Yashwantrao Chavan Maharashtra Open University Nashik

School of Computer Science

FYBCA (2016 Pattern) Syllabus

2016 – 2017

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Programme Structure of BCA

B.C.A. (Bachelor of Computer Applications) (2016 pattern) Code: P131

Course Code	Course Name	Theory/ Practical/ Project	Contact (HRS)	Credit Points	Assessment Type	Passing Marks
Semester 1						
AEC001	English Communication	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP501	Mathematics	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP502	Problem Solving using Computers	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP503	Programming using C++	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP701	Lab: Mathematics	Practical	30	2	EE(20/50)	20/50
CMP702	Lab: Problem Solving using Computers	Practical	30	2	EE(20/50)	20/50
CMP703	Lab: Programming using C++	Practical	30	2	EE(20/50)	20/50
					Total	**220/550**
Semester 2						
ENV121	Environmental Studies	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP504	Statistics	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP505	Data Structure using C++	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP506	Computer Networks	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP704	Lab: Statistics	Practical	30	2	EE(20/50)	20/50
CMP705	Lab: Data Structure using C++	Practical	30	2	EE(20/50)	20/50
CMP706	Lab: Computer Networks	Practical	30	2	EE(20/50)	20/50
					Total	**220/550**
Semester 3						
ICT151	IT and E-Learning Skills	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP507	Operating System	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP508	Web Technologies	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP509	Database Management System	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP707	Lab: Operating System	Practical	30	2	EE(20/50)	20/50
CMP708	Lab: Web Technologies	Practical	30	2	EE(20/50)	20/50
CMP709	Lab: Database Management System	Practical	30	2	EE(20/50)	20/50
					Total	**220/550**
Semester 4						
OPN272	Financial and Investment Skills	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP510	Computer System Architecture	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP511	Software Engineering	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP512	JAVA	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP710	Lab: Computer System Architecture	Practical	30	2	EE(20/50)	20/50
CMP711	Lab: Software Engineering	Practical	30	2	EE(20/50)	20/50
CMP712	Lab: JAVA	Practical	30	2	EE(20/50)	20/50
					Total	**220/550**
Semester 5						
CMP332	Quantitative Aptitude	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP513	E Commerce Technologies	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP514	Advance JAVA	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP515	Linux Administration	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP713	Lab: E Commerce Technologies	Practical	30	2	EE(20/50)	20/50
CMP714	Lab: Advance JAVA	Practical	30	2	EE(20/50)	20/50
CMP715	Lab: Linux Administration	Practical	30	2	EE(20/50)	20/50
					Total	**220/550**
Semester 6						
OPN273	Personality and Career Skills	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP516	Android Programming	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP517	PHP Programming	Theory	60	4	CA(20) + EE(32/80)	40/100
CMP716	Lab: Android Programming	Practical	30	2	EE(20/50)	20/50
CMP717	Lab: PHP Programming	Practical	30	2	EE(20/50)	20/50
CMP801	Project-BCA	Project	90	6	EE(60/150)	60/150
					Total	**220/550**

English Communication (AEC001)

Unit No. and Name	Details	Counselling Sessions	Weightage
Unit 1: Introduction	**Introduction:** Theories of Communication, Types and modes of Communication **Language of Communication:** Personal, Barriers and Strategies, Intra Personal, Inter Personal and Group Communication **Speaking Skills:** Monologue, Dialogue, Group Discussion, Effective Communication/ Mis-Communication		
Unit 2 : Verbal Communication	**Understanding the Basis of Verbal Communication:** Organizing Your Messages, Using Vocal Elements Effectively, Understanding Nonverbal Language, Developing Credibility, Giving and Receiving Feedback, Overcoming Barriers to Communication, Communicating Ethically, Understanding Cross-Cultural Issues **Working with Customers:** Understanding Customer Service Basics, Communicating Empathetically, Asking Question to Understand Problems, Denying Request, Copying with Angry Customers **Developing Professional Telephone Skills:** Exploring Professional Telephone Communication, Placing Telephone Calls, Receiving Telephone Calls, Using Voice Mail, Leaving Professional Messages, Taking Calls for Other People, Screening, Holding, and Transferring Calls, Developing Cell Phone Etiquette **Improving Informal Communication:** Communicating Informally, Listening Actively, Speaking Persuasively, Negotiating Effectively, Managing Conflict, Participating in Meeting, Dealing with Office Politics, Making Proper Introductions		
Unit 3: Reading and Writing Skills	**Reading and Understanding:** Close Reading, Comprehension, Summary Paraphrasing, Analysis and Interpretation, Translation(from Indian language to English and vice-versa) Literary/Knowledge Texts **Writing Skills:** Documenting, Report Writing, Making notes, Letter Writing **Uncovering the Secrets of Clear writing:** Clarifying Written Communication, Writing Solid Sentences, Developing Effective Paragraphs, Mastering Punctuation **Communicating with E-Mail and Memos:** Understanding E-Mail Message and Memos, Composing the Main Elements of Message, Creating Professional E-Mail Message, Constructing Professional Memos, Writing Request Messages, Writing Response Messages, Writing Bad- News Messages, Technology Tools **Writing for Employment:** Writing Effective Cover Letters, Planning Resumes, Writing Chronological Resumes, Writing Functional Resumes, Requesting Letters of Reference, Sending Follow-Up Messages, Accepting or Rejecting Job Offers		
Unit 4: Developing Reports	Understanding Reports and Proposals, Planning a Report or Proposals, Writing Proposals		

and Proposals			
Unit 5: Solving the Problem	**Identifying and Defining Problems:** Understanding Problem Solving, Analyzing Problems, Determining Causes, Simplifying Complex Problems, Identifying and Managing Risks, Avoiding Problem-Solving Traps **Solving the Problem:** Gathering and Analyzing Data, Developing Alternatives, Evaluating Options, Implementing the Solution, Monitoring and Managing the Solution, Using Adaptive Techniques, Developing Ethical Solution		
Unit 6: Working in Groups and Teams	**Working in Groups and Teams:** Understanding the Role of Team in Organizations, Defining the types of Groups and Teams, Recognizing Differences Between Groups and Teams, Ensuring Team Success, Working with Distributed Teams **Group Decision Making and Problem Solving:** Understanding Group Dynamics, Evolving From a Group to a Team, Using Divergent Thinking, Using Convergent Thinking, Avoiding Common Group Traps, Working with Large Group **Exploring Team Roles and Processes:** Recognizing the Need for Team Leadership, Selecting Team Member, Choosing the Optional Team Size, Defining Common Team Roles, Establishing Team Rules, Clarifying Team Objectives, Making Collective Decisions **Building and Developing Teams:** Understanding the Benefits of Working in Teams, Fostering Relationships, Overcoming Resistance, Using Team- Building Activities, Dealing with Difficult Team Member, Benefits of professional networking		
Unit 7: Thinking Critically	Understanding Critical Thinking, Assessing the Credibility of an Argument, Becoming a Critical Thinker		
Unit 8: Presenting yourself Professionally	**Presenting yourself Professionally:** Meeting Business Casual Standards, Maintaining a Professional Wardrobe, Practicing good Grooming and Hygiene, Improving Your Speech **Developing Your Interpersonal Skills:** Networking Professionally, Showing Basic Office Courtesies, Recovering from difficult interpersonal situations, Displaying Optimism and Enthusiasm, Developing Diplomacy Skills, Interacting with others, Respecting social protocols		
		30	80

Mathematics (CMP501)

Unit No. & Name	Details	Counseling Sessions	Weightage
Unit 1 Set Theory And Number Systems	• Relevance of Mathematics • Set Noatations, Types of sets, Set Operations, Properties of Set operations, Venn Diagrams • Binary Number System, Conversion between Binary and Decimal Number System, Addition and Subtraction of Binary Numbers, Octal Number System, Hexadecimal Number System	04	10
Unit 2 Mathematical Induction And Mathematical Logic	• Mathematical Induction : First Principle, Proofs of statements using mathematical induction • Mathematical Logic : Statement, Truth value of a Statement, Types of logical statements, Types of Compound Statements, Logically Equivalent Statements, Logical Identities, Tautology and Contradiction	04	10
Unit 3 Exponents, Surds and Logarithms	• Exponential form and Laws of Exponents • Laws of Fractional Exponents, Surd, Order of Surd, Forms of surds • Logarithm, Antilogarithm, Conversion to different base, Application of Logarithms in Complex Calculations	04	10
Unit 4 Permutations and Combinations	• Addition Principle, Multiplication Principle • Factorial of Number • Permutations and Combinations	04	15
Unit 5 Relations and Functions	• Cartesian Product of Sets, Relations, Types of Relations • Equivalence Relations and Equivalence Classes • Matrix of a Relation • Functions, Types of Functions, Composition of Functions	04	10
Unit 6 Vectors, Matrices and Determinants	• Vectors, Types of Vectors, Algebra of Vectors, Collinear and Coplanar Vectors • Matrix, Types of Matrices, Algebra of Matrices, • Determinants, Inverse of Matrix	04	10
Unit 7 Linear Equations, Polynomials and Introduction to Graph theory	• Linear Equations, System of Linear Equations, Representation in Matrix Form, Cramer's Rule • Polynomials, Operations on Polynomials, Roots of polynomial Equation, Test of Divisibility, Quadratic Equations and their Roots • Graph, Commonly used terminology in Graph Theory, Some important types of Graphs, Representation of Graphs using Matrix, Eulerian and Hamiltonian Graphs	04	10
Unit 8 Mensuration	• Areas of Plane Figures, Perimeters of Plane Figures, Volumes of Solid Objects, Surface Areas of Solid Objects	02	05
		30	80

Problem Solving using Computers (CMP502)

Unit No. & Name	Details	Counseling Sessions	Weightage
Unit 1 Introduction to Computer	• **Computer Fundamentals**: Introduction to Computers: Characteristics of Computers, Uses of computers, Types and generations of Computers. • **Basic Computer Organization:** Units of a computer, CPU, ALU, memory hierarchy, registers, I/O devices.	3	5
Unit 2 Techniques of Problem Solving:	• Concept of problem solving, Problem definition, Program design • Flowcharting, decision table, algorithms, Structured programming concepts	3	10
Unit 3 Planning the Computer Program	• Programming methodologies viz. top-down and bottom-up programming • Debugging, Types of errors in programming, Documentation	2	10
Unit 4 Introduction to C	• History of C • C Basics i) C character set, tokens, constants, variables, keywords, identifiers ii) C operators- arithmetic, logical, assignment, relational, increment and decrement, conditional, bit wise, special, operator precedence, C expressions data types. • Problem solving techniques: flowchart and algorithm • Formatted input, formatted output instructions.	3	10
Unit 5 Decision Making and looping	• Decision making and branching if-statement – if, if-else, else-if ladder, nested if else, switch case statement, break statement • Decision making and looping - while, do, do- while statement , for loop, continue statement	5	15
Unit 6 Arrays and Strings	• Arrays Declaration and initialization of one dimensional, two Dimensional and character arrays, accessing array elements. • Declaration and initialization of string variables, string handling functions from standard library – strlen(), strcpy(), strcat(), strcmp()	4	15
Unit 7 Functions and Pointers	• Need of functions, scope and lifetime of variables, defining functions, function call, call by value, call by reference, return values, storage classes. category of function - No argument No return value, No argument with return value, argument with return value, recursion, command line Arguments • Understanding pointers, declaring pointer variable, initialization of pointer variable, accessing address of a variable, pointer expressions, Pointers arithmetic	4	10
Unit 8 Structures and Unions	• Structures: - Defining structure, declaring and accessing structure members, initialization of structure, arrays of structure, Difference between	2	5

Unit No. & Name	Details	Counseling Sessions	Weightage
	array and structure. • Union : Defining Union, declaring and accessing union members, Difference between structure and union		
	Revision	4	0
		30	80

Programming using C++ (CMP503)

Unit No. & Name	Details	Counseling Sessions	Weightage
Unit 1 Introduction	**Introduction**: Software Evolution, Procedure-Oriented Programming, Object-Oriented Programming, Basic Concepts of OOP, Benefits & Applications of OOP, Introduction to C++, C++ Statements, Structure of C++, Creating Source File, Compiling & Linking. **Tokens, Expression & Control Structure**: Tokens, Keywords, Identifiers & Constants, Data types, Storage Classes, Declaration, Operators, Operator Precedence, Implicit Conversions, Type Cast Operator, Scope Resolution Operator, Control Structure	3	5
Unit 2 Classes Objects and functions in c++	**Functions in C++**: Introduction, Main Function, Function Prototyping, Call by Value, Call by Reference, Return by Reference, Inline Function, Default Arguments, Recursion, Function Overloading, Math Library Function **Classes & Objects**: Introduction, Structure of Class, Defining Members of Class, Arrays within a Class, Private & Public Members, Memory Allocation for Object, Static Data Member, Arrays of Objects, Objects as Function Arguments, Friendly Functions, Returning Objects, Pointers to Members, Local Classes	4	10
Unit 3 Constructors, Destructors and Operator Overloading	**Constructors & Destructors**: Introduction, Constructors, Parameterized Constructor, Constructor with Default Arguments, Multiple Constructors in Class, Dynamic Initialization of Object, Copy Constructor, Dynamic Constructor, Two-Dimensional Arrays, const Objects, Destructors **Operator Overloading & Type Conversion:** Introduction, Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Manipulation of Strings Using Operators, Rules for Overloading Operators, Type Conversion	4	10
Unit 4 Inheritance	**Inheritance-Extending Classes**: Introduction, Derived Classes, Single Inheritance, Making Private Member Inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived	4	15

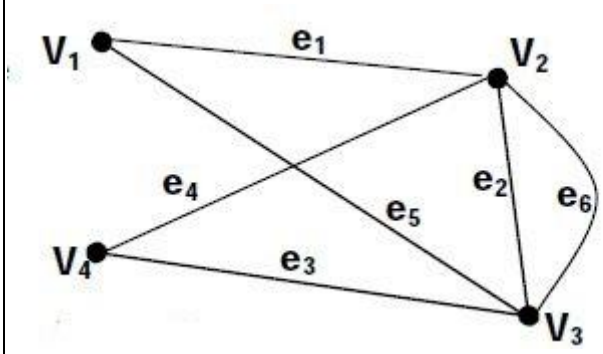
Unit No. & Name	Details	Counseling Sessions	Weightage
	Classes, Nesting of Classes		
Unit 5 Polymorphism	**Pointers, Virtual Functions & Polymorphism**: Introduction, Pointers, Pointers to Objects, this Pointer, Pointer to Derived Classes, Virtual Functions, Pure Virtual Functions, Virtual Constructors & Destructors	3	10
Unit 6 Working with files , Console I/O Operations	**Managing Console I/O Operations**: Introduction, C++ Streams, Stream Classes, Unformatted I/O Operations, Formatted Console I/O Operations, Manipulators **Working with Files**: Introduction, Classes for File Stream Operation, Opening & Closing of File, End-of-File, File Modes, File Pointers, Random Access, Command Line Arguments	3	10
Unit 7 Exception Handling	**Exception Handling**: Introduction, Basics, Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism, Rethrowing an Exception, Exceptions in Constructors & Destructors, Exception in Operator Overloaded Functions	2	10
Unit 8 Templates and Standard Template Library	**Templates**: Introduction, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters, Overloading of Template Functions, Member Function Templates **Standard Template Library**: Introduction, Components of STL, Containers, Algorithms, Iterators, Application of Container Classes, Function Objects	3	10
	Examples and Revision	4	0
		30	80

LAB: Mathematics (CMP701)

Practical No.	Practical	Activities
1	Set Theory-Set operations	[a].If P = {x / x^2+14x+40 = 0} , Q= {x/x^2-5x+6 = 0}, R ={x/x^2+17x-60 = 0} and the universal set X={ -20,-10,-4,2,3,4} Find 1. 1. P U Q 2. 2. Q∩R 3. 3. P U (Q∩R) [b] If U = {1,2,3….10}, A={x: x is a prime number less than 10} B= {2,4,6,8,10}, C ={1,4,9,16,25} Find 1. $(A \cup B)^c$ 2. $A^c \cup B^c$ 3. $C \cup A^c$ [c] In a hostel, 25 students take tea, 20 students take coffee, 15 students take milk, 10 students take both tea and coffee, 8 students take both milk and coffee. None of them take tea and milk both and everyone takes atleast one beverage. Find the number of students in the hostel. Represent it with a Venn diagram. [d] Discuss the properties of set operations.

2	Mathematical Induction	[a]Prove by the method of Induction that 2^{3n}-1 is divisible by 7 for all n∈N [b]Prove by the method of induction that : 7^n-1 is divisible by for all natural numbers n>=1 [c] Prove by the method of induction that : $1^2+2^2+3^2……+n^2 = [n(n+1)(2n+1)]/6$ for all n∈N [d]Prove using the method of induction that $1^3+2^3+3^3+…..+n^3 = [n^2(n+1)^2]/4$
3	Exponents, Logarithms, Surds	[a] What is the simplest form of the surd $\sqrt{\frac{343}{45}}$ [b] What is the simplest form of the surd $\sqrt[4]{1875}$ [c] Evaluate : (45.83 * 9.5432)/ 27.39 [d] Evaluate : $\sqrt[5]{\frac{3 \times 71.43}{7.284}}$
4	Number Systems, Binary Addition and Subtraction	[a] Convert the decimal number 142 to binary, Octal, hexadecimal [b] Do the reverse process also for all the above three conversions. [c] Add the following binary numbers: 1. $(11)_2$+ $(111)_2$ 2. $(1\ 1\ 1\ 00)_2$ + $(1\ 0\ 0\ 11)_2$ [d] Subtract the following binary numbers: 1.$(11100)_2$ – $(10011)_2$ 2. $(1001)_2$ –$(110)_2$
5	Permutations and Combinations	[a]Four different books on Mathematics, 3 different books on English and 2 different books on Physics are to be arranged in a shelf, so that books on the same subject are together. How many different ways can this be done. [b] In a question paper there are 6 questions in Section 'A' and 4 questions in Section B and also there is note "Attempt in all 5 questions selecting atleast one from each section." Find the number of ways in which a student can answer the question paper.
6	Mathematical Logic	[a] Write the inverse , converse and contrapositive of the statement: "The crop will be destroyed if there is a flood." [b] State whether the following statement pattern is a tautology or a contradiction or a contingency. (p→q) ^(q v r) [c] Write the truth table of the following statement pattern [~(p ^q)] ⟷ (q v r) [d] Using the truth table determine whether following statement pattern is logically equivalent or not. p and p ^ (p v q)
7	Relations	[a]Let R be a relation on Q defined by R = {(a,b)/a, b∈Q, a-b∈ Z} Show that R is an equivalence relation [b] Let L = {C, Pascal, Cobol is a set of computer languages and S = {Windows, UNIX,DOS} is a set of operating systems. Find the Product set L x S [c] if A= {1,2,3,4} and R is a relation on set A listed as a set R ={(1,1),(2,1),(3,1),(4,1),(2,2),(4,2),(3,3),(4,4). What is the matrix of relation R. [d] Explain with examples the different closures of relation R
8	Functions	[a] Show that f: R→R given by $f(x) = 3x - 4$ is one-one and onto. Find its inverse function. Also find $f^{-1}(9)$ and $f^{-1}(-2)$ [b] Find gof and fog when f(x) = x-2, g(x) = x^2+3x+1

9	Vectors	[a] If $\bar{a} = 4\hat{i} + \hat{j} + \hat{k}$, $\bar{b} = 5\hat{i} + 9\hat{j} + 19\hat{k}$, $\bar{c} = 8\hat{i} + 6\hat{j} + 5\hat{k}$. Find $\bar{a} \cdot \bar{b} \times \bar{c}$ Are these three vectors co-planar? [b]Show that vectors $2\bar{i} + \bar{j} - 3\bar{k}$ and $3\bar{i} - 3\bar{j} + \bar{k}$ are at right angles [c] Find 'p' if vectors $2\bar{i} + 2\bar{j} + p\bar{k}$ and $3\bar{i} - \bar{j} + 2\bar{k}$ are at right angles [d] Find the area of the parallelogram formed by the two vectors $2\bar{i} + \bar{j}$ and $\bar{j} + 3\bar{k}$
10	Matrices and Determinants	[a] By the adjoint method find A^{-1} IF A = $\begin{pmatrix} 4 & -5 & -11 \\ 1 & -3 & 1 \\ 2 & 3 & -7 \end{pmatrix}$ [b] If A = $\begin{pmatrix} 3 & 1 \\ 2 & 4 \end{pmatrix}$ B = = $\begin{pmatrix} 0 & 3 \\ -1 & 5 \end{pmatrix}$ Show that i. (AB)' = B' A' 2. |AB| = |A||B| [c] Find x,y,z if (5A – 3B)C = X where A = $\begin{pmatrix} 2 & 0 \\ 0 & 2 \\ 2 & 2 \end{pmatrix}$ B = $\begin{pmatrix} 2 & 4 \\ -4 & 6 \\ 6 & 2 \end{pmatrix}$ C= $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$ X = $\begin{pmatrix} x \\ y \\ z \end{pmatrix}$ [d] if A = $\begin{pmatrix} -2 & 0 & 1 \\ 1 & 2 & 3 \end{pmatrix}$, B = $\begin{pmatrix} 0 & 1 \\ 2 & 3 \\ 1 & 1 \end{pmatrix}$ Show that the matrix AB is non singular
11	Mensuration	[a] Find surface area S of right circular cone with height 20 cm and the radius of the circular base 15cm. [b] Find the area of triangle with sides 5cm, 12cm and 13cm [c] Find the volume of a right circular cylinder with radius 4.6cm and height 8.5m [d] Find the volume of a right circular cone of height 20 cm and radius of the circular bas 15cm.
12	System of Linear Equations	[a] Find x,y,z using Cramer's Rule If $x - y + z = 4$, $2x + y - 3z = 0$ and $x + y + z = 2$ [b] Solve the following system by Cramer's Rule $x + y + 2z = 7$ $-x - 2y + 3z = 6$ $3x - 7y + 6z = 1$
13	Polynomials and Quadratic Equations	[a] Find all the roots of $x^3 - 6x^2 + 9x - 4 = 0$ [b] $if\ f(x) = 3x - 2\ and\ g(x) = 8x^2 + 9x + 3$. find the product of the two polynomials. [c] $f\ f(x) = 3x - 2\ and\ g(x) = 6x^2 + 9x + 3$. Divide $g(x)/f(x)$ [d] Find the roots of the quadratic equation $x^2 - 6x + 9 = 0.$

14	Graph Theory	[a] Explain with examples Eulerian graph ,Hamiltonian graph and a tree. [b] Draw the adjacency matrix for the following : 
15	Miscellaneous	[a] Find the number of permutations obtained by arranging all the letters of the word “COMBINATION”. [b] Convert(11001)2 to decimal equivalent number. [c] Write the converse, inverse and contrapositive of the following conditional statement “If interest rates are low then the economy is god” [d] Calculate $[(29.13)^{1/3} \times 0.0046]/(0.123 \times 8.13)$

LAB: Problem Solving Using Computers [CMP702]

Practical No.	Practical	Activities
1	Flowchart and Algorithm	Prepare flowchart, write algorithm and then write a program to perform the mathematical operations such as addition, subtraction multiplication, division and mod of two numbers.
2	if statement, Conditional operator	Write a program to find greatest among the 3 numbers using if statements. Write a program to find smallest among the 3 numbers using conditional operators
3	Switch statement	Write a program to input a character and decide whether it is a vowel or not. Try to use toupper() or tolower() function to ignore the character case of the vowels.
4	For loop	Write a program to find factorial of number.
5	do-while / while-do loop	Write a program to find sum and average of ‘n’ numbers. Declare average as float and other variables as integers.
6	if-else ladder/nested if	Write a program to input name and marks of 3 subjects. Calculate total, percentage and grade the students according to the slab: **Per** — **Grade** >=75 and <=100 — ’O’ >=60 and <75 — ’A’ >=50 and < 60 — ’B’ >=40 and < 50 — ’C’ >=0 and < 40 — ’D’
	Menu driven program	Write a menu driven program to convert dollars to rupees and rupees to dollars.

8	Functions	Write a program using functions to find reverse of a number and decide whether it is palindrome or not. Develop two functions getnum() and reverse() with proper prototypes.
9	Functions and Recursion	Write a program to find factorial of a number using the concept of recursion.
10	One Dimensional Array	Write a menu driven program to create one dimensional array, display it , find the sum of all the elements, find maximum and minimum element within the array, include the facility to search an element. Finally sort the array.
11	Two Dimensional Arrays	Write a program to create two arrays, find sum and difference of these two matrices.
12	Array of structures	Write a program using the concept of array of structures to create a list of students having the following fields 'rollno, name, marks[3], total '. Marks should be stored as an integer array.
13	Pointers	Write a program to swap the values of two variables by using call by reference method in functions
14	File Handling	Write a program to create a text file 'L1.txt' which stores a line of text till the user presses the enter. Copy this file into 'L2.txt'
15	Mini Project	Write a menu driven program to create an array of structure which stores names of the countries and their capitals. Display the list and include the facility such that if the user enters the country name, the program should give its capital and also include the reverse facility ,in case the country or capital is not found proper message should be printed. The Menu should be as follow: **MENU** 1. Create 2. Display 3. Country to Capital 4. Capital to country 5. Exit

Lab: Programming using C++ [CMP703]

Practical No.	Practical	Activities
1		Write a C++ program to declare two integer , one float variables and assign 10, 15, and 12.6 to them respectively and then prints these values on the screen.
2		Write a C++ program to prompt the user to input her/his name and print this name on the screen, as shown below. The text from keyboard can be read by using cin>> and to display the text on the screen you can use cout<<.
3		Write a C++ program that prompts the user to input three integer values and find the greatest value of the three values.
4		Write a program that determines a student's grade. The program will read three types of scores (quiz, mid-term, and final scores) and determine the grade based on the following rules: -if the average score =90% =>grade=A -if the average score >= 70% and <90% => grade=B -if the average score>=50% and <70% =>grade=C -if the average score<50% =>grade=F
5		Define a class called as circle which has radius as its data member. The class should have following member functions a. Function to set the value of radius

		b. Function to get the value of radius c. Function to calculate and return the area of circle d. Function to calculate and return circumference
6		Develop a class to represent one digit counter. The class must have data member to represent counter. The class should have following function a. Function to set the value of the counter b. Function to display value of the counter c. Function to increment the counter d. Function to decrement the counter
7		Define a class called as distance represented in feet and inches. The class should have following member function a. Function to set the distance b. Function to get the distance from user c. Function to display the distance d. Function to add two distances and return the addition
8		Define a class Period which has hours and minutes as its data member. Function add to add the periods and return the addition. The function should work as Friend Function.
9		• Create a class to demonstrate use of constructor • Write a program to demonstrate use of copy constructor
10		• Define a class that has following data member functions a. Inc, dec, display b. Constructor with default parameter zero c. Destructor function • Define a class to overload unary ++ and unary - - operator
11		• Define a class complex to represent complex number. The class should have constructor with 2 default parameters. Create member function setcomplex( ), getcomplex( ) and display( ) and also operator functions to overload +, -, *, / for carrying out operation with complex number
12		Design a class for multilevel inheritance using public and private derivation
13		Write a program to demonstrate the concept of method overriding, virtual function.
14		Design a class FileDemo, open the file in read mode and display the total number of line, word and characters
15		Show the implementation of template class library for swap function

Environmental Studies (ENV121)

Unit No. and Name	Details	Counselling Sessions	Weightage
Unit 1 Multidisciplinary Nature Of Environmental Studies	Definition, Scope And Importance – Definition, Scope, Importance, Need For Public Awareness - Institutions in Environment, People in Environment		
Unit 2 Natural Resources	Introduction, Renewable And Non-Renewable Resources - Natural resources and associated problems, Non-renewable resources, Renewable resources, Forest Resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people, Water Resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems. Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food Resources: World food problems, Changes in land use by agriculture and grazing, Effects of modern agriculture, Fertilizer/ pesticide problems, Water logging and salinity. Energy Resources: Increasing energy needs, Renewable/ nonrenewable, Use of Alternate energy sources, Case studies, Land resources: Land as a resource, land degradation, man-induced land-slides, soil erosion and desertification. Role Of An Individual In Conservation Of Natural Resources, Equitable Use Of Resources For Sustainable Lifestyles		
Unit 3 Ecosystems	Concept of an ecosystem, Understanding ecosystems, Ecosystem degradation, Resource utilization, Structure and functions of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, The water cycle, The Carbon cycle, The Oxygen cycle, The Nitrogen cycle, The energy cycle, Integration of cycles in nature, Ecological succession, Food chains, Food webs and Ecological pyramids, The food chains, The food webs, The ecological pyramids, Introduction, Types, Characteristic features, Structure and functions, Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, lakes, streams, rivers, estuaries, oceans)		
Unit 4 Biodiversity And Its Conservation	Introduction – Definition: Genetic, Species, Ecosystem Diversity, Genetic diversity, Species diversity, Ecosystem diversity, Biogeographic Classification Of India, Value Of Biodiversity: Consumptive, Productive Use, Social, Ethical, Aesthetic And Option Values, Consumptive value, Productive value, Social value, Ethical value, Aesthetic value, Option value, Biodiversity At Global, National And Local Levels, India As A		

	Mega Diversity Nation, Hotspots Of Biodiversity, Threats To Biodiversity: Habitat Loss, Poaching Of Wildlife, Man-Wildlife Conflicts, Endangered And Endemic Species Of India, Common Plant species, Common Animal species, Conservation Of Biodiversity: In-Situ And Ex-Situ, In-situ conservation, Ex-situ conservation		
Unit 5 Environmental Pollution	:Definition, Causes, Effects And Control Measures of, Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear hazards, Solid Waste Management: Causes, Effects And Control Measures, Urban And Industrial Waste, Role Of Individuals In Pollution Prevention, Pollution Case Studies, Disaster Management: Floods, Earthquakes, Cyclones, Landslides		
Unit 6 Social Issues And The Environment	From Unsustainable To Sustainable Development, Urban Problems Related To Energy, Water Conservation, Rain Water Harvesting, Watershed Management, Water conservation, Rain water harvesting, Watershed management, Resettlement And Rehabilitation Of People; Its Problems And Concerns. Case Studies, Environmental Ethics: Issues And Possible Solutions, Resource consumption patterns and the need for their equitable utilization, Equity – Disparity in the Northern and Southern countries, Urban – rural equity issues, The need for Gender Equity, Preserving resources for future generations, The rights of animals, The ethical basis of environment education and awareness, The conservation ethic and traditional value systems of India, Climate Change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents And Nuclear Holocaust. Case Studies, Climate change, Global warming, Acid rain, Ozone layer depletion, Nuclear Accidents and Nuclear Holocaust, Wasteland Reclamation, Consumerism And Waste Products, Environment Protection Act, Air (Prevention And Control Of Pollution) Act, Water (Prevention And Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues Involved In Enforcement of Environmental Legislation, Environment Impact Assessment (EIA), Citizens actions and action groups, Public Awareness, Using an Environmental Calendar of Activities, What can I do?		
Unit 7 Human Population And The Environment	Population Growth, Variation Among Nations, Global population growth, Population Explosion – Family Welfare Program, Methods of sterilization, Urbanization, Environmental And Human Health, Environmental health, Climate and health, Infectious diseases, Water-related diseases, Risks due to chemicals in food, Cancer and environment, Human Rights, Equity, Nutrition, health and human rights, Intellectual Property Rights and Community Biodiversity Registers, Value Education,		

	Environmental Values, Valuing Nature, Valuing cultures, Social justice, Human heritage, Equitable use of Resources, Common Property Resources, Ecological degradation, HIV/AIDS, Women And Child Welfare, Role Of Information Technology In Environment And Human Health		
Unit 8 Field Work	Visit To A Local Area To Document Environmental Assets (River/ Forest/ Grasslands/ Hill / Mountain), Visit To A Local Polluted Site, Study Of Common Plants, Insects, Birds, Study of Simple Ecosystems		
		30	80

Statistics (CMP504)

Unit No. and Name	Details	Counselling Sessions	Weightage
Unit 1 Classification, Tabulation and Graphical Methods	• Definition of Statistics, Scales and Measurements, • Scope and Importance of Statistics, Limitations of Statistics • Representation of Data, Classification of Data • Cumulative Frequency Distribution and Curve • Pie Chart, Bar Diagram, Histogram, Frequency Polygon and line graph	02	10
Unit 2 Measures of Central Tendency	• Mean • Median • Mode • Other Avarages	03	10
Unit 3 Measures of Dispersion	• Range • Standard Deviation • Merits and Demerits of Standard Deviation • Formula for Combined Standard Deviation (without proof) • Interpretation of Standard Deviation • Coefficient of Variation	02	10
Unit 4 Moments Skewness and Kurtosis	• Moments • Skewness and Kurtosis • Numerica Example	02	10
Unit 5 Correlation and Regression	• Scatter Diagram • Karl Pearson's Correlation Coefficient and its properties • Applications of Correlation in Various Fields • Spearman's Rank Correlation Coefficient • Linear Regression (Bivariate data)	03	10
Unit 6 Probability	• Random Experiments • Probability • Relative Frequency Approach of Determining Probability • Equally Likely Approach • Axioms of Probability • Conditional Probability • Multiplicative Law • Baye's Theorem	04	10

	• Concept of Independence • Counting Techniques		
Unit 7 Random Variables, Special Continuous Probability Distributions	• Random Variables, Discrete Random Variable, Continuous Random Variable • Probability Distribution, Some Special Continuous Probability Distributions • Sampling Distributions	05	10
Unit 8 Test of Hypothesis, Large Sample Tests, Small Sample Tests	• Statistical Hypothesis, Null Hypothesis and • Alternative Hypothesis • Test of a Statistical Hypothesis • Test Statistic • Critical Region and Acceptance Region • Type I Error and Type II Error • Level of Significances • Large Sample Tests • Small Sample Tests, Test for Population Mean, Test for Equality of Two Population Means, Test of Variances, Test based on Chi-Square Distribution	05	10
		04	
		30	80

Data structure using C ++ (CMP505)

Unit No. and Name	Details	Counselling Sessions	Weightage
Unit 1 Introduction to Data Structure	• **Basic Terminology** a. Elementary data structure organization b. Classification of data structure • **Operations on data structures** a. Traversing, Inserting, deleting b. Searching, sorting, merging • **Different Approaches to designing an algorithm** a. Top-Down approach b. Bottom-up approach • **Complexity** a. Time complexity b. Space complexity • **Asymptotic Notations** a. O Notation b. Ω Notation c. θ Notation	3	10
Unit 2 Sorting and Searching	• **Sorting Techniques** a. Introduction b. Selection sort c. Insertion sort d. Bubble sort e. Merge sort f. Radix sort (Only algorithm) g. Shell sort (Only algorithm) h. Quick sort (Only algorithm) • **Searching** a. Linear search	3	10

	b. Binary search		
Unit 3 Stacks	• **Introduction to stack** a. Stack as an abstract data type b. Representation of stack through arrays • **Applications of Stack** a. Reversing a list b. Polish notations c. Conversion of infix to postfix expression d. Evaluation of postfix expression e. Converting an infix into prefix expression f. Evaluation of prefix expression g. Recursion	2	10
Unit 4 Queues	• **Introduction** a. Queues as an abstract data type b. Representation of a Queue as an array • **Types of Queue** a. Circular Queue b. Double Ended Queue c. Priority Queue d. Dequeues • **Applications of Queue**	3	10
Unit 5 Linked List	• **Introduction** a. Terminologies: node, Address, Pointer, b. Information, Next, Null Pointer, Empty list etc. • **Type of lists** a. Linear list b. Circular list c. Doubly list • **Operations on a singly linked list (only algorithm)** a. Traversing a singly linked list b. Searching a linked list c. Inserting a new node in a linked list d. Deleting a node from a linked list	4	10
Unit 6 Trees	• **Introduction** a. Terminologies: tree ,degree of a node, degree of a tree, level of a node, leaf node, Depth / Height of a tree, In-degree & out-Degree, Directed edge, Path, Ancestor & descendant nodes. • **Tree Types and Traversal Methods** b. Type of Trees c. General tree d. Binary tree e. Binary search tree (BST). • **Binary tree traversal (only algorithm)** a. In order traversal b. Pre order traversal c. Post order traversal • **Expression tree**	5	15
Unit 7 Graph	• **Introduction** a. Terminologies: graph, node (Vertices), arcs (edge), directed graph, in-degree, out-degree, adjacent, successor, predecessor, relation, weight, path, length. • **Representations of a graph** a. Array Representation b. Linked list Representation	4	10

	• **Traversal of graphs** a. Depth-first search (DFS). b. Breadth-first search (BFS). • **Applications of Graph**		
Unit 8 Hashing	• **Hash function** • **Collision resolution techniques**	2	5
	Revision	4	0
		30	80

Computer Networks (CMP506)

Unit No. and Name	Details	Counselling Sessions	Weightage
Unit 1 Introduction to Networks	• Fundamentals of Computer Network- Definition Need of Computer Network, Applications, Component of Computer Network. • Network Benefits- Sharing Information(File Sharing, E-mail) - Sharing Resources (Printer Sharing, Application Services) - Facilitating Centralized Management-Managing Software, Maintaining the Network, Backing up data • Computer Network Classifications- Classification of Network by their Geography.-PAN, CAN, LAN, MAN, WAN • Classification of Network by their Component Role--Peer-to-Peer Network, Server-Based Network, Types of server	3	10
Unit 2 Network Topologies & Networking Devices	• Network Topologies - Introduction, Definition, Selection Criteria, Types of Topology- i) Bus ii) Ring iii) Star iv) Mesh v) Tree vi) Hybrid. • Network Control / Connecting Devices - Need of Network Control devices, Role of Network Control devices in a Network, Connectors, Hub, Repeater, Bridges, Switches, Router, Gateway, Modem. • Network software: NIC Device Driver, client-server software e.g. DHCP, TELNET, FTP	3	5
Unit 3 Transmission Media	• Need of Transmission Media, Selection Criteria. • Types of Transmission Media- 1) Guided Media: Cable Characteristics, Types of Cable-Twisted Pair Cable, Co-axial Cable, Fibre Optic Cable. 2) Unguided media: Types of Communication Band-Microwave Communication, Radio wave • Communication, Satellite and Infrared Communication • Latest Technologies in Wireless Network-Bluetooth Architecture, Wi-Fi, Wi- Max • Cellular (Mobile) Telephone – Band in Cellular Telephony, Calls using Mobile Phones, Transmitting receiving / Handoff operations	3	10
Unit 4 Network Architecture and Protocols	• Layered Architecture • Peer-to- Peer Processes Interfaces between Layer, Organization of the Layers • Protocols	3	10

	• Encapsulation.		
Unit 5 OSI Reference Model	• Layers of the OSI Reference Model • Physical and Data-Link Layer • Network and Transport Layer • Session, Presentation and Application Layer	5	15
Unit 6 TCP / IP Suite	• Introduction –Addressing mechanism in the Internet • IP Addressing – IP Address classes, classless IP addressing, Subnetting, supernetting, Masking, • Layered Structure of the TCP / IP Model – Host-to-Network, Internet, Transport, Application • TCP / IP Protocol Suite: Host-to-Network-SLIP and PPP, Internet Layer-ARP, RARP and IP: Introduction, IPv4, IPv6 (Header Format), Difference between IPv4 & IPv6 • Transport Layer- TCP and UDP (Frame Format, port addresses), Application Layer- FTP, SMTP, DNS • Comparison between OSI and TCP/IP Model	3	10
Unit 7 Computer Security	• Introduction to Computer Security, Need for security, • Security basics: Confidentiality, Integrity, Availability, Accountability, Non-repudiation. • Threats to Security: Viruses (its types) and Worms, Intruders, Insiders, Criminal organizations, Terrorists, Information warfare Avenues of attack, Steps in attack • Security Attacks: Active and Passive attacks (Types of attack) • Password Management • Role of people in Security: Do's and Don'ts	3	10
Unit 8 Cryptography & Network Security	• Introduction: Cryptography, Cryptanalysis, Cryptology. • Cryptography Techniques: a) Substitution techniques: Caesar's cipher, monoalphabetic and polyalphabetic, one-time pad. b) Transposition techniques – Rail fence technique, simple columnar. • Hashing – concept • Firewalls: Introduction, Why Firewall, features, advantages and disadvantages. Types of Firewall. • Virtual Private Network work • Security topologies: security zones, DMZ, Internet, Intranet, VLAN. • Intrusion Detection: Intrusion detection systems (IDS), host based IDS, network based IDS	3	10
	Revision	4	0
		30	80

LAB: Statistics (CMP704)

<table>
<tr><th>Practical No.</th><th>Practical</th><th>Activities</th></tr>
<tr><td>1</td><td>Classification and tabulation of data, Frequency Distribution</td><td>1. Tabulate the following information:
The number of students in a college in the year 1998 was 510, of these 480 were boys and the rest girls. In 2003, the number of boys increased by 100 and that of girls increased by 300 as compared to their strengths in 1998.In 2003, the total number of students in the college was 1200, the number of boys being double the number of girls.
2. Following is an extract of the data on internal marks (out of 10), in a unit test, secured by F.Y.B.C.A students of a College. Prepare appropriate frequency distribution and write your findings.
<table>
<tr><td>1</td><td>2</td><td>5</td><td>5</td><td>6</td><td>6</td><td>2</td><td>0</td><td>4</td><td>5</td></tr>
<tr><td>4</td><td>2</td><td>3</td><td>1</td><td>4</td><td>4</td><td>1</td><td>2</td><td>6</td><td>2</td></tr>
<tr><td>3</td><td>3</td><td>1</td><td>3</td><td>5</td><td>1</td><td>5</td><td>4</td><td>4</td><td>5</td></tr>
<tr><td>7</td><td>3</td><td>2</td><td>1</td><td>5</td><td>1</td><td>3</td><td>7</td><td>3</td><td>1</td></tr>
<tr><td>4</td><td>1</td><td>2</td><td>4</td><td>4</td><td>2</td><td>3</td><td>1</td><td>1</td><td>5</td></tr>
</table></td></tr>
<tr><td>2</td><td>Graphical representation of data Part I</td><td>1. Following is the given frequency distribution of marks of Statistics subject obtained by 100 students in a class. Calculate ‘less than’ and ‘more than’ cumulative frequency distribution and also draw the respective Ogive curves.
<table>
<tr><th>Marks</th><th>No of Students</th></tr>
<tr><td>20-29</td><td>07</td></tr>
<tr><td>30-39</td><td>11</td></tr>
<tr><td>40-49</td><td>24</td></tr>
<tr><td>50-59</td><td>32</td></tr>
<tr><td>60-69</td><td>09</td></tr>
<tr><td>70-79</td><td>14</td></tr>
<tr><td>80-89</td><td>02</td></tr>
<tr><td>90-99</td><td>01</td></tr>
</table></td></tr>
<tr><td>3</td><td>Graphical representation of data Part II</td><td>1. Represent the following frequency distribution by means of a Histogram. Also draw the frequency polygon and frequency curve.
<table>
<tr><th>Salary (`)</th><th>No of Employees</th></tr>
<tr><td>300-400</td><td>20</td></tr>
<tr><td>400-500</td><td>30</td></tr>
<tr><td>500-600</td><td>60</td></tr>
<tr><td>600-700</td><td>75</td></tr>
<tr><td>700-800</td><td>115</td></tr>
<tr><td>800-900</td><td>100</td></tr>
<tr><td>900-1000</td><td>60</td></tr>
<tr><td>1000-1200</td><td>40</td></tr>
</table>
2. Draw a pie diagram for the following data of patients according to the type of disease.
Distribution of patients according to type of disease
<table>
<tr><td>Disease</td><td>G.I</td><td>Chest</td><td>E.N.T</td><td>Diabetes</td><td>Heart</td><td>Total</td></tr>
<tr><td>Number</td><td>1200</td><td>260</td><td>400</td><td>700</td><td>50</td><td>2670</td></tr>
<tr><td>Percentage Share</td><td>47</td><td>10</td><td>15</td><td>26</td><td>2</td><td>100</td></tr>
</table></td></tr>
<tr><td>4</td><td>Measures of Central Tendancy</td><td>1. Obtain the median, from the following frequency distribution using formula and also graphically.
<table>
<tr><td>Weekly Salary (Rs.)</td><td>1400-1600</td><td>1600-1800</td><td>1800-2000</td><td>2000-22000</td><td>2200-2400</td><td>2400-2600</td></tr>
<tr><td>Frequency</td><td>12</td><td>30</td><td>55</td><td>40</td><td>35</td><td>28</td></tr>
</table>
2. From the following data find the missing frequencies, it is given that mean is 15.3818 and total frequency is 55.
<table>
<tr><td>Class</td><td>9-11</td><td>11-13</td><td>13-15</td><td>15-17</td><td>17-19</td><td>19-21</td></tr>
<tr><td>Frequency</td><td>3</td><td>7</td><td>-</td><td>20</td><td>-</td><td>5</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td></td><td>3. Calculate mode of the following frequency distribution.
<table>
<tr><td>Class</td><td>50-100</td><td>100-150</td><td>150-200</td><td>200-250</td><td>250-300</td><td>300-350</td><td>350-400</td></tr>
<tr><td>Frequency</td><td>5</td><td>15</td><td>25</td><td>18</td><td>12</td><td>3</td><td>2</td></tr>
</table>
4. Write Merits and Demerits of Mean, Median and Mode.</td></tr>
<tr><td>5</td><td>Measures of Dispersion Part I</td><td>1. The number of runs scored by cricketers A and B in 5 test matches are shown below:
<table>
<tr><td>A</td><td>5</td><td>20</td><td>90</td><td>76</td><td>102</td><td>90</td><td>6</td><td>108</td><td>20</td><td>16</td></tr>
<tr><td>B</td><td>40</td><td>35</td><td>60</td><td>62</td><td>58</td><td>76</td><td>42</td><td>30</td><td>30</td><td>20</td></tr>
</table>
Find (i) which cricketer is better in average? (ii) Which cricketer is more consistent?
2. A machine capability study was made on a Brown and Sharpe single – spindle screw machine. The number of items inspected (sample size), their mean diameters and standard deviations reported were as follows.
<table>
<tr><td>Sample size (mm)</td><td>Mean diameter (mm)</td><td>Standard deviation</td></tr>
<tr><td>4</td><td>2.8325</td><td>0.2479</td></tr>
<tr><td>6</td><td>2.8333</td><td>0.2687</td></tr>
<tr><td>5</td><td>2.8520</td><td>0.2786</td></tr>
<tr><td>4</td><td>2.8400</td><td>0.2581</td></tr>
<tr><td>5</td><td>2.8820</td><td>0.2721</td></tr>
<tr><td>6</td><td>2.8533</td><td>0.2925</td></tr>
</table>
Show that the combined mean and combined standard deviation of all samples is 2.84932 mm and 0.2724 mm respectively.</td></tr>
<tr><td>6</td><td>Measures of Dispersion Part II</td><td>1. Time taken (in minutes) per customer by a counter employee is shown below:
<table>
<tr><td>Clerk I</td><td>5</td><td>5</td><td>3</td><td>4</td><td>2</td><td>5</td><td>4</td><td>5</td><td>3</td><td>5</td><td>2</td></tr>
<tr><td>Clerk II</td><td>3</td><td>3</td><td>5</td><td>4</td><td>5</td><td>5</td><td>3</td><td>5</td><td>3</td><td>5</td><td>5</td></tr>
</table>
It is claimed that A is better than B and is also consistent. Do you accept the claim? Justify your answer.
2. The time required (in minutes) for writing a successful program is the variable under consideration. Two students Swanand and Ashish are asked to write 10 programs and submit them. The data on time required are as follows:
<table>
<tr><td>Swanand</td><td>10</td><td>15</td><td>24</td><td>8</td><td>12</td><td>10</td><td>10</td><td>7</td><td>8</td><td>10</td></tr>
<tr><td>Ashish</td><td>8</td><td>12</td><td>30</td><td>10</td><td>12</td><td>15</td><td>8</td><td>9</td><td>5</td><td>10</td></tr>
</table>
Analyze above data and comment on the results.</td></tr>
<tr><td>7</td><td>Moments& Measures of Skewness and Kurtosis Part I</td><td>1. Calculate Karl Pearson’s coefficient of skewness:
<table>
<tr><td>Variable</td><td>Frequency</td><td>Variable</td><td>Frequency</td></tr>
<tr><td>70-80</td><td>11</td><td>30-40</td><td>21</td></tr>
<tr><td>60-70</td><td>22</td><td>20-30</td><td>11</td></tr>
<tr><td>50-60</td><td>30</td><td>10-20</td><td>6</td></tr>
<tr><td>40-50</td><td>35</td><td>0 -10</td><td>5</td></tr>
</table>
2. Calculate first four moments about the mean and also the value of β_1 and β_2 from the following data :
<table>
<tr><td>Marks</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr>
<tr><td>No of students</td><td>8</td><td>12</td><td>20</td><td>30</td><td>15</td><td>10</td><td>5</td></tr>
</table></td></tr>
<tr><td>8</td><td>Moments& Measures of Skewness and Kurtosis Part II</td><td>1. Calculate Bowley’s coefficient of skewness for the data given below:
<table>
<tr><td>Weight(in lbs.)</td><td>No. of Students</td><td>Weight(in lbs.)</td><td>No. of Students</td></tr>
<tr><td>Below 99</td><td>01</td><td>150-159</td><td>65</td></tr>
<tr><td>100-109</td><td>14</td><td>160-169</td><td>34</td></tr>
<tr><td>110-119</td><td>66</td><td>170-179</td><td>12</td></tr>
<tr><td>120-129</td><td>122</td><td>180-189</td><td>05</td></tr>
<tr><td>130-139</td><td>145</td><td>190-199</td><td>02</td></tr>
<tr><td>140-149</td><td>121</td><td>200 and over</td><td>02</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td></td><td>2. For a moderately skewed distribution mean is 17.2, s.d is 50 and median is 16.7, obtain the coefficient of skewness and mode</td></tr>
<tr><td>9</td><td>Correlation and Regression-Part I</td><td>1. Discuss with proper examples various scatter diagrams
2. Seven students obtained the following percentage of marks in the college test(X) and the final examination (Y). Find the coefficient of correlation between these variables.
<table>
<tr><td>X</td><td>50</td><td>62</td><td>72</td><td>25</td><td>20</td><td>60</td><td>60</td></tr>
<tr><td>Y</td><td>48</td><td>65</td><td>74</td><td>33</td><td>25</td><td>55</td><td>66</td></tr>
</table></td></tr>
<tr><td>10</td><td>Correlation and Regression-Part II</td><td>1. The ranks of the same 15 students in two subjects A and B are given below. The two numbers within the brackets denote the ranks of the same student in A and B respectively. Find the Spearman's Rank Correlation Coefficient.
(1,10), (2,7), (3,2), (4,6), (5,,4), (6,8), (7,3), (10,1), (9,1), (10,15),(11,19), (12,5),(13,14), (14,12),(15,13)
2. From the following data obtain the two regression equations:
<table>
<tr><td>X</td><td>6</td><td>2</td><td>10</td><td>4</td><td>8</td></tr>
<tr><td>Y</td><td>9</td><td>11</td><td>5</td><td>8</td><td>7</td></tr>
</table></td></tr>
<tr><td>11</td><td>Probability Part I</td><td>1. There are sixty employees working in a mall. Their details are as follows:
<table>
<tr><th>Sex\Education</th><th>Undergraduate</th><th>Postgraduate</th><th>Total</th></tr>
<tr><td>Female</td><td>45</td><td>15</td><td>60</td></tr>
<tr><td>Male</td><td>105</td><td>35</td><td>140</td></tr>
<tr><td>Total</td><td>150</td><td>50</td><td>200</td></tr>
</table>
An employee is selected at random
a. What is the probability the employee is male?
b. What is the probability the employee is either male or postgraduate?
c. What is the probability the employee is a postgraduate given that a male employee is selected.
2. A student plants ten seeds each of the two crops A and B in a pot culture trial. If it is known that the probability that seed of A will germinate is 0.9, the probability that seed of B will germinate is 0.2 then find
a. Probability that all the seeds of A and B will germinate
b. Probability that exactly all the seeds of one of the crop A or B will germinate.</td></tr>
<tr><td>12</td><td>Probability Part II</td><td>3. Two cards are drawn from a well –shuffled deck of 52 cards. Consider the following events.
A. Both cards are queens
B. Both cards are red
C. One card is red and one is black
D. A queen and a king is drawn
4. There are 3 urns .Urn I contains 6 white and 4 red balls. Urn II contains 2 white and 6 red balls and Urn III contains 1 white and 8 red balls. An Urn is chosen at random and the ball is drawn from the Urn, the ball is white. Find the probability that the ball is drawn from Urn I</td></tr>
<tr><td>13</td><td>Random Variables, Special Continuous Probability Distributions</td><td>1. Suppose you toss two fair dice with faces marked 1,2,….6 and observe the sum on the uppermost faces (say X) . Verify that following is the probability mass function of the sum on the uppermost faces.
<table>
<tr><td>x</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr>
<tr><td>P(x)</td><td>1/36</td><td>2/36</td><td>3/36</td><td>4/36</td><td>5/36</td><td>6/36</td><td>5/36</td><td>4/36</td><td>3/36</td><td>2/36</td><td>1/36</td></tr>
</table>
2. The CDF of a r.v X is given below. Using it obtain (i) pmf of X (ii) P(X<=2), (iii) P(X<=4), (iv) P(X>4), (v) E(X) and V(X), (vi) x such that P(X<=x) =0.5
<table>
<tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>F(x)</td><td>0.08</td><td>0.26</td><td>0.50</td><td>0.68</td><td>0.93</td><td>1.00</td></tr>
</table>
3. The probability density function of a continuous r.v X is as given below
f(x) = 3x2 for 0<=x<=1
= 0 otherwise</td></tr>
</table>

<table>
<tr><td></td><td></td><td>Verify that f(x) is a well-defined probability density function. Find its mean and variance. Sketch the probability density and cdf of X. Also find P(0.75<X<0.90)
4. The mean height of 1000 students at a certain college is 165 cms and S.D is 10cms.Assuming normal distribution , find the number of students whose height is
a. Greater than 172 cm b. between 159 and 178 cm</td></tr>
<tr><td>14</td><td>Test of Hypothesis, Large Sample Tests, Small Sample Tests- Part I</td><td>1. According to the norms established for a mechanical aptitude test, persons who are 18 years old should average 73.2 with standard deviation of 8.6. If 45 randomly selected persons of that age averaged 76.7, test the null hypothesis μ=73.2 against alternative hypothesis μ≠73.2 at 0.01 level of significance.
2. Daily sales figures of 40 shopkeepers showed that their average sales and standard deviation were `.528 and `. 600 respectively. Is the assertion that daily sale on the average is ` 400 contradicted at 5% level of significance by the sample.</td></tr>
<tr><td>15</td><td>Test of Hypothesis, Large Sample Tests, Small Sample Tests- Part II</td><td>1. Suppose that a die is rolled 150 times and the number of times each face comes up is recorded and results are obtained as
<table>
<tr><td>Face</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>Observed frequency</td><td>29</td><td>19</td><td>19</td><td>27</td><td>26</td><td>30</td></tr>
</table>
Are these results consistent with the hypothesis that the die is fair at 1% level of significance?
2. A company has been producing steel tubes of mean inner diameter of 2.00 cm. A sample of 10 tubes gives an average inner diameter of 2.01cm and a variance of 0.004cm square.Is the difference in the value of mean significant?</td></tr>
</table>

Lab: Data structure using C++ (CMP705)

Practical No.	Practical	Activities
1	Array	Write a program to accept the elements in 2D array and perform all the matrix operations i.e. addition, multiplication, transpose etc.
2	Sorting Techniques	Explain following techniques • Bubble sort • Insertion sort • Radix sort
3	Searching Technique	Suppose an array contains n elements. Given a number x that may occur several times in the array. Write a program to find i. The number of occurrences of x in the array ii. The position of first occurrence of x in the array.
4	Array	Write a program in C++ to delete particular element from an array of 10 integers.
5	Array	Consider two single dimensional array of size 20 and 3 respectively. Write a program in C++ to display all the elements which are common in both arrays.
6	Sparse Matrix	Write a program to build a sparse matrix as an array. Write functions to check if the sparse matrix is a square, diagonal, lower triangular, upper triangular or tridiagonal matrix
7	Stack	Write a menu driven program for stack contain following function • PUSH • POP • DISPLAY • PEEK

8	Stack	Transform the following infix expressions into their equivalent prefix expressions: (A-B) *(D/ E) (A+B^D) / (E-F) + G A* (B+D) / E -F* (G + H/ K)
9	Queue	Write a program in C++ to implement queue using Array.
10	Linked List	Consider the single Linked List contains following elements: Rollno int, sname char(20),city char(20),course char(3) Write a program in C++ to represent linked List with the above elements.
11	Linked List	Write menu driven program which create and display the circular linked list.
12	Tree	Create binary search tree 15, 2, 25, 45, 35, 23, 100, 5
13	Tree	Given two binary trees, write a program that finds whether - The two binary trees are similar. - the two binary trees are mirror images of each other
14	Graph	Write a program to traverse the graph using BFS method.
15	Graph	Write a program to traverse the graph using DFS method.

LAB: Computer Networks [CMP706]

Practical No.	**Practical**	**Activities**
1		Observe, Identify and Know the Use of Network Components in Computer Network Lab
2		Observe, Identify and Know the Use of Network Features.
3		Observe, Identify and Know the Use of Transmission Media and Network Control devices.
4		Connecting two PC's by fabricating Straight Cable and Network Cross over Cable
5		Install Network Interface Card with proper driver software to locate MAC address of Computer
6		Connect Computers in Star Topology using Wired Media and any Network control Device.
7		Configure Peer-to-Peer Network
8		Use of Sharing Printers and Folders in a Network
9		Installing TCP/IP Protocols (Version 4 and version 6) and configure advanced features of TCP/IP Protocols
10		Installing Wireshark software and configure it to capture Ethernet packet
11		Execute Basic TCP/IP Utilities and Network Commands with all options
12		Observe, Identify and Know the Use of Subnet Masking and create two subnets
13		Working with network simulators (Cisco Packet Tracer) Working with wireless devices. (Installing & Configuring)
14		Configuring the firewall with existing network / New network and Firewall services
15		remote connectivity sessions (Team viewer, ammyyadmin etc..) and sharing of network resourses (Printer, fax etc..)

"We are reaching the stage where problems that we must solve are going to become insoluble without computers. I do not fear computers; I fear the lack of them"

Isaac Asimov

Recipient of the International Award for Institutional Excellence in Distance Education from Commonwealth of Learning, Canada

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