA:7.8	Credit: 25 SGPA:5.6	Credit: 26 SGPA:6.0	Credit: 26 SGPA:6.3	Credit: 25 SGPA:8.0

Thus, CGPA= $\frac{20x6.9+22x7.8+25x5.6+26x6.0+26x6.3+25x8.0}{144}$ = **6.73**

8. CRITERION FOR CREDIT

(a) In case a student secures minimum passing marks (40% and above) in a Theory / Practical paper, he / she will earn the assigned credit of that particular paper.

(b) A student is eligible for the award of diploma, if he / she earn minimum credits required for that particular programme. However if the student has not acquired minimum credits required for obtaining the diploma, he / she will have to appear in some of the papers in which he has not got credit to fulfill the minimum requirement of Credits.

(c) **MAXIMUM & MINIMUM CREDITS**

The total number of the credits of the Diploma 3-Year Programme is 152

Each student shall be required to appear for examination in all courses. However, for the award of the Diploma a student should secure at least 152 credits.

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