Courses of Studies

(Under CBCS)

For B.C.A. Programme

in

Software Development

(Syllabus of Courses Effective from the Academic Year: 2022-23)

PARISHKAR COLLEGE OF GLOBAL EXCELLENCE

AUTONOMOUS

Syllabus of Courses to be offered

(Core courses, Department Elective Courses and Open Elective Courses)

Preamble

The objective of this programme is to prepare the students for the society at large. Parishkar College of Global Excellence visualize all its programmes in the best interest of their students and in this endeavour, it offers a new vision to all its Under-Graduate course. we have adopted an approach that has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice. The Under-Graduate Programmes will prepare the students for both, academia, and Professional. They will be able to Understand Operative and ethical and Professional Responsibility.

The graduate attributes encompass values related to well-being, emotional stability, critical thinking, social justice and skills for employability. In short, each programme prepares students for sustainability and life-long learning.

The new curriculum of Bachelor of Computer Applications (Software Development) offers students' core papers that help build their foundation in computer science. The choice of generic electives and skill enhancement courses enable students to pursue an area of their interest in the field of computer science and application. The contents of each course have been carefully designed to prepare students with knowledge and skill sets that will not only make them industry ready but also foster entrepreneurial and innovative thinking. The new curriculum of Bachelor of Computer Applications (Software Development) is structured in a way that the students acquire in depth knowledge in data science and analysis. The comprehensive curriculum design bestows excellent career opportunities to explore new vistas in present competitive corporate arena. It offers students core papers that help build their foundation in the corporate as well as Government sector. The choice of general electives and skill enhancement courses enable students to pursue an area of their interest it the field of computer science. The contents of each course have been carefully designed to prepare students with knowledge and skill sets that will not only make them industry ready but also foster innovative thinking.

CREDIT DISTRIBUTION FOR BCA (SOFTWARE DEVELOPMENT)

S.No.	Course	Credits	Total Credits	
1.	Core Paper-12	6	12× 6	72
2.	Ability Enhancement - 2	4	2 × 4	8
3.	Skill Enhancement - 4	4	4 × 4	16
4.	Discipline Elective Course - 4	6	4 × 6	24
5.	General Elective Course - 4	6	2× 6	12
		Total		**134**

SUBJECT SCHEME:

Semester	Subject 1 (Credit-6)	Subject 2 (Credit-6)	Ability Enhancement (Credit-4)	Skill Enhancement (Credit-4)	DSE Paper (Credit-6)	GE Paper (Credit-6)
I	Discrete Structure	Introduction to Programming (4+2)	English Communication	Introductory Computer Skill (2+2)		
II	Understanding Computer System	Programming with C++ (4 + 2)		Mathematical & Computational Thinking		Web Designing Using HTML & CSS (4 + 2)
III	Data Structure Using C++(4+2)	Design and Analysis of Algorithm(4+2)		Professional & Leadership & Management	Programming in Java / .NET with C# (4+2)	Programming in Javascript / JQuery(4+2)
IV	Advance Data Structure Using C++(4+2)	Database Management System(4+2)		Competitive Coding & GITHUB	Object Oriented Analysis and Design (OOAD)(4+2)	
V	Fundamental of Artificial Intelligence	Software Engineering			Advanced JAVA / Advance .NET with C#(4+2)	Advance Java / Advance .NET (4+2)
VI	Introduction to Virtualization and Cloud Computing	Information Security and Cyber laws	Environmental Science		Project Work / Dissertation	

BCA

(Software Development)

SEMESTER – I

DISCRETE STRUCTURE

UNIT I: Introduction

Sets - finite and Infinite sets, uncountably Infinite Sets; Functions, relations, Properties of Binary Relations; counting - Pigeonhole Principle, Permutation and Combination; Mathematical Induction.

UNIT II: Logic & Proofs

Propositional Logic, Propositional Equivalences, Predicates & Quantifiers, Inference Theory, Introduction to Proofs, Normal forms, Proof Methods & Strategy

UNIT III: Algorithms, the Integers

Algorithms, Growth of Functions, Complexity of Algorithms, Summation formulas and properties, Bounding Summations, approximation by Integrals, Number Theory.

UNIT IV: Recurrences

Recurrence Relations, generating functions, Linear Recurrence Relations with constant coefficients and their solution, Substitution Method, Recurrence Trees, Master Theorem

UNIT V: Graph Theory

Basic Terminology, Models and Types, multigraphs and weighted graphs, Graph Representation, Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Colouring, Trees, Basic Terminology and properties of Trees, Introduction to Spanning Trees

Recommended Books:

1. Kenneth Rosen, Discrete Mathematics and Its Applications, Sixth Edition, McGraw Hill 2006
2. C.L. Liu, D.P. Mahopatra, Elements of Discrete mathematics, 2nd Edition, Tata McGraw Hill, 1985,
3. T.H. Coremen, C.E. Leiserson, R. L. Rivest, Introduction to algorithms, 3rd edition Prentice Hall on India, 2009
4. M. O. Albertson and J. P. Hutchinson, Discrete Mathematics with Algorithms, John Wiley Publication, 1988
5. J. L. Hein, Discrete Structures, Logic, and Computability, 3rd Edition, Jones and Bartlett Publishers, 2009
6. D.J. Hunter, Essentials of Discrete Mathematics, Jones and Bartlett Publishers, 2008

INTRODUCTION TO PROGRAMMING

UNIT I: Introduction to Computer

Concept of Hardware and Software, Types of software, Compiler, and Interpreter, Introduction to Procedure Oriented Language, Concepts of Machine level language, Assembly level language and High-level programming language, Flow charts and Algorithms

UNIT II: Introduction to C language

Fundamentle of C:History and importance of C, Basic Structure of Simple C program and execution of C program,C Comment,Constant,variable,datatype,different type of operators,operator precedence and associability

UNIT III: Control Structures

Iteration:Simple if statement, if and else condition,nested if,Looping:for,while,do....while,nested loop,break,continue,go to statement,switch case

UNIT IV: Arrays

Array & Strings :Concept of array, One- and Two-dimensional arrays, declaration and initialization of arrays,Reading and writing Strings, String handling function

UNIT V: Functions & Pointers

Need and elements for user defined function,definition of functions,return values and their types,function calls and declaration,recursion,parameter passing,

Understanding pointers:Accessing the address of a variable,declaration and initialization of pointer variable,pointer and array,Function returning pointer

Basic concept of structure and union with example

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Reference Books:

1. Let us C, Yashwant Kanitkar
2. C: The Complete Reference, Herbert Schildt, McGrawHill
3. Computer fundamentals and Programming in C, Pradip dey and Manas Ghosh, Oxford

INTRODUCTION TO PROGRAMMING LAB

Q.1 Write a c program to perform all operator function.

Q.2 Write a c program to print even number without using for loop.

Q.3 Write a c program to print sum of first 10 natural number.

Q.4 Write a c program to print multiplication table.

Q.5 Write a c program to perform arithmetic operation unsing switch case.

Q.6 Write a c program to print any four star pattern using switch case.

Q.7 Write a c program to find factorial and print Fibonacci series (menu driven)

Q.8 Write a c program to calculate power x^n

Q.9 Write a c program to calculate sum of digit of a number and reverse that number.

Q.10 Write a c program to check whether a number is Armstrong or not or to check whether a number is prime or not(Menu driven).

Q.11 Write a c program to print all Armstrong no b/w 1-500 or print prime no b/w 1-500(Menu driven)

Q.12 Write a c program to print sum of even or odd number from an array.

Q.13 Write a c program to find largest and smallest element from an array.

Q.14 Write a c program to reverse an array and stored the reverse array in another array.

Q.15 Write a c program to perform string operation (reverse string,check string is palindrome or not,concatenate two string)

Q.16 Write a c program to perform matrix operation (addition,subtraction,multiplication,transpose,diagonal,inverse,symmetry)

Q.17 Write a c program to print largest element from 5*5 matrix.

Q.18 Write a c program to add two distance using structure.

Q.19 Write a c Program to add two times using structure.

Q.20 Write a simple c program with the use of union.

Q.21 Write a c program to swap two values using pointer

Q.22 Write a c program to perform find area of different shape using function(circle,rectangle,triangle,Cylinder,sphere,cone,cube)

Q.23 Write a c program to input employee no,employee name and basic and to print output into following format:

Emp-no	Name	BASIC	DA	HRA	MA	PF	GROSS	NET-PAY
1	ABC	5000	2500	500	100	500	8100	7600
2								
3								

DA=50% of Basic HRA =10% of Basic

MA=100 PF=10% of Basic

Gross =Basic+DA+HRA+MA Net-Pay=Gross-PF

ENGLISH COMMUNICATION

UNIT I

Essential English Vocabulary of day-to-day life (around 1500 words) and Basic Grammar usage for Spoken English}

- Parts of the speech (noun, pronoun, adjective, adverb etc.)
- Types of the sentences (affirmative, negative, interrogative- Y/N, Wh.)
- Use of is, are, am, do, does, did, has, have, had, has been, had been, will etc.
- Use of may, might, can, could, would, should, must etc. [To express invitation, request, gratitude, asking for information, seeking permission etc.]
- Use of a, an, the
- Use of in, into, at, over, above etc.
- Some special constructions like feel like going to, had better, used to, as if, be, get, let etc

UNIT II

- Speaking Practice (Solo/Monologue)
    1) Greeting and Self-introduction
    2) Daily routine
    3) My family
    4) My village/city
    5) My school/College
    6) My hobby
    7) My favourites etc.
- Speaking Practice (Dialogue/Group Discussion/Public Speech)
- Listening Practices {Storytelling and listening, listening to recorded conversations, loud reading, Mock interviews, listening to English news, listening speeches, and watching English movies with subtitles (as homework, self-study material)}
- Translating sentences from Hindi to English and vice versa.

UNIT III

Writing Skills: Letter Writing, Report Writing, Email Writing, Answer writing

UNIT IV

- Theory of communication: Types and modes of communication
- (Verbal Communication. Non-Verbal Communication. Visual Communication)

UNIT V

Language of communication: Personal, Social and Business Communication; Intra-personal, Interpersonal and Group Communication; Barriers and Strategies of Communication

Note: The units I and II of the Spoken English part should be learned collectively. Daily students should learn small grammar topic, 20 essential words and one module of speaking practice in the institute or learning at home.

INTRODUCTORY COMPUTER SKILLS

UNIT I

Computer Fundamental: Introduction to Computer, Definition, Characteristics, History & Generation, Hardware & Software, Uses of Computer, Input & Output Devices, Computer Memory, Types of Windows, Windows Concept Features (Desktop, Taskbar, Start Menu, My Computer, Recycle bin) Windows Accessories (Calculator, Notepad, Paint, Word Pad, Character Map, Windows Explorer, Entertainment, System Tools, Communication) DOS Commands (Internal & External).

UNIT II

Networking Concept: Introduction to Networking, Network Strategies, LAN, WAN, MAN, Transmission Media (Wired, Wireless), Networking Devices, IP Addresses, MAC Address, Cyber Security and Awareness (Type of Cyber threats, How to Identify Safe website and Portal).

Introduction to Web Technologies, World Wide Web, Elements of the Web, Browsers, Search Engine, Mails, News and Chat, Security and privacy issues (Cookies, firewalls, executable applets and scripts, blocking system), Audio & Video Streaming, Subscription, *E-Commerce* (Digital Payment & Platforms, Mobile Communication, Digital Signature, (UOR),

Google Docs, Google Drive, Google Forms. Google Meet, Microsoft Team, Virtual Lab.

UNIT III

Software Packages: Types of Office Suite, MS-Office (MS-Word, MS-Excel, MS-PowerPoint, Outlook), MS-Word (Ribbon & Tabs, Quick Access Toolbar, Proofing Features, Modify Page Layout, Mail-Merge, Drop-Cap), Power-Point (Create Presentation, Insert Picture & Clipart, Animation & Transition, Slide Effects, Slide Layout), Outlook (Introduction to Outlook), Latest versions of MS-Office

UNIT IV

MS-Excel(Concept of Worksheet & Eorkbook, Formulas, Charts ,Graphs,Pivot Table,Macros)

Advance Excel: Spreadsheet Design and Documentation,Advanced Formula Techniques,Financial Functions and Working with Dates,Advanced Lookup Functions(dynamic lookup ranges – INDIRECT, ADDRESS, OFFSET and INDEX.),Building Professional Dashboards(visualise data through graphs and charts, create data models, and add interactivity.),

UNIT V

MS-Access (table, queries, forms, reports), Creating and editing Database, customizing tables, linking tables, Changing table design,assigning fields properties,setting primary key,inner and outer join.

Select data with queries:creating query by design & by wizard(Select,Make Table,Append,Delete,Update),Creating Multi table queries,sorting & fIltering.

Working with forms:Creating Basic Forms,Working with bound,unbound and calculated controls,Working with data om Forms:Changing Layout,creating Sub forms,Creating list box,combo box and option group

Working with report:Creating Basic Reports,Creating Header & Footer,Sorting & grouping,Creating Sub Report

Suggested Readings:

1. P.K Sinha, "Computer Fundamentals", BPB Publications.
2. Raja Raman, Fundamentals of Computers, Fourth edition, Prentice Hall India Pvt. Limited.
3. Peter Norton, "Introduction to Computers", 4th Edition, TMH Ltd.
4. B. Ram," Computers Fundamentals", New Age International Publications, New Delhi.

Introductory Computing Skills Laboratory

Practical exercises based on MS Office/ Open Office tools using document preparation and spreadsheet handling packages.

MS Word

1. **Prepare a grocery list having four columns (Serial number, the name of the product, quantity and price) for the month of April, 06.**
   - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
   - The headings of the columns should be in 12-point and bold.
   - The rest of the document should be in 10-point Times New Roman.
   - Leave a gap of 12-points after the title.

2. **Create a telephone directory.**
   - The heading should be 16-point Arial Font in bold
   - The rest of the document should use 10-point font size
   - Other headings should use 10-point Courier New Font.
   - The footer should show the page number as well as the date last updated.

3. **Design a time-table form for your college.**
   - The first line should mention the name of the college in 16-point Arial Font and should be bold.
   - The second line should give the course name/teacher‘s name and the department in 14-point Arial.
   - Leave a gap of 12-points.
   - The rest of the document should use 10-point Times New Roman font.
   - The footer should contain your specifications as the designer and date of creation.

4. **BPB Publications plans to release a new book designed as per your syllabus.**
   Design the first page of the book as per the given specifications.
   - The title of the book should appear in bold using 20-point Arial font.
   - The name of the author and his qualifications should be in the centre of the page in 16-point Arial font.
   - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
   - The details of the offices of the publisher (only location) should appear in the footer.

5. **Create the following one page documents.**
   - Compose a note inviting friends to a get-together at your house, including a list of things to bring with them.
   - Design a certificate in landscape orientation with a border around the document.
   - Design a Garage Sale sign.
   - Make a sign outlining your rules for your bedroom at home, using a numbered list.

6. **Create the following documents:**
   - A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.

- Use a newsletter format to promote upcoming projects or events in your classroom or college.

7. Convert following text to a table, using comma as delimiter Type the following as shown (do not bold).

Color, Style, Item Blue, A980, Van Red, X023, Car
Green, YL724, Truck Name, Age, Sex
Bob, 23, M
Linda, 46, F
Tom, 29, M

9. Enter the following data into a table given on the next page.

Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067

Add a column Region (values: S, N, N, S, S, S) between the Salesperson and Dolls columns to the given table Sort your table data by region and within Region by Salesperson in ascending order:
In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

10. Wrapping of text around the image.

11. Following features of menu option must be covered

FILE	Complete menu
EDIT	Complete menu
VIEW	Complete menu
INSERT	Complete menu
FORMAT	Complete menu
TABLE	Complete menu
WINDOW	Complete menu
HELP	Complete menu
TOOLS	All options except Online collaboration, Tools on Macro, Templates

MS Excel

1. Enter the Following data in Excel Sheet

TOTAL AVERAGE

(a) Apply Formatting as follow:
1. Title in TIMES NEW ROMAN
2. Font Size – 14
3. Remaining text - ARIAL, Font Size -10
3. State names and Qtr. Heading Bold, Italic with Gray Fill Color.
4. Numbers in two decimal places.
5. Qtr. Heading in center Alignment.
6. Apply Border to whole data.

(b) Calculate State and Qtr. Total

(c) Calculate Average for each quarter

(d) Calculate Amount = Rate * Total.

2. Given the following worksheet

	A	B	C	D
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	
6	1005	Har Bhajan	56	

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
>= 80	A+
>= 60 < 80	A
>= 50 < 60	B
< 50	F

3. **Given the following worksheet**

	A	B	C	D	E	F	G
1	Salesman			Sales in (Rs.)			
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission
3	S001	5000	8500	12000	9000		
4	S002	7000	4000	7500	11000		
5	S003	4000	9000	6500	8200		
6	S004	5500	6900	4500	10500		
7	S005	7400	8500	9200	8300		
8	S006	5300	7600	9800	6100		

Calculate the commission earned by the salesmen on the basis of following Candidates:

If Total Sales	Commission
< 20000	0% of sales
> 20000 and < 25000	4% of sales
> 25000 and < 30000	5.5% of sales
> 30000 and < 35000	8% of sales
>= 35000	11% of sales

The total sales is sum of sales of all the four quarters.

4. **A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:**

Allowances

• HRA Dependent on Basic

30% of Basic if Basic <=1000

25% of Basic if Basic>1000 & Basic<=3000 20% of Basic if Basic >3000

• DA Fixed for all employees, 30% of Basic

• Conveyance Allowance Rs. 50/- if Basic is <=1000 Rs. 75/- if Basic >1000 & Basic<=2000 Rs. 100 if Basic >2000

• Entertainment Allowance NIL if Basic is
<=1000 Rs. 100/- if Basic > 1000
Deductions
• Provident Fund 6% of Basic
• Group Insurance Premium Rs. 40/- if Basic is <=1500 Rs. 60/- if Basic > 1500 & Basic<=3000
Rs. 80/- if Basic >3000 Calculate the following:
Gross Salary = Basic + HRA + DA + Conveyance + Entertainment Total deduction = Provident Fund + Group Insurance Premium
Net Salary = Gross Salary – Total Deduction

No. of Instalments	5%	6%	7%	8%	9%
3	XX	XX	XX	XX	XX
4	XX	XX	XX	XX	XX
5	XX	XX	XX	XX	XX
6	XX	XX	XX	XX	XX
18000	?				
5200	?				

7. The following table gives year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

(a) Calculate total sale year wise.
(b) Calculate the net sale made by each salesman
(c) Calculate the maximum sale made by the salesman
(d) Calculate the commission for each salesman under the condition.
(i) If total sales >4,00,000 give 5% commission on total sale made by the salesman.
(ii) Otherwise give 2% commission.
(e) Draw a bar graph representing the sale made by each salesman.
(f) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

PERSONAL BUDGET FOR FIRST QUARTER
Monthly Income (Net): 1,475

EXPENSES	JAN	FEB	MARCH	QUARTER TOTAL	QUARTER AVERAGE
Rent600.00	600.00	600.00			
Telephone	48.25	43.50	60.00		
Utilities	67.27	110.00	70.00		
Credit Card	200.00	110.00	70.00		
Oil	100.00	150.00	90.00		
AV to Insurance		150.00			
Cable TV	40.75	40.75	40.75		
Monthly Total					

9. Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL

Publisher name	1997	1998	1999	2000	total
A	Rs. 1,000.00	Rs. 1100.00	Rs. 1,300.00	Rs. 800.00	
B	Rs. 1,500.00	Rs.700.00	Rs. 1,000.00	Rs. 2,000.00	
C	Rs.700.00	Rs.900.00	Rs. 1,500.00	Rs. 600.00	
D	Rs. 1,200.00	Rs.500.00	Rs. 200.00	Rs. 1,100.00	
E	Rs 800.00	Rs. 1,000.00	Rs. 3,000.00	Rs.560.00	

(a) Compute the total revenue earned.

(b) Plot the line chart to compare the revenue of all publisher for 4 years.

(b) Chart Title should be _Total Revenue of sam's Bookstall (1997-2000)'

(c) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

Introduction to Database System Theory: 60 lectures

Database: Introduction to database, relational data model, DBMS architecture, data Independence, DBA, database users, end users, front end tools 14L

E-R Modeling: Entity types, entity set, attribute and key, relationships, relation Types, E- R diagrams, database design using ER diagrams 14L

Relational Data Model: Relational model concepts, relational constraints, primary and foreign key, normalization: 1NF, 2NF, 3NF 14L

Structured Query Language: SQL queries, create a database table, create relationships between database tables, modify and manage tables, queries, forms, reports, modify, filter and view data. 18L

Reference Books:

1. P. Rob, C. Coronel, Database System Concepts by, Cengage Learning India, 2008

2. R. Elmasri, S. Navathe Fundamentals of Database Systems, Pearson Education, Fifth Edition, 2007

3. MySQL: Reference Manual Introduction to Database System Lab Practical: 60 lectures

a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.

b) Delete the record of book titled —Database System Concepts‖.

c) Change the Department of the book titled —Discrete Maths‖ to —CS‖.

d) List all books that belong to —CS‖ department.

e) List all books that belong to —CS‖ department and are written by author —Navathe‖.

f) List all computer (Department=‖CS‖) that have been issued.

g) List all books which have a price less than 500 or purchased between —01/01/1999‖ and —01/01/2004‖.

2) Create a database having three tables to store the details of students of Computer Department in your college.

Personal information about Student (College roll number, Name of student, Date of birth, Address, Marks(rounded off to whole number) in percentage at 10 + 2, Phone number) Paper Details (Paper code, Name of the Paper)
Student's Academic and Attendance details (College roll number, Paper code, Attendance, Marks in home examination).

a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.

b) Design a query that will return the records (from the second table) along with the name of student from the first table, related to students who have more than 75% attendance and more than 60% marks in paper 2.

c) List all students who live in ―Delhi‖ and have marks greater than 60 in paper 1.

d) Find the total attendance and total marks obtained by each student.

e) List the name of student who has got the highest marks in paper 2.

3) Create the following tables and answer the queries given below:

Customer (CustID, email, Name, Phone, ReferrerID)
Bicycle (BicycleID, DatePurchased, Color, CustID, ModelNo) BicycleModel (ModelNo, Manufacturer, Style) Service (StartDate, BicycleID, EndDate)

a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.

b) List all the customers who have the bicycles manufactured by manufacturer ―Honda‖.

c) List the bicycles purchased by the customers who have been referred by customer ―C1‖.

d) List the manufacturer of red colored bicycles.

e) List the models of the bicycles given for service.

4) Create the following tables, enter at least 5 records in each table and answer the queries given below.

EMPLOYEE (Person_Name, Street, City) WORKS (Person_Name, Company_Name, Salary) COMPANY (Company_Name, City)
MANAGES (Person_Name, Manager_Name)

a) Identify primary and foreign keys.

b) Alter table employee, add a column ―email‖ of type varchar(20).

c) Find the name of all managers who work for both Samba Bank and NCB Bank.

d) Find the names, street address and cities of residence and salary of all employees who work for ―Samba Bank‖ and earn more than $10,000.

e) Find the names of all employees who live in the same city as the company for which they work.

f) Find the highest salary, lowest salary and average salary paid by each company.

g) Find the sum of salary and number of employees in each company.

h) Find the name of the company that pays highest salary.

5) Create the following tables, enter at least 5 records in each table and answer the queries given below.

Suppliers (SNo, Sname, Status, SCity) Parts (PNo, Pname, Colour, Weight, City) Project (JNo, Jname, Jcity) Shipment (Sno, Pno, Jno, Qunatity)

a) Identify primary and foreign keys.

b) Get supplier numbers for suppliers in Paris with status>20.

c) Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.

d) Get suppliers names for suppliers who do not supply part P2.

e) For each shipment get full shipment details, including total shipment weights.

f) Get all the shipments where the quantity is in the range 300 to 750 inclusive.

g) Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.

h) Get the names of cities that store more than five red parts.

i) Get full details of parts supplied by a supplier in London.

j) Get part numbers for part supplied by a supplier in London to a project in London.

k) Get the total number of project supplied by a supplier (say, S1).

l) Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).

SEMESTER – II

UNDERSTADING COMPUTER SYSTEM

UNIT I

Introduction to digital electronics and computer arithmetic

Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units. Number systems, complements, fixed and floating-point representation, character representation, addition, subtraction, magnitude comparison, and multiplication and division algorithms for integers

UNIT II

Basic Computer Organization and Design

Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt, Interconnection Structures, Bus Interconnection design of basic computer.

UNIT III

Central Processing Unit / Memory Organization / Input-Output Organization ()

Register organization, arithmetic and micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming, RISC, CISC architectures, Cache memory, Associative memory, mapping. Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards. Hardwired and micro-programmed design approaches, Case study - design of a simple hypothetical CPU.

UNIT IV

Introduction to Operating System

Basic OS functions, resource abstraction, types of operating systems–multiprogramming systems, batch systems, time sharing systems; operating systems for personal computers & workstations, process control & real time systems. Processor and user modes, kernels, system calls and system programs.

Process & Memory Management

System view of the process and resources, process abstraction, process hierarchy, threads, threading issues, thread libraries; Process Scheduling, non-pre-emptive and pre-emptive scheduling algorithms; concurrent and processes, critical section, semaphores, methods for inter- process communication; deadlocks, Physical and virtual address space; memory allocation strategies -fixed and variable partitions, paging, segmentation, virtual memory.

UNIT V

File and I/O Management

Directory structure, file operations, file allocation methods, device management.

Protection and Security

Policy mechanism, Authentication, Internal access Authorization.

Recommended Books:

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, John Wiley Publications 2008. Edition,
2. A.S. Tanenbaum, Modern Operating Systems, Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles , Edition, Prentice Hall of India. 2008.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.
6. M. Mano, Computer System Architecture, Pearson Education 1992

PROGRAMMING WITH C++

UNIT I

Introduction to C and C++

History, Overview of Procedural and Object-Oriented Programming, Objects and Classes, Compilation and Execution in C++, IDE, Language Elements, Lexical structure of C++, Machine/Natural/Artificial Languages, Portability, Literals (Char; Integer, floating-point, and double type number; scientific notations, strings), Data Types, Abstract Data Type (ADT), Basics of control structure (Conditional statements, looping).

UNIT II

Functions, Arrays and Vectors

Definition of Functions (Void, Inline), Parameters, Call by Value, Call by Reference, Function Returning Value, Command Line Arguments / Parameters, Functions with Variable Number of Arguments, Creating and Initializing Arrays, Indexing, Manipulating Arrays, Types of Arrays (Single and Multi-Dimensional), Sorting Data in Arrays, Arrays of Objects, STL Vectors.

UNIT III

Pointers and Memory Allocation in C++

Pointers and Address Operator, Pointer Variables, Pointer Arithmetic, Initializing Pointers, Using Arrays as Pointer, Pointers as Function Parameters, Returning Pointers from Function, Pointers to class Objects and Structures, Pointers to Pointers, Smart Pointers, Differentiating between static and dynamic memory allocation, malloc(), calloc() and free() functions, use of new and delete operators.

UNIT IV

Classes & Objects in C++

Defining & Using Classes, Objects as Parameters, Class Constructor, Constructor Overloading, Destructor, This Pointer, Function Overloading by number and type of arguments, Operator Overloading (including assignment operators, unary operators), Class Variables and Functions, Access Specifiers, Copy Constructor, Friend Functions & Classes.

UNIT V

Inheritance, Polymorphism and Exception Handling

Introduction to Inheritance (Multi-level and Multiple), Polymorphism (Virtual & Pure Virtual Function), Basic Exception Handling (Using catch, throw, multiple catch statements), Catching all exceptions, Restricting exceptions, Rethrowing exceptions.

Reference Books:

1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill. 2013
2. Bjrane Stroustroup, "A Tour of C++", Second Edition, Addison-Wesley. 2018.
3. Tony Gaddis, Judy Walters, Godfrey Muganda, "Starting Out with C++ Early Objects", 10th edition. 2019.
4. E. Balaguruswamy, "Object Oriented Programming with C++", Tata McGraw-Hill Education, 2008.

Programming with C++ Lab

1. WAP to print the sum and product of digits of an integer.

2. WAP to reverse a number.

3. WAP to compute the sum of the first n terms of the following series S = 1+1/2+1/3+1/4+……

4. WAP to compute the sum of the first n terms of the following series S =1-2+3-4+5…….

5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.

6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.

7.WAP to compute the factors of a given number.

8. Write a macro that swaps two numbers. WAP to use it.

9. WAP to print a triangle of stars as follows (take number of lines from user): * *** ***** ******* *********

10. WAP to perform following actions on an array entered by the user: i) Print the even-valued elements ii) Print the odd-valued elements iii) Calculate and print the sum and average of the elements of array iv) Print the maximum and minimum element of array v) Remove the duplicates from the array vi) Print the array in reverse order The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

11. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.

12. Write a program that swaps two numbers using pointers.

13. Write a program in which a function is passed address of two variables and then alter its contents.

14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.

15. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.

16. Write a menu driven program to perform following operations on strings:
    a) Show address of each character in string
    b) Concatenate two strings without using strcat function.
    c) Concatenate two strings using strcat function.
    d) Compare two strings
    e) Calculate length of the string (use pointers)
    f) Convert all lowercase characters to uppercase
    g) Convert all uppercase characters to lowercase
    h) Calculate number of vowels i) Reverse the string

17. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.

18. WAP to display Fibonacci series (i)using recursion, (ii) using iteration

19. WAP to calculate Factorial of a number (i)using recursion, (ii) using iteration

20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.

21. Create Matrix class using templates. Write a menu-driven program to perform following Matrix operations (2-D array implementation):

a) Sum
b) Difference
c) Product
d) Transpose

22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).

23. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.

24. Create a class Box containing length, breath and height. Include following methods in it:

a) Calculate surface Area
b) Calculate Volume
c) Increment, Overload ++ operator (both prefix & postfix)
d) Decrement, Overload -- operator (both prefix & postfix)
e) Overload operator == (to check equality of two boxes), as a friend function
f) Overload Assignment operator
g) Check if it is a Cube or cuboid Write a program which takes input from the user for length, breath and height to test the above class.

25. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

26. Write a program to retrieve the student information from file created in previous question and print it in following format: Roll No. Name Marks

27. Copy the contents of one text file to another file, after removing all whitespaces.

28. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.

MATHEMATICAL AND COMPUTATIONAL THINKING

UNIT I

Fundamentals of Mathematics

Number line and Number system, Units and measurement, 3-D geometry and angles, Simple Expression and Equation, Work, Distance and Time, Profit and Loss, Mean and Median

UNIT II

Introduction and Descriptive Statistics for Exploring Data

Pie Chart, Line chart, Scatter plot, Bar Graph, Confidence Interval, Providing Context is Key for Statistical Analyses, Pitfalls when Visualizing Information

UNIT III

Producing Data and Sampling

Introduction, Population V/S Samples, their real-world use in conducting analysis and research, Simple Random Sampling and Stratified Random Sampling, Bias and Chance Error, Variance, Observation vs. Experiment, Confounding, and the Placebo Effect, The Logic of Randomized Controlled Experiments, Distributions in Graphical format (Histograms and density plots)

UNIT IV

Understanding Visualization

Graphical Integrity (Is the information represented trustable?), Graphical heuristics: Lie Factor and Spark Lines (Edward Tufte), Data Density, Small Multiples, Graphical heuristics: Data-ink ratio (Edward Tufte), Graphical heuristics: Chart junk (Edward Tufte), The Truthful Art (Alberto Cairo) {Give as self-study content / Reference material}, Dark Horse Analytics (Optional) {Used as source of Case studies}, Graphics Lies, Misleading Visuals

UNIT V

Mathematics in Various Branch

Climatology and Meteorology, Relativity and Cosmology, Microbiology and Genomics, Crystal and Lattice Structures, Optics and Gravity, Financial Mathematics, Neuroscience

WEB DESIGNING USING HTML & CSS

Unit – I

Introduction

Introduction, The HTML, The Head, Title, The Body, Colours, Attributes, Lists, ordered and unordered, Headings, paragraphs, The doctype, The meta tag & the Unicode character set.

Unit – II

Relative Links, Absolute Links, Link Attributes, Using the ID Attribute to Link Within a Document, Anchor tags & Hyper-links, linking to other websites, Opening a link in a new browser window/tab

Unit – III

Putting an Image on a Page, Using Images as Links, Putting an Image in the Background, creating a Table, Table Headers, Captions, Spanning Multiple Columns, Styling Table

Unit – IV

Introduction to HTML Forms, Different types of element HTML Forms, Basic Input and Attributes, Other Kinds of Inputs, Different types of HTML Tags, Creating HTML Forms

Unit – V

Introduction to CSS, Types of Style sheet, styling forms with CSS, CSS Property (colour, background, borders, margin and padding, height and width), Filter Effects, Where to Go from Here

REFERENCES:

1. Virginia DE Bolt, Integrated HTML and CSS A Smarter, Faster Way to Learn Wiley / Skybox, 2006
2. Cassidy Williams, Camryn Williams Introduction to HTML and CSS, O'Reilly, 2015
3. CBH Publication, Website designing and Multimedia
4. https://www.geeksforgeeks.org/
5. https://www.uniraj.ac.in/ (UOR)

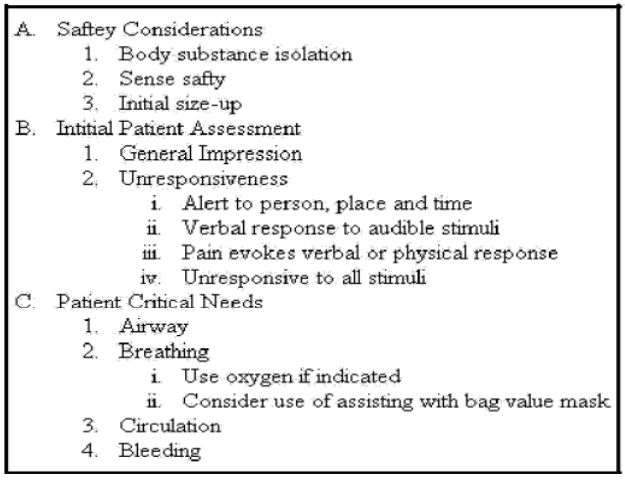
Software Lab Based on HTML

Q.1 Create an HTML document with the following formatting options:

1. Bold
2. Italics
3. Underline
4. Headings (Using H1 to H6 heading styles)
5. Font (Type, Size and Color)
6. Background (Colored background/Image in background)
7. Paragraph
8. Line Break
9. Horizontal Rule
10. Pre tag

Q.2 Create an HTML document which consists of:

1. Ordered List
2. Unordered List
3. Nested List
4. Image



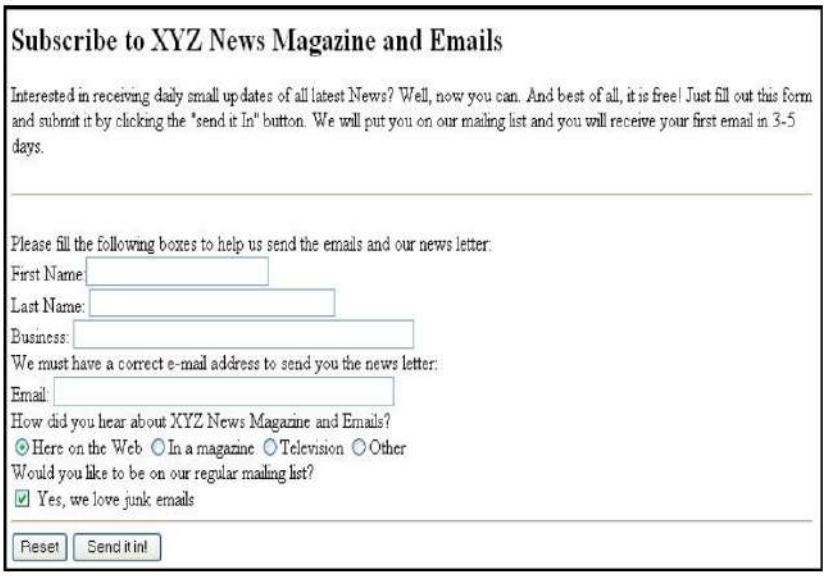
Q.3 Create an HTML document which implements Internal linking as well as external linking.

Q4 Create a table using HTML which consists of columns for Roll No., Student's name and grade, Class.

Result			
Roll No.	**Name**	**Grade**	**Class**

Q.5 Create a form using HTML which has the following types of controls:

- Text Box
- Option/radio buttons
- Check boxes
- Reset and Submit button



Q.6 Create HTML documents (having multiple frames) in the following three formats: