ज्ञानगंगा घरोघरी

Yashwantrao Chavan Maharashtra Open University, Nashik

School of Computer Science

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

(P131) Syllabus

SEMESTER 1

English Communication (AEC001)

Course Objectives:

1. To enable the learner to communicate effectively and appropriately in real life situation.
2. To use English effectively for study purpose across the curriculum.
3. To revise and reinforce structure already learnt.
4. To develop and integrate the use of four language skills a) Reading b) Writing c) Listening d) Speaking

Learning Outcomes:

1. Reading Skills: - Ability to read English with ability to read English with understanding and decipher paragraph patterns, writer techniques and conclusions.
2. Writing Skills:- Skill to develop the ability to write English correctly and master the mechanics of writing the use of correct punctuation marks and capital letter.
3. Listening Skills: - Ability to understand English when it is spoken in various contexts.
4. Speaking Skills: - Develop the ability to speak intelligibly using appropriate word stress, sentence stress and elementary intonation patterns.

Unit No. and Name	Details	Counseling 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/ Miscommunication	02	10
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	05	10

Unit No. and Name	Details	Counseling Sessions	Weightage
	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	05	10
Unit 4: Developing Reports and Proposals	Understanding Reports and Proposals, Planning a Report or Proposals, Writing Proposals	02	10
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	04	10
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	04	10

Unit No. and Name	Details	Counseling Sessions	Weightage
	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	03	10
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	04	10

Reference Books:

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas
5. Understanding Body Language by Alan Pease.

Mathematics (CMP501)

Course Objectives

- To impart knowledge of various mathematical techniques.
- To understand logarithmic and polynomial methods.
- To use the concept of probability in business.
- To learn how to perform error analysis for arithmetic operations.
- To understand the concept of matrices and linear equations and its applications.
- To develop students' understanding through laboratory activities to solve problems related to above stated concepts.

Learning Outcomes:

- Skill to choose and apply appropriate numerical methods to obtain approximate solutions to difficult mathematical problems.
- Ability to apply various mathematical techniques such as set theory and mathematical induction to deduce problem and find correct hypothesis.
- Able to use probability and permutation concepts in real life to solving problems.
- Able to perform error analysis for arithmetic operations.
- Should be able to demonstrate working of various numerical methods and their applications.

Unit No. & Name	Details	Counseling Sessions	Weightage

Unit 1 Set Theory And Number Systems	• Relevance of Mathematics • Set Notations, 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

Reference Books:

1. Reference Books: Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Thomson Learning).
2. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).
3. Applied Discrete Structure for Computer Science by Alan Doerr &Knenneth Levasseur.
4. N. Biggs,"Discrete Mathematics", 2nd Edition, Oxford University Press
4. Singh, "Discrete Mathematical Structures", Wiley

Problem Solving using Computers (CMP502)

Course Objectives:

- To Know the Basics of Programming and how to use programming in day to day Applications.
- Learn how to solve common types of computing problems & how to apply logic to develop solutions.
- Learn data types and control structures of C
- Learn to map problems to programming features of C.
- Learn to write good portable C programs.

Learning Outcomes:

Upon successful completion of the course, a student will be able to:

- Appreciate and understand the working of a digital computer.
- Analyze a given problem and develop an algorithm to solve the problem
- Improve upon a solution to a problem.
- Use the 'C' language constructs in the right way
- Design, develop and test programs written in 'C'

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 array and structure. • Union : Defining Union, declaring and accessing union members, Difference between structure and union	**4**	**5**
	Revision	*2*	
		30	*80*

Reference Books:

1. Let us C-Yashwant Kanetkar.
2. Programming in C- Balguruswamy
3. The C programming Lang., Pearson Ecl – Dennis Ritchie
4. Structured programming approach using C-Forouzah &Ceilberg Thomson learning publication.

Programming using C++ (CMP503)

Course Objectives

- To give an overview of benefits of Object Oriented Programming (OOP) approach over the Traditional Programming approach.
- Employ a problem-solving strategy to breakdown a complex problem into a series of simpler tasks.
- To impart detailed knowledge of a powerful object oriented programming language – C++.
- To learn how to apply analytical and logical thinking to extract facts from a problem description and determine how they relate to one another and to the problems to be solved.

- Design and implement an object oriented solution to solve a real life problem.

Learning Outcomes:

- Develop algorithms for solving problems by using modular programming concepts.
- Abstract data and entities from the problem domain, build object models and design software solutions using object-oriented principles and strategies.
- Discover, explore and apply tools and best practices in object-oriented programming.
- Develop programs that appropriately utilize key object-oriented concepts
- Skill to write codes in C++ by applying concept of OOP, such as Objects, Classes, Constructors, Inheritance etc., to solve mathematical or real world problems .
- Ability to isolate and fix common errors in C++ programs.

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 Classes, Nesting of Classes	4	15
Unit 5 Polymorphis m	**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

Reference Books:

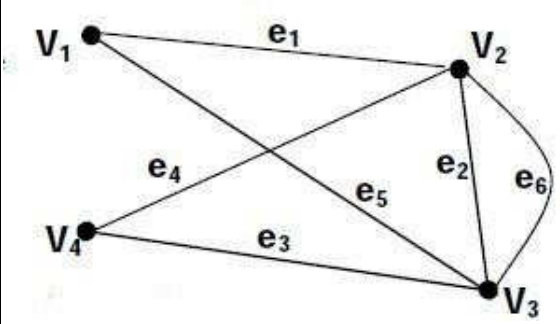
1. Object Oriented Programming with C++" by Balagurusamy E
2. C++ A Beginner's Guide" by Herbert schildt
3. Object Oriented Modeling and Design by James Rambough
4. The Complete Reference C++ by Herbert Shildth
5. Let us C++ by – Yashwant Kanitkar

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)

Practical No.	Practical	Activities
		[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 23n-1 is divisible by 7 for all n□N [b]Prove by the method of induction that : 7n-1 is divisible by for all natural numbers n>=1 [c] Prove by the method of induction that : 12+22+32……+n2 = [n(n+1)(2n+1)]/6 for all n□N [d]Prove using the method of induction that 13+23+33+…..+n3 = [n2(n+1)2]/4
3	Exponents, Logarithms, Surds	[a] What is the simplest form of the surd [b] What is the simplest form of the surd $\sqrt[4]{1875}$ [c] Evaluate : (45.83 * 9.5432)/ 27.39 [d] Evaluate : $= \sqrt{\frac{3 \times 71.43}{7.284}}$
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

Practical No.	Practical	Activities
		= {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) = x2+3x+1
9	Vectors	[a] If = + $\vec{j}$ +$\vec{k}$, $\vec{b}$= +9$\vec{j}$ +19$\vec{k}$, = +6$\vec{j}$ +5$\vec{k}$. Find . $\vec{b}$ x Are these three vectors co-planar? [b]Show that vectors 2 + -3$\vec{k}$ and 3 $\vec{i}$ -3 + are at right angles [c] Find „p" if vectors 2 + 2 +p$\vec{k}$ and 3 $\vec{i}$ - +2$\vec{k}$ are at right angles [d] Find the area of the parallelogram formed by the two vectors 2 + $\vec{j}$ and $\vec{j}$ +
10	Matrices and Determinant s	[a] By the adjoint method find A^{-1} IF A = $\begin{matrix} 4 & -5 & -11 \\ 1 & -3 & 1 \\ 2 & 3 & -7 \end{matrix}$ [b] If A = $\begin{matrix} 3 & 1 \\ 2 & 4 \end{matrix}$ B = = $\begin{matrix} 0 & 3 \\ -1 & 5 \end{matrix}$ Show that i. (AB)' = B' A' 2. |AB| = |A||B| [c] Find x,y,z if (5A – 3B)C = X where A = $\begin{matrix} 2 & 0 \\ 0 & 2 \\ 2 & 2 \end{matrix}$ B = $\begin{matrix} 2 & 4 \\ -4 & 6 \\ 6 & 2 \end{matrix}$ C= X = [d] if A = , B = 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 [b] find the product of

Practical No.	Practical	Activities
		the two polynomials. [c] 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 economyis god" [d] Calculate [(29.13) $^{1/3}$ x 0.0046]/(0.123 x 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

SEMESTER 2

Environmental Studies (ENV121)

Course Outcomes:

1. Understand fundamental physical and biological principles that govern natural processes.
2. Understand the natural environment as a system and how human activities affect the system
3. Interpret environmental resource management and sustainability conflicts from multiple perspectives.
4. Effectively analyze and integrate the social and natural sciences to understand diverse environmental and sustainability challenges ranging from local issues to global environments.

Learning Outcomes:

1. Acquire skills to understand environment and its various components, related issues and problems, identifying and solving them.
2. Participate and be actively involved at all levels in working towards the benefits of environment.
3. Gain a variety of experiences and acquire knowledge to save the environment for future generations.
4. Acquire an awareness of the environment as a whole, its allied problems and sensitivity.

Unit No. and Name	Details	Counseling 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	02	10
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	06	10
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)	04	10

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	04	10
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	03	10
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?	05	10
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	04	10
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	02	10

Reference Books:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha.
2. The Biodiversity of India" by Bharucha Erach
3. Essentials of Ecology" by Townsend C and Michael Begon
4. Environmental Science and Engineering" by Anjali Bagad

Statistics (CMP504)

Course Objectives

- To impart knowledge of various statistical techniques.
- To use frequency distribution to make decision
- To understand and to calculate various types of averages and variation.
- To use the concept of probability in business.
- To learn how to perform error analysis for arithmetic operations.
- To demonstrate working of various numerical methods.
- To develop students' understanding through laboratory activities to solve problems related to above stated concepts.

Learning Outcomes:

- Skill to choose and apply appropriate numerical methods to obtain approximate solutions to difficult mathematical problems.
- Ability to apply various statistical techniques such as Measures of Central Tendency and Dispersion.
- Understanding of relationship between variables using the method of Correlation and Trend Fit Analysis.
- Skill to execute programs of various Numerical Methods and Statistical Techniques for solving mathematical problems.
-

Unit No. and Name	Details	Counseling 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 Averages	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 • Concept of Independence • Counting Techniques	04	10
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
	Practice	04	
		30	80

Reference Books:

1) S.C. Gupta - Fundamentals of Statistics – Sultan chand & sons, Delhi.
2) D.N. Elhance – Fundamentals of Statistics – Kitab Mahal, Allahabad.
3) Montgomery D.C. – Statistical Quality Control John Wiley and sons.
4) Hogg R.V. and Craig R.G. – Introduction to Mathematical Statistics Ed 4 (1989) - Macmillan Pub
5) Gupta S.P. – Statistical Methods, Sultan Chand & sons pub.

Data structure using C ++ (CMP505)

Course Objectives:

- To study data structures and their implementations using OOP (C++) and their applications.
- To familiarize the students with data structures used for representing data in memory like Arrays, Linked Lists, Graphs, Trees etc.
- To analyze the performance of algorithms.
- To learn how to apply algorithms of data structures on data.
- To gain knowledge of various methods used in data structures such as brute force, divide and conquer, greedy, etc.

Learning Outcomes:

After successful completion of this course, student will be able to

- Analyze algorithms and to determine algorithm correctness and time efficiency class.
- Understand different advanced abstract data type (ADT) and data structures and their Implementations.
- Apply and implement learned algorithm design techniques and data structures to solve problems.
- Skill to analyze algorithms and to determine algorithm correctness and their time efficiency.
- Knowledge of advanced abstract data type (ADT) and data structures and their implementations.
- Ability to implement algorithms to perform various operations on data structures.

Unit No. and Name	Details	Counseling 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 b. Binary search	3	10

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*

Reference Books:

1. Introduction to Algorithms by Thomas H. Cormen.
2. Data structures and Algorithms Made Easy by Narasimha Karumanchi
3. Bruno R Preiss, "Data Structures and Algorithms with Object-Oriented Design Patterns in C++", Wiley India Edition
4. G. A.V, PAI , "Data Structures and Algorithms ", McGraw Hill

Computer Networks (CMP506)

Course Objectives

- To provide an introduction to the fundamental concepts on data communication and the design of computer networks.
- To get familiarized with the basic protocols of computer networks.
- Learn about different layers and protocols present in those layers.
- Enable the students to understand the Network Architecture, Network type and topologies.
- To understand the design issues and working of each layer of OSI model.
- To familiarize with the benefits and issues regarding Network Security.

Learning Outcomes

- Knowledge of uses and services of Computer Network.
- Ability to identify types and topologies of network.
- Understanding of analog and digital transmission of data.
- Familiarization with the techniques of Network Security.

Unit No. and Name	Details	Counseling 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

Reference Books:

1. Fourauzan B., "Data Communications and Networking", 3rd edition, TataMcGraw-HillPublications,
2. Tanenbaum A., "Computer Networks", 4th Edition, PHI
3. William Stallings, "Data and Computer Communication"
4. Keshav S., "An Engineering Approach to Computer Networking", PearsonEducation

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>5</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>3</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>Tota l</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>2000-2200</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>

3. Calculate mode of the following frequency distribution.

Class	50-100	100-150	150-200	200-250	250-300	300-350	350-400
Frequency	5	15	25	18	12	3	2

4. Write Merits and Demerits of Mean, Median and Mode.

5 — Measures of Dispersion Part I

1. The number of runs scored by cricketers A and B in 5 test matches are shown below:

A	5	20	90	76	102	90	6	108	20	16
B	40	35	60	62	58	76	42	30	30	20

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.

Sample size (mm)	Mean diameter (mm)	Standard deviation
4	2.8325	0.2479
6	2.8333	0.2687
5	2.8520	0.2786
4	2.8400	0.2581
5	2.8820	0.2721
6	2.8533	0.2925

Show that the combined mean and combined standard deviation of all samples is 2.84932 mm and 0.2724 mm respectively.

6 — Measures of Dispersion Part II

1. Time taken (in minutes) per customer by a counter employee is shown below:

Clerk I	5	5	3	4	2	5	4	5	3	5	2
Clerk II	3	3	5	4	5	5	3	5	3	5	5

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:

Swanand	10	15	24	8	12	10	10	7	8	10
Ashish	8	12	30	10	12	15	8	9	5	10

Analyze above data and comment on the results.

7 — Moments& Measures of Skewness and Kurtosis Part I

1. Calculate Karl Pearson's coefficient of skewness:

Variable	Frequency	Variable	Frequency
70-80	11	30-40	21
60-70	22	20-30	11
50-60	30	10-20	6
40-50	35	0 -10	5

2. Calculate first four moments about the mean and also the value of β_1 and β_2 from the following data :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No of students	8	12	20	30	15	10	5

8 — Moments& Measures of Skewness and Kurtosis Part II

1. Calculate Bowley's coefficient of skewness for the data given below:

Weight(in lbs.)	No. of Students	Weight(in lbs.)	No. of Students
Below 99	01	150-159	65
100-109	14	160-169	34
110-119	66	170-179	12
120-129	122	180-189	05
130-139	145	190-199	02
140-149	121	200 and over	02

<table>
<tr><td></td><td></td><td>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..)

Semester 3

IT and E-Learning Skills (ICT151)

Course Objectives:

- To prepare students in understanding ICT basics and make them conversant in using operating systems.
- Remembering, recognizing, and recalling include retrieving relevant knowledge from memory recognition.
- Online testing stimulates self-assessment, self-education and self-knowledge, because of the given feedback.
- Understanding how to use different resources of e-learning like LMS,OERs, MOOC, Mobile , productivity tools etc.

Learning Outcomes:

- Learners must be able to recall or remember the information.
- Learners must be able to understand the information.
- Learners must be able to use the information they have learned at the same or different contexts.
- Learners must be able to analyze the information, by identifying its different components.
- Able to use different resources of e-learning like LMS,OERs, MOOC, Mobile , productivity tools etc.

Unit No. and Name	Details	Counseling Sessions	Weightage
Unit 1: Learning Skills	• Observations • reading • writing • thinking • Verbal Communication	2	5
Unit 2 : 21st century Learning environment	• ICT • Flip Classrooms • Virtual laboratories • Blended Learning • Collaborative Learning • LMS • OERs • MOOC • Mobile learning • Machine assessment and feedback • Self and Peer assessment	4	10
Unit 3: Productivity tools Part I	• Wordprocessing • Spreadsheet • Presentation softwares • Utilities	4	15
Unit 4: Productivity tools Part II	• e-mail • Search Engines • Smart Phones	3	10
Unit 5: ELearning Skills	• Searching the right Information on web • Using Social Media effectively • Blogs • Discussion Forums • Ethics and Etiquettes	5	15

Unit 6: E learning Challenges	• Motivation • Evaluating effectiveness • Adaptability • Technical issues • Time Management	3	10
Unit 7: Security	• Threats • Desktop and mobile security • Cyber Security	3	10
Unit 8: List of resources	• MOOC • Open Educational resources • Mobile apps	2	5
	Revision	4	0
		30	80

Reference Books:

1. Design for How People Learn (recently updated with 3 new chapters)
2. ISD from the Ground Up: A No-Nonsense Approach to Instructional Design
3. Understanding by Design
4. E-Learning Fundamentals: A Practical Guide
5. Michael Allen's books. I recommend starting with one from his E-Learning Library series.

Operating System (CMP507)

Course Objectives

- Gain extensive knowledge on principles and modules of operating systems.
- Understand key mechanisms in design of operating systems modules.
- Understand process management, concurrent processes and threads, memory management, virtual memory concepts, deadlocks.
- To understand what a process is and how processes are synchronized and scheduled.
- How to use system calls for managing processes, memory and the file system.
- Understand the data structures and algorithms used to implement an OS.

Learning Outcomes

- Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.
- Identify the dead lock situation and provide appropriate solution so that protection and security of the operating system is also maintained.
- Analyze memory management techniques, concepts of virtual memory and disk scheduling.
- Understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.
- Ability to apply CPU scheduling algorithms to manage tasks.
- Initiation into the process of applying memory management methods and allocation policies.
- Knowledge of methods of prevention and recovery from a system deadlock.

Unit No. & Name	Details	Counseling Sessions	Weightage
Unit 1 History of The Operating Systems	• Introduction(What is OS, Important of OS, Features, Uses, Applications) • Evolution of OS (proprietary, CP/M, DOS, UNIX, Windows and other, Command line to GUI, Portability, Client Server) • Types of Operating System(multiprogramming systems, batch systems , time sharing systems; operating systems for personal computers & workstations, process control & real time systems.) • User's View of the Operating System	3	10
Unit 2 Operating System –Functions And Structure	• Different Services of the Operating Systems o Information Management o Process Management o Memory Management • Uses of System Calls • Operating System Structure (Monolithic (Simple) Operating System, Layered Operating System, Microkernel Operating System, Exokernel Operating system), • Virtual Machine • Booting	3	10
Unit 3 Information Management	• Disk Basics • Direct Memory Access (DMA) • File System (Block and Block numbering Scheme, File Support Levels, Writing/Reading a Record, Relationship between the Operating System and DMS, File Directory Entry, Open/Close Operations, Disk Space Allocation Methods, Directory Structure: User's View, Implementation of a Directory System) • Device Driver (DD) (Basics, Path Management, Submodules of DD	3	10

Unit4 Process Management	• Process, • Evolution of Multiprogramming • Context Switching, • Process States, Process State Transitions, Process Control Block (PCB), Process Hierarchy, Operation on a Process, Create/ Kill/ Dispatch a Process, Change the Priority of a Process, • Block / Time Up /Wake Up a Process, Suspend/ Resume Operations, • Process Scheduling (Objectives, Concepts of Priority and Time Slice, Scheduling philosophies, Scheduling Levels, Scheduling Policies (For Short Term scheduling)), • Multithreading (Models, Implementation of Threads)	6	10
Unit 5 Inter Process Communication	• The Producer-Consumer Problems, Solutions to the Producer-Consumer Problems (Interrupt Disabling/Enabling, Lock-flag, • What are Primitives for Mutual Exclusion? • Classical IPC problems • Semaphores • Alternating Policy • Peterson's Algorithm		15
Unit 6 I/O Management And Deadlock	• I/O Procedure, I/O Scheduler, Device Handler, Interrupt Service Routine (ISR) • Terminal I/O(Terminal Hardware, Terminal Software) • Organizing Data on the CD-ROM, DVD-ROM • Graphical Representation of a Deadlock, • Deadlock Prerequisites • Deadlock Strategies (Ignore a Deadlock, Detect a Deadlock, Recover from a Deadlock, Prevent a Deadlock, Avoid a Deadlock)	4	10

Unit 7 Memory Management	• Single Contiguous Memory Management • Fixed Partitioned Memory Management • Variable Partitions (Allocation Algorithms, Swapping, Relocation and Address Translation, Protection and Sharing, Evaluation) • Non-Contiguous Allocation – General Concepts, Paging (Allocation Algorithms, Swapping, Relocation and Address Translation), Segmentation (Swapping, Address Translation and Relocation, Sharing and Protection) • Combined Systems • Virtual Memory Management Systems (Relocation and Address Translation, Swapping, Relocation and Address Translation, Protection and Sharing, Evaluation, Design Consideration for Virtual Systems)	6	10
Unit 8 Protection and Security	• Protection and Security Policy mechanism • Authentication • Internal access Authorization	3	5
	Revision	2	0
		30	80

Reference Books:

1. Operating Systems by Achyut Godbole
2. Operating Systems A Concept Based Approach -by Dhananjay dhamdhere
3. Operating System Concepts by Silberschatz, Galvin and Gagne.

Web Technologies (CMP508)

Course Objectives

- To learn advanced features of the web programming.
- To learn various Web Technologies and their characteristics of HTML, XHTML, Java script, XML.
- To learn the basic principles of Web programming like designing and implement static and dynamic Web pages.
- To enhance problem solving and programming skills in web programming with extensive programming projects.
- To acquire fundamental skills to maintain web server services required to host a website.
- Understand hierarchy of object oriented programming.

Learning Outcomes

Upon completion of this course, students will be able to:

- Understand the various steps in designing Creative and dynamic website.
- Write HTML, JavaScript, CSS and PHP.
- Ability to develop web pages using HTML and Cascading Style Sheets.
- Skill to create XML documents and Schemas.
- Knowledge of client-side (JavaScript) and server-side scripting (PHP, ASP.NET) languages to build dynamic web pages.
- Familiarization with Web Application Terminologies, Internet Tools, E – Commerce and other web services.
- Ability to develop database applications with MySQL.

Unit No. & Name	Details	Counseling Sessions	Weightage
Unit 1 Introduction to Web	• History and Evolution • Web development cycle • Web publishing • Web contents • Dynamic Web contents	3	10
Unit 2 Languages and technologies for browsers	• HTML, DHTML, XHTML, JSP, JavaScript • Features and Applications	3	10

Unit 3 Introduction to HTML	• HTML Fundamentals • HTML Browsers • HTML tags, Elements and Attributes • **Structure of HTML code:** Head, Body • **Lists:** Ordered List, Unordered List, Definition List, Nesting List • **Block Level Tags:**Block formatting, Heading, Paragraph, Comments, Text, alignment, Font size • **Text Level Tags:** Bold, Italic, Underlined, Strikethrough, Subscript,superscript • **Inserting graphics:** Scaling images, Frameset, Forms • An introduction to DHTML , DOM	3	10
Unit 4 Cascading Style Sheets	• The usefulness of style sheets • Types of Style sheets • Creating style sheets • Common tasks with CSS • **Font Family:** Font Metrics, Units • Properties • Classes and Pseudo classes • CSS tags	3	10
Unit 5 Introduction to Client side Scripting	• What is Scripting Language • Client side and server side scripting • Types of scripting languages	2	10
Unit 6 JavaScript	• Introduction • Operators, Assignments and Comparisons, Reserved words • **Starting with JavaScript:** Writing first JavaScript program, Putting Comments	5	10
	• Functions • Statements in JavaScript • Working with objects: Object Types and Object Instantiation, Date object, Math Object, String object, Event object, Frame object, Screen object • Handling Events: Event handling attributes, Window Events, Form Events, Event Object, Event Simulation • Events- Keyboard & Mouse events		

Unit 7 XML	• Introduction to XML, • Anatomy of an XML document • Creating XML Documents, • Creating XML DTDs, XML Schemas, XSL	3	10
Unit 8 Website Design Concepts	• **How the website should be:** Basic rules of Web Page design, Types of Website	4	10
	Revision	4	0
		30	80

Reference Books:

1. Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Black Book
2. Information Architecture for The World Wide Web" by Morville
3. "A Practical Guide to Developing Web 2.0 Rich Internet Applications" by Phil Pearl
4. **Web Information Systems Engineering – WISE 2016" by Jianmin Wang and Wojciech Cellary**

Database Management System (CMP509)

Course Objectives

- The objective of the course is to enable students to understand and use a relational database system. Introduction to Databases, Conceptual design using ERD, Functional dependencies and Normalization, Relational Algebra is covered in detail.
- To learn how to design a database by using different models.
- Students learn how to design and create a good database and use various SQL operations.
- To enable the students to understand the database handling during execution of the transactions.
- To understand the handling of database by concurrent users.
- To gain complete knowledge of SQL and PL/SQL
- The course concludes with an overview of transaction management and introduction to advanced and non-relational databases.

Learning Outcomes

Upon completion of this course, students will be able to:

- Able to master the basic concepts and understand the applications of database systems.
- Able to construct an Entity-Relationship (E-R) model from specifications and to transform to relational model.
- Able to construct unary/binary/set/aggregate queries in Relational Algebra.
- Understand and apply database normalization principles.
- Able to construct SQL queries to perform CRUD operations on database. (Create, Retrieve, Update, Delete) and Ability to code database transactions using SQL.
- Understand principles of database transaction management, database recovery, security.
- Skill to write PL/SQL programs.

Unit No. & Name	Details	Counseling Sessions	Weightage
Unit 1 Data files and DBMS	• Introduction- Data, Files • Operations on file • Introduction to Database -Definition of database, Entity, • Attributes, Domain, Instance, Record/Tuple	3	10
Unit 2 Introduction to DBMS	• Definition to DMBS • WHY DMBS • Services provided by DMBS – Transaction Management, Concurrency Control, Recovery Management, Security Management, Language Interface • Applications of DMBS • Differences between File System and DMBS • Drawbacks of File system • Abstraction Levels (Three Levels of Abstraction) • Database Users • DDL and DML • Structure of DMBS • Metadata	3	10

Unit 3 Relational data models and relational algebra	• Introduction to DATA Models • Object-based Logical Models - E-R Model, Object-Oriented Model • Record-based Logical Models - Relational Model, Network Model, Hierarchical Model • Physical Data Models		10
Unit 4 Entity Relationship	• Overview • Modelling • Basic styles of data model • ER Model • Components of ER Model - Entity, Attributes, Entity Set, Domain • Entity Types – weak entity, Strong Entity, Recursive Entity, Composite Entities • Attributes Types – Simple, Composite, Single Valued, Multi Valued, Stored, Derived, Complex, Null Attributes. • Relation • Relationship – Relationship set, Connectivity in relationship • Types of Relationship – Unary, Binary, Ternary • Classifying Relationship – Degree of	3	10
	Relationship, Multiplicity, Existence • Mapping Cardinalities – One to One, One to Many, Many to One, Many to Many • Keys • Keys for Relationship set- Super key, Candidate key, Secondary key, Compound key, Alternate key, Primary key, Foreign key • E-R Diagrams – E-R Modelling Symbols • Cardinality Constraints related to E-R diagrams • Alternative Notations for cardinality limits • Weak Entity sets • Case Studies on E-R diagrams		
Unit 5 Normalizations	• Overview • Relational DB design • Decomposition (Small schema) • Lossy Decomposition • Loss less Decomposition • Functional Dependency – Full Dependency, Partial Dependency, Transitive Dependency • Normalized Forms – Un – Normalized form, 1NF, 2NF, 3NF • De-normalization	3	10

Unit 6 SQL	• Introduction • SQL Statements - DML, DDL, DCL • Data Types in SQL • Basic Types structure • SELECT- SQL SELECT DISTINCT Statement, SQL Where Clause, And, OR, In, Between, Like Operator, SQL Order by Keyword, Aggregate Functions, Group By, Having Clause. • CREATE – DROP TABLE, Constraints • INSERT, UPDATE, DELETE, ALTER • DATA Control Language (DCL) • Different operations on tables – Rename, Tuple Variables, Set Operations(UNION Operator, UNION ALL Operator, INTERSECT Operator, Minus Operator), String Operations • Null Values	4	10
Unit 7 Transaction Management	• Introduction • Transaction Concept • Properties of Transactions • Transaction Terminology • Transaction Terminology • Transaction States • Concurrent Execution of Transactions • Operations on a Transactions • Concurrency Control • Schedules • Recoverability	3	10
Unit 8 PL/SQL	• Introduction to PL/SQL • The Advantages of PL/SQL • PL/SQL Architecture • PL/SQL Data types • Variable and Constants • Using Built_in Functions • Conditional and Unconditional Statements • Simple if, if… else, nested if..else, if..else Ladder • Selection Case, Simple Case, GOTO Label and EXIT • Iterations in PL/SQL • Procedures in PL/SQL • EXCEPTIONS in PL/SQL • Database Triggers in PL/SQL • File Input/Output	4	10
	Examples and Revision	4	0

		30	80

Reference Books:

1) Database System Concepts (4th Ed) By: Korth, Sudarshan, Silberschatz
2. Database Management Systems, Raghu Ramakrishnan and Johannes Gehrke,McGraw-Hill
3. Fundamentals of Database Systems (4th Ed) By: Elmasri and Navathe
4. MySQL :the Complete Reference By Vikram Vaswani
5. Learning MySQL by O'reilly

Lab: Operating System (CMP707)

Practical No.	Practical	Activities
1		DOS commands
2		Batch file
3		UNIX Commands
4		File access permissions(Read/ Write/Execute/ chmodcommand)
5		File processing commands(CAT/ join/sort/paste/compare/word count /grep command)
6		File / folder sharing in windows
7		Windows Control panel 1 –
8		Windows Control panel 2
9		Demonstration of Task Manager
10		Demonstration of computer manage tool
11		Numerical on process scheduling
12		Numerical on memory management (Best Fit/ worst fit)
13		Numerical on paging and segmentation
14		Simulation 1
15		Simulation 2
		Case Study : Implementation of Mutual Exclusion Primitives

Lab: Web Technologies (CMP708)

Practical No.	Practical	Activities
1		Design a web page using different text formatting tags.
2		Design a web page with different types of Marquee.
3		Design a web page with links to different pages and allow navigation between pages.
4		Design a web page with Image and Imagemaps.
5		Create a student table with the following fields. Student Id, Name, DOB, Course, Address, E-mail id and apply Embedded cascading style sheet CSS with the following attributes:Font size, color, style, bold, italic, border color, set the background image & set the center align of table & text.
6		Create an external CSS for above and apply to the web page.
		Create a frameset that divides browser window into horizontal and vertical framesets.
8		Write the javascript code to enter five numbers in the prompt box. Calculate addition of the numbers & average.
9		Create a web page with image and text apply javascript Mouse events – onmouseover , onmouseout, onclick on the image and text
10		Create a page which displays Javascript popupboxes : 1. Alert 2. Confirm 3. Prompt.
11		Design a form and validate all the controls placed on the form using Java Script.
12		Design a DTD, corresponding XML document and display it in browser using CSS.
13		Design an XML document and display it in browser using XSL
14		Design XML Schema and corresponding XML document
15		Create a web site with Minimum 3 pages Home, Page 1 and Page2 Incorporate all HTML & DHTML elements. The pages should be linked.

Lab: Database Management System (CMP709)

Practical No.	Practical	Activities
1	Entity Relationship Model	**AIM:** To draw ER Model and Relational Model for a given database **a) Case study 1:**List the data requirements for the database of the company which keeps track of the company employee, department and projects. The database designers provide the following description 1. The company is organized into departments. Each department has unique name, unique number, and particular employee to manage the department. We keep track of the start date and the employee begins managing the department. The department has several locations. 2. The department controls a number of projects each of which has a unique name, unique number and a single location. 3. We store each employee names social security number , address , salary, sex and dob. An employee is assigned one department but may work on several projects which are not necessarily controlled by the same department. We keep track of the department of each employee works on each project and for insurance purpose. We keep each dependents first name, sex, dob and relation. **b) Case study 2**: Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted. Also Construct appropriate tables for the ER Diagram
2	Entity Relationship	**AIM:** Create one-to-many Relationship between Manager and Employee Relations Create following Relations with the given fields **a)** EMPLOYEE EmpId (PK), EmpName (Should be in the upper case), Department(Should be Finance, Purchase or Sales) Salary, Mgrid **b)** MANAGER Mgrid, MgrName, No. of Employees controlled **Using above table solve the following queries:** a. Display details of all those employees whose salary is higher than Rs.50 b. Display the details of employees who are working in Purchase department.

<table>
<tr>
<td>3</td>
<td>Normalization</td>
<td>AIM: Determine the functional dependencies. Remove partial dependency and transitive dependencies in given table. (i.e. convert it into 3NF).
Student = (RollNo, Name, Course_Code, Course_Name, Fees)

<table>
<tr><th>RollNo</th><th>Name</th><th>Course_Code</th><th>CourseName</th><th>Fees</th></tr>
<tr><td>123</td><td>Ravi</td><td>C102</td><td>C</td><td>2500</td></tr>
<tr><td>123</td><td>Ravi</td><td>C103</td><td>C++</td><td>1200</td></tr>
<tr><td>123</td><td>Ravi</td><td>C104</td><td>OOPs</td><td>3200</td></tr>
<tr><td>124</td><td>Sumit</td><td>C102</td><td>C</td><td>2500</td></tr>
<tr><td>124</td><td>Sumit</td><td>C103</td><td>C++</td><td>1200</td></tr>
<tr><td>125</td><td>Trupta</td><td>C102</td><td>C</td><td>2500</td></tr>
<tr><td>125</td><td>Trupta</td><td>C103</td><td>C++</td><td>1200</td></tr>
<tr><td>125</td><td>Trupta</td><td>C104</td><td>OOPs</td><td>3200</td></tr>
</table>
</td>
</tr>
<tr>
<td>4</td>
<td>DDL command</td>
<td>AIM: Creation of Database and table-DDL COMMAND Create a table called EMP with the following structure.

<table>
<tr><th>Name</th><th>Type</th></tr>
<tr><td>EMPNO</td><td>NUMBER(6)</td></tr>
<tr><td>ENAME</td><td>VARCHAR2(20)</td></tr>
<tr><td>JOB</td><td>VARCHAR2(10)</td></tr>
<tr><td>DEPTNO</td><td>NUMBER(3)</td></tr>
<tr><td>SAL</td><td>NUMBER(7,2)</td></tr>
</table>
Allow NULL for all columns except ENAME and JOB.

a) -Add a column experience to the emp table. experience numeric null allowed.

b) Modify the column width of the job field of emp table.

Create dept table with the following structure.

<table>
<tr><th>Name</th><th>Type</th></tr>
<tr><td>DEPTNO</td><td>NUMBER(2)</td></tr>
<tr><td>DNAME</td><td>VARCHAR2(10)</td></tr>
<tr><td>LOC</td><td>VARCHAR2(10)</td></tr>
</table>
DEPTNO as the primary key

a) Create the emp1 table with ename and empno, add constraints to check the empnovalue while entering (i.e) empno> 100.

b) Drop a column experience to the emp table.</td>
</tr>
<tr>
<td>5</td>
<td>DML command</td>
<td>AIM: Simple SQL Query-1-DML COMMAND

A] Write syntax of all DML command.

B] Create database where create following tables:

Emp(EMPNO int, ENAME VARCHAR(20),JOB</td>
</tr>
</table>

		VARCHAR(10),DEPTNO int,SAL numeric(7,2)) Allow NULL for all columns except ename and job. Dept(DEPTNO int, DNAME VARCHAR(10),LOC VARCHAR(10)) Deptno as the primarykey Insert at least 8 records into tables and solve the following given queries using Emp and Dept table: a) Create the emp1 table with ename and empno, add constraints to check the empno value while entering (i.e) empno> 100. b) Update the emp table to set the salary of all employees to Rs15000/- who are working as ASP. c) Delete only those who are working as lecturer. d) List the records in the emp table orderby salary in ascending order. e) Display total salary spent for each job category. f) Add constraints to the emp table that empno as the primary key and deptno as the foreign key. g) Add columns DOB to the emp table.
6	SQL Functions	**AIM:** Simple SQL Query2: SQL Functions a) List all the aggregate functions with example? b) List all the string functions with example? c) Using above Emptable solve the following queries: 1. Display all the details of the records whose employee name starts with 'A'. 2. Display all the details of the records whose employee name does not start with 'A'. 3. Calculate the total and average salary amount of the emp table. 4. Determine the max and min salary and rename the column as max_salary and min_salary. 5. Find how many job titles are available in employee table. 6. Count the total records in the emp table.
7	Set Operations	**AIM:** Advanced SQL queries using Set Operations. a) List all the set operators? b) Using above Emp table solve the following queries: 1. Display all the dept numbers available with the dept and emp tables avoiding duplicates.

		2. Display all the dept numbers available with the dept and emp tables. 3. Display all the dept numbers available in emp and not in dept tables and vice versa.
8	Sub query	**AIM:** Advanced SQL queries using Sub query. Using aboveEmp table solve the following queries: 1. Display all employee names and salary whose salary is greater than minimum salary of the company and job title starts with 'M'. 2. Issue a query to find all the employees who work in the same job as Arjun. 3. Issue a query to display information about employees who earn more than any employee in dept.
9	JOINS	**AIM:** Advanced SQL queries using JOINS. a) What is joins? List types of joins with syntax b) Using aboveEmp table solve the following queries: 1. Display the employee details, departments that the departments are same in both the emp and dept. 2. Display all the employees and the departments implementing a left outer join. 3. Display the employee name and department name in which they are working implementing a right outer join. 4. Display the employee name and department name in which they are working implementing a full outer join.
10	PL-SQL	**AIM:** Advanced SQL queries using PL-SQL. Solve the following PL-SQL programs. A) Write a pl/sql program to swap two numbers. B) Write a pl/sql program to find the largest of two numbers.
11	PROCEDURE AND FUNCTION	**AIM:** Advanced SQL queries usingPROCEDURE AND FUNCTION A] Write syntax of Procedure and Function. B] Create a procedure to print the odd numbers from 1 to 10.
12	Practice Questions1	**AIM:** Write a pl/sql program to find the total and average of 6 subjects and display the grade
13	Practice Questions2	**AIM:** Write a procedure to calculate total for the all the students and pass regno, mark1, & mark2 as arguments.
14	Practice	**AIM:** Write a procedure raise_sal which increases the salary of an

	Questions3	employee. It accepts an employee number and salary increase amount. It uses the employee number to find the current salary from the EMPLOYEE table and update the salary. Consider the EMPLOYEE (EMPNO, SALARY, ENAME) Table.
15	Practice Questions- SQL Query	**AIM:** Simple SQL Query. Q.1) Create the following tables with the mapping given below. stu_details(reg_no, stu_name, DOB, address, city) mark_details(reg_no, mark1, mark2, mark3, total) (i) Display only those rows whose total ranges between 250 and 300. (ii) Drop the table mark_details. (iii) Delete the row whose reg_no=161. (iv) Display all details whose names begins with 'a'. Create the following tables with the mapping given below. book (book_name,author,price,quantity). customer (Cust_id , Cust_name, Addr, ph_no,pan_no) (i) Truncate the table customer. (ii) List the author of the book which one have the price of 200. (iii) List the price of the book which one is between the price of 175 & 250. (iv) Retrieve all the details from the table book whose author name start with K.

SEMESTER 4

Financial and Investment Skills (OPN272)

Course Objective:

- To understand theories of value, risk and return, capital investment decisions, financing decisions, dividend policy, capital structure, and options. Also, to study leasing, corporate takeovers, and managerial compensation.
- To advance the understanding of fundamental concepts of finance, financial markets and market participants, valuation techniques of financial instruments, and working knowledge of portfolio management
- To develop critical thinking and problem solving competencies, at both the individual and group levels, of financial statement analysis, financial planning, principles of valuation, capital budgeting, capital structure, and issues in financial policy, and to apply financial theory to analyze real life situations in an uncertain environment with an incomplete data set.
- To gain an understanding of how debt and equity funds are attracted to capitalize investment real estate by utilizing standard investment measures of Internal Rate of Return, Net Present Value and Return on Investment to evaluate prospective real estate investments and formulate investment strategies that will optimize the investor's expected investment outcome.

Learning Outcomes:

- Students will have the knowledge and skills to select and employ base level tools for financial analysis.
- Students will have the knowledge and skills to analyze companies for investment purposes.
- Students will have the knowledge and skills to develop portfolio strategies for individual and institutional investors.
- Students will have the knowledge and to operate ethically as investment management professionals.
- Students will be able to identify and analyze the relevant legal issues involved in civil and criminal matters affecting business.

Unit No. and Name	Details	Counseling Sessions	Weightage
Unit 1 Introduction to Stock Markets-1	• The Need to Invest • Regulators • Financial Intermediaries • The IPO Markets	2	5
Unit 2 Introduction to Stock Markets-2	• The Stock Markets • The Stock Markets Index • Commonly Used Jargons • The Trading Terminal	3	5
Unit 3 Introduction to Stock Markets-3	• Clearing and Settlement Process • Five Corporate Actions and Its Impact on Stock Prices • Key Events and Their Impact on Markets • Getting started!	3	5
Unit 4 Fundamental Analysis-1	• Introduction to Fundamental Analysis • Mindset of an Investor • How to Read the Annual Report of a Company	3	5

Unit 5 Fundamental Analysis-2	• Understanding the P&L Statement • Understanding Balance Sheet Statement • The Cash Flow statement • The Financial Ratio Analysis	3	10
Unit 6 Fundamental Analysis-3	• The Investment Due Diligence • Equity Research • Discounted Cash Flow (DCF) and Time Value of Money • The follies of DCF Analysis • Margin of Safety • When to sell? How many stocks in the portfolio?	3	10
Unit 7 Technical Analysis - 01	• Background, Introducing Technical Analysis • The Chart Types • Getting Started with Candlesticks	2	5
Unit 8 Technical Analysis - 02	• Single Candlestick patterns • Multiple candlestick patterns • The Support and Resistance	3	10
Unit 9 Technical Analysis - 03	• Volumes, Moving Averages • Indicators • The Fibonacci Retracements • The Dow Theory • Getting Started	3	5
Unit 10 Markets and Taxation	• Introduction, Basics • Classifying Your Market Activity • Taxation for Investors • Taxation for Traders • Turnover • Balance Sheet • and P&L • ITR Forms	3	10
Unit 11 Trading Psychology and Risk Management	• Risk • Equity Curve • Expected Returns • Portfolio Optimization • Value at Risk • Position Sizing for Active Trader	2	10
	•	30	80

References Books:

1. The Business of Investment Banking by K. Thomas Liaw
2. A Dictionary of Finance and Banking, oxford
3. Finance: The Basics Book by Erik Banks

Computer System Architecture (CMP510)

Course Objectives:

- The objective of this course is to study the basics of Computer System and to learn how to configure computer devices.
- To understand the structure, function and characteristics of computer systems.
- To understand the design of the various functional units and components of computers like Motherboard, storage devices, display devices and input output devices.
- To understand the peripheral devices and their applications.
- To understand PC Troubleshooting and Maintenance Tools.
- To understand the concept of Power supply and it's working.
- To understand the concept of parallel processing and pipelining in detail and its applications.

Learning Outcome:

After completion of this course, the student will be able to

- Understand Motherboard & Its Components working.
- Understand Cache memory and its working, role in OS.
- Understand the roles and working of Storage Devices and how the data is stored on these devices.
- Understand how different storage, peripheral and input output devices are connected to computer and their working.
- Understand and demonstrate PC Troubleshooting use of different Maintenance Tools.
- Understand the concept of parallel processing ,pipelining and Programming aspects for Intel Itanium Processor

Unit No. and Name	Details	Counseling Sessions	Weightage
Unit 1: Motherboard & Its Component Objectives	• CPU – Concept like address lines, data lines, internal registers. • Modes of operation of CPU – Real mode, IA-32 mode, IA-32 • Virtual Real Mode. • Process Technologies, Dual Independent Bus Architecture, Hyper • Threading Technologies & its requirement. • Processor socket & slots. • Chipset basic, chipset Architecture, North / South bridge & Hub • Architecture. • Latest chipset for PC • Overview & features of PCI, PCI –X, PCI express, AGP bus. • Logical memory organization conventional memory, extended • memory, expanded memory. • Overview & features of SDRAM, DDR, DDR2, DDR3. • Concept of Cache memory: • L1 Cache, L2 Cache, L3 Cache, Cache Hit & Cache Miss.	4	10

	• BIOS – Basics & CMOS Set Up. • Motherboard Selection Criteria.		
Unit 2 : Storage Devices & Interfacing. Objectives	• Recording Techniques: FM, MFM , RLL, perpendicular recording • Hard Disk construction and working. • Terms related to Hard Disk. • Track, sector, cylinder, cluster, landing zone, MBR, zone recording, write pre-compensation. • Formatting: Low level, High level & partitioning. • FAT Basics: Introduction to file system, FAT 16, FAT 32, NTFS • Hard Disk Interface: Features of IDE, SCSI, PATA, SATA, Cables and Jumpers. • CD ROM Drive: Construction, recording.(Block diagram) • DVD: Construction, Recording. (Block Diagram) • Blue-ray Disc specification.	4	10
Unit 3: Display Devices & Interfacing	• CRT: - Block diagram & working of monochrome & colour Monitor • Characteristics of CRT Monitor :- DOT Pitch, Resolution, Horizontal Scanning frequency, Verticalscanning frequency, Interlaced Scanning, Non-Interfaced scanning, • Aspect ratio. • LCD Monitor: - Functional Block Diagram of LCD monitor, working principle, Passive matrix, Active matrix LCD display. • Touch Screen Display – The construction and working principle • Plasma Display Technology: - Construction & working principle. • Basic Block Diagram of Video Accelerator card	4	10

Unit 4: Input and Output Devices	• Keyboard: Types of key switches: Membrane, Mechanical, Rubber dome, Capacitive, optoelectronic and interfacing. • Mouse: Opto-mechanical, optical (New design) • Scanner: Flat Bed, Sheet-fed, Handheld: Block diagram of flat Bed and specifications, OCR, TWAIN, Resolution, Interpolation. • Modem: Internal and External: Block diagram and specifications. • Printer: Printer Characteristics, Dot matrix, Inkjet, Laser: block diagram and specifications	3	10
Unit 5: Power Supplies	• Block diagram and working of SMPS. • Signal description and pin-out diagram of AT and ATX connectors • Power supply characteristics: Rated wattage, Efficiency, Regulation, Ripple, Load regulation, Line regulation. • Power problems: Blackout, Brownout, surges and spikes. • Symptoms of power problems. • Protection devices: circuit breaker, surge suppressor. • Uninterrupted Power Supply, Online and Offline UPS, working of UPS: Block diagram, advantages and disadvantages, Ratings	4	10
Unit 6: Interfaces	• SCSI, SCSI cables and connectors, SCSI drive configuration. • USB features. • RS 232 : (Voltages and 9 pin description) • Centronics (interface diagram, important signals and timing waveform) • Firewire features • Blue tooth	4	10
Unit 7: PC Troubleshooting, Maintenance and Tools	• POST: POST sequence, Beep codes, visual display codes. • Preventive maintenance: Active, Passive, periodic maintenance procedure • Diagnostic Tools: logic Analyzer, logic probe. • Diagnostic software for trouble shooting PC • BGA workstation and its applications for reballing of north bridge and south bridge	3	10
Unit 8: Overview of Parallel Processing and Pipelining Processing	• Study and comparison of uniprocessors and parallel processors. Conventional and EPIC architecture • Evolution of parallel processors • Future trends and there architecture • Overview of Parallel Processing and Pipelining Processing. Necessity of High Performance • Constraints of conventional architecture • Parallelism in uniprocessor system • Architectural Classification • Applications of parallel Processing • Instruction level Parallelism and Thread Level Parallelism • Explicitly Parallel Instruction Computing (EPIC)	4	10

	Architecture • Case Study of Intel Itanium Processor • Principles of scalable performance: Performance Metrics and Measures, Speedup Performance Laws • Programming aspects for Intel Itanium Processor.		
		30	80

Reference Books:

1. Computer organization and architecture by william stallings
2. "Computer Organization" by Zvonco Vranesic and Safwat Zaky

Software Engineering (CMP511)

Course Objectives

- To provide foundation for understanding the software development process in a defined way according to industrial standards.
- To understand the complete software development life cycle and the different methodologies.
- To develop an understanding of software engineering, software crisis, SDLC. Understanding the concept of software project planning – feasibility analysis, requirement analysis, SRS documents.
- To know the software designing strategies – structured analysis, structured design, DFD, structure chart.
- Understand concept of Project Management along with software testing, maintenance, back-up..

Learning Outcomes

After completion of this course, the student will be able to

- Develop the software projects or prototypes by understanding the requirements.
- Meet the project deadlines along with the number of resources and type of tasks to be carried out.
- Evaluate and analyze the SDLC and basic architecture SRS documents.
- Help to understand the software design and coding techniques.
- Understand the software testing principles.
- Understand the concept project management.
- Identify various concepts of Advanced UML techniques

Unit No. and Name	Details	Counseling Sessions	Weightage
Unit 1 Software Engineering and Models	• Evolution of SE • Software Standards • Importance of SE • Various Models – Waterfall, Spiral , RAD	3	10
Unit 2 Requirement Analysis	• SRS • Fact Finding • DFD • ERD • Data Dictionary • Structure Charts	4	10
Unit 3 Software Design	• Architectural Design • Modular Design with SC Guidelines – Coupling / Cohesion • Interface Design – Screen Design	4	10
Unit 4 Coding, structured programming, programming practices	• Logic • Algorithm Design • Design walk through • Critical Design Review • Coding • Programming Practices • Structured Programming	3	10
Unit 5 Software Testing	• Testing Strategies • Testing Architecture • Testing Tools • Maintenance • Defect analysis	4	10
Unit 6 Quality Assurance	• Attributes for Quality • Quality Standards • Checklist • SEI/CMMi	4	10

Unit 7 Software Configuration Management	• Software Change Management • Software Configuration Management • Change Control	4	10
Unit 8 Latest trends in Software Engineering	• Web SE • Case Tools • Project Matrix • UML • XP programming • OOAD • Agile programming	4	10
		30	80

Reference Books:

1. Software Engineering – A Practitioner's Approach 7 th Edition – Roger S. Pressman [McGraw Hill International Edition]
2. Software Engineering – IAN Sommerville 7th / 8th Edition (Pearson Edition)

JAVA (CMP512)

Course Objectives

- The fundamental point in learning programming is to develop the critical skills of formulating programmatic solutions for real problems.
- To learn the syntax and semantics to write Java programs.
- To understand the fundamentals of object-oriented programming in Java.
- Learn to develop object oriented software using class encapsulation and inheritance, packages and interfaces
- To impart the basic concepts of Java Programming and to develop understanding about Basic Object oriented Design using UML and Applet.
- Design and implement Applet and event handling mechanisms in programs

Learning Outcome:

Upon completion of this course, students will be able to:

- Understand the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
- Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
- Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifies, automatic documentation through comments, error exception handling).
- Use testing and debugging tools to automatically discover errors of Java programs as well as use versioning tools for collaborative programming/editing.
- Develop programs using the Java Collection API as well as the Java standard class library.
- Apply object oriented programming concepts in problem solving through JAVA.

Unit No. and Name	Details	Counseling Sessions	Weightage
Unit 1 Evolution of Java; Variables and Naming Rules	Evolution • History of Java • Features of Java • Difference in the working of C++ and Java • What is JDK, JRE and JVM? • Introduction to Class and objects • Instantiation in java variables and naming rules • Variables in Java • Scopes of the variables • Datatypes • Operators • Primitive Variables • Garbage Collection of the variables. • Source File Declaration Rules • Class and Method Naming Rules • Camel Casing Rule	4	1 0

Unit 2 Decision Making and looping	• if statement • if-else statement • if – else if – else ladder • nesting of if • ? : operator • switch case • for loop • while loop • Do while loop • Jumps in Loops	4	10
Unit 3 Implementation of Methods	• Methods and Constructor • Method Overloading and Constructor Overloading • Method Overriding • Static members • Final keyword • Inheritance • Super keyword	4	10
Unit 4 Wrapper Classes, Arrays & String	Wrapper Classes • Data Types in Java • Wrapper Classes • Conversion and Utility methods of Wrapper Class • Type Casting • Boxing & autoboxing array & strings • Concept of Arrays • Array Declaration, Construction and Initialization • 1-D Array • Array of Objects • 2-D Arrays	4	10
Unit 5 String Handling and Exception Handling	String Handling • Understanding String class. • Methods of String • String buffer & string builder exception handeling • What is Exception? • Difference in Exception and Error • Using try….catch • Using throws for handling Exception • Making our own Exception • Difference in throw and throws	3	10
Unit 6 Package and Deferred Implementation	Package • How Java Library uses Packages • Import statements in Java • Creating our own package • Making Jar Files Deferred Implementation (Abstract Class and Interfaces) • Abstract Class • Working with abstract class and abstract methods	4	10

	• Interfaces • Abstract Class vs Interfaces • Multiple Interface Implementation • Generalization using Interface		
Unit 7 Java I/O	• Working with File Class • Reading and Writing with Disk Files • BufferedReader and BufferedWriter • Object Serialization • Scanner class	3	10
Unit 8 Thread, Generics and Collection	Thread • Defining Threads • java.lang.Thread and java.lang.Runnable • Thread States • Thread Priorities • Synchronization generics & collection • Defining Generics • Generics Methods • What is Collection API • Difference in Arrays and Collection • List(ArrayList,Vector and LinkedList) • Queue(PriorityQueue) • Map(SortedMap)	4	10
		30	80

Reference:

1. OCA/OCP Java SE 7 Programmer I and II Study Guide: Kathy Sierra and Bert Bates
2. Programming with Java, A Primer: E Balagurusamy
3. Head First Java, Second Edition: Kathy Sierra and Bert Bates

Lab: Computer System Architecture (CMP710)

Practical No.	Activities
1	Identify and draw the motherboard layout of Intel i3 processor and understand connection and layout of the H67 or P67chipset
2	Perform Basic Input/output System (BIOS) setting and configuration setup using Complementary Metal Oxide Semiconductor (CMOS).
3	Format, partition and install a Hard Disk Drive (HDD) and format a pen drive.
4	Understand layout, characteristics and functions of different components of Hard Disk Drive (HDD) as a storage device.
5	Install Video Graphics Array (VGA) or Super Video Graphics Array (SVGA) display cards.
6	Install and understand the working of printer.
7	Install and understand the working of Input/output devices such as scanner and modem.
8	Connect Switched Mode Power Supply (SMPS) and identify different parts of SMPS. Understand the working of SMPS and Uninterrupted Power Supply (UPS).
9	Use diagnostic software to identify installed computer peripherals and test their working condition.
10	Find faults related to Monitor.
11	Find faults related to CPU.
12	A Find faults related to Hard disk.
13	Find faults related to Printer and other peripherals.
14	Form a pico net using Bluetooth devices and transfer data.
15	Assemble PC and install an operating system.

Lab: Software Engineering (CMP711)

Practical No.	Practical	Activities
1		SRS
2		Justification for selection of suitable model
3		DFD
4		ERD (Use STARUML software)and Data Dictionary
5		Structured Chart
6		Design the input screens for sample project selected
7		Design the output screens for sample project selected
8		Design the reports for sample project selected
9		Cost estimation using COCOMO 1
10		Duration estimation using COCOMO 1 and draw Gantt Chart
11		Effort estimation using COCOMO 1
12		UML Diagrams 1– Class Diagram, Use Case Diagram (Use STARUML software)
13		UML Diagrams 2 – Activity Diagram, Sequence Diagram, Collaboration Diagram (Use STARUML software)
14		What is meant by software testing? What are its types? Which are the tools used for testing?
15		What is meant by quality assurance?

Lab: JAVA (CMP712)

Practical No.	Practical	Activities

1		i. Write a Java class to swap two numbers without using third variable. ii. Write a Java Program to determine reverse the number iii. Write a Java class to print the Fibonacci sequence till 100 iv. Write a Java Program to determine whether the number is Armstrong or not. v. Write a Java Program to determine whether the number is prime or not.
2		i. Write a Java program for the following scenario: Run a loop from 1 to 100, while looping when the number is even print its square and when the number is odd print its cube. ii. Write a Java program to print the following Floyd Triangle 1 0 1 1 0 1 0 1 0 1 iii. Write a Java Program to print following 1 2 3 4 5 1 2 3 4 1 2 3 1 2 1
3		i. Write a Java class Employee with variables name, age, gender write setter and getter methods for it. ii. Write a class mobile with methods call() and sms(). Write a class Demo and access it. iii. Write a class MathDemo with methods square() with one parameter and add() with two parameters. Call these methods to get the output.
4		Write a Java class for following methods display() -- Display number from 1 to 100 using while loop in Java fibonacci() -- Prints Fibonacci series till 100
5		Write a class Automobile with default constructor, write a class Plane which extends Automobile and has a default as well as parameterized constructor, write a class Airbus with a default constructor which extends Plane.
6		i. Write a Java Program to convert "25" to Primitive as well as Wrapper. ii. Write a Java program to convert 110011 to decimal value.
7		Write a Java Program to convert the "59" to Primitive float (without using Constructor of Float)
8		Write a class User with abstract methods pay() and receive(), later make two concrete class GoldUser and SilverUser, override the abstract method.
9		Write a Java program to write the following, class A with method m1( ) and m2( ) and write a class B with methods m3( ) and m4( ), Override the methods of A in class B.
10		• Write an abstract class Car with methods start() and stop(). Write a class Santro and Audi and override the methods. • Write two interfaces SportsCar and CommercialCar and implement the appropriate interface on the appropriate class made in example 1.

11		• Make an Interface CE which have methods call(), sms (), Make another interface ISO which have methods radiation() and sound(). Make two classes IPhone and Galaxy and make them implement both the interfaces. • Write a Java program to make a package com.shapes, make classes Circle and Square in the same package.
12		i. Write a Java Program to make an Exception AgeException. When user passes some age and if age is less than 18 throw this Exception. ii. Create an Exception StringNotPalindromeException. Write a class with method which throws this Exception when String passed is not palindrome.
13		i. Write a Java program to determine the number of vowels in a String ii. Write a Java program for separate hours, minutes and seconds from following string 01:23:45 PM.
14		i. Write a Java Program to store the following data, in the collection you feel will suite best. Name- Tom Email- tom@gmail.com Phone:9988776655 ii. Write a Java Program to find the minimum value in Vector [8,9,1,3,4]. iii. Write a Java Program to find the number of String starting with „S" from following TreeSet [Smith, Alex , Tom, Steve, Mark, Sammy]
15		Sort the given list of objects in order of their email Contact: id, name, email, phone

Semester 5

Quantitative Aptitude (CMP332)

Course Objectives:

- To enhance the problem solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.
- Communication Goal: Students will be able to interpret and communicate quantitative information and mathematical and statistical concepts using language appropriate to the context and intended audience.
- Problem Solving Goal: Students will be able to make sense of problems, develop strategies to find solutions, and persevere in solving them.
- Reasoning Goal: Students will be able to reason, model, and draw conclusions or make decisions with mathematical, statistical, and quantitative information.
- Evaluation Goal: Students will be able to critique and evaluate quantitative arguments that utilize mathematical, statistical, and quantitative information.
- Technology Goal: Students will be able to use appropriate technology in a given context.

Learning Outcomes:

On successful completion of the course the students will be able to:

- Understand the basic concepts of QUANTITATIVE ABILITY
- Understand the basic concepts of LOGICAL REASONING Skills
- Acquire satisfactory competency in use of VERBAL REASONING
- Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- Solve real-life problems requiring interpretation and comparison of complex numeric summaries which extend beyond simple measures of centre.
- Distinguish between proportional and non proportional situations and, when appropriate, apply proportional reasoning.
- Students will apply probabilistic reasoning to draw conclusions, to make decisions, and to evaluate outcomes of decisions.
- Students will draw conclusions or make decisions and communicate their rationale based on understanding, analysis, and critique of self-created or reported statistical information and statistical summaries.
- Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

Unit No. and Name	Details	Counseling Sessions	Weightage
Unit 1 : Number System Basics	• Number system • Divisibility • Factors • HCF and LCM		
Unit 2 : Averages and Problems on Ages	• Arithmetic Mean • Geometric Mean • Harmonic Mean • Mean, Median and Mode		

Unit 3 : Percentages, Profit and Loss	• Basic Concepts of Percentages • Successive Discounts • Percentage Error • Increase and Decrease in Percentage • Basics of Profit and Loss • Formulas to calculate Profit & Loss • Profit Percentage		
Unit 4 : Ratio and Proportion, Partnership, Mixtures and Allegations, Simple Interest and Compound Interest	• Basics of Ratio and Proportion • Continued Proportion • Comparison of Ratios • Variations • Understanding of Simple and Compound Interest • EMI Calculation		
Unit 5 : Work and Time and Geometry and Trigonometry	• Basics on Work • Time and Work Formula and Application • Pipes and Cisterns • Chain Rule • Basics on Geometry and Trigonometry • Types, methodologies, and terminologies of geometry. • Formulas of functions of Trigonometry		
Unit 6 : Speed, Distance and Time	• Basics of Speed Distance and Time • Average Speed • Relative Speed • Problems on Trains Boats and Streams • Problems on Boats		
Unit 7 : Permutation and Combination, Probability	• Basics of Permutation and Combination • Representation of Permutation and Combination • Problems on Permutation and Combination • Basics of Probability • Variables and Distributions • Problems on Permutation, Combination and Probability		
Unit 8 : Introduction to Tables and Graph	• Vertical Bar Charts. • Histogram. • Horizontal Bar. • Pie Charts. • Line Charts. • And other Graphs and Tables.		

Reference Books:

1. Quantitative aptitude by R.S Agarwal
2. Arihant Publications - Fast Track Objective Arithmetic
3. R.D. Sharma - Mathematics Class 11th and 12th
4. Sarvesh K. Verma- Quantitative Aptitude

E Commerce Technologies (CMP513)

Course Objectives

- To develop an understanding of scope of E-Commerce.
- To develop an understanding of electronic market and market place.
- To develop an understanding of business models.
- Understanding payment systems used in E-commerce.
- To develop an understanding of legal issues, threats of E-Commerce.
- Understanding security challenges and solutions required for E-commerce
- Understanding the WAP model and its role in E-commerce.

Course Outcomes:

Upon completion of this course, students will be able to:

- Demonstrate an understanding of the foundations and importance of E-commerce.
- Understand the business models and its working and how it affects the flow of ecommerce.
- Demonstrate an understanding of retailing in E-commerce by analyzing branding and pricing strategies, using and determining the effectiveness of market research, assessing the effects of disintermediation.
- Analyze the impact of E-commerce on business models and strategy.
- Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational. Describe the infrastructure for E-commerce.
- How to Assess and analyze electronic payment systems.
- Recognize and discuss global E-commerce issues

Unit No. & Name	Details	Counseling Sessions	Weightage
Unit 1 Introduction	**Enabling Technologies of the World Wide Web** • Internet Client/Server Applications • Networks and Internets • Internet Service Provider (ISP) • Broadband Technologies **History of E-Commerce** • Early Business Information Exchange Efforts • Emergence of the Internet and World Wide Web • The Milestones • Advantages of E-Commerce • Online Extension of BAM Model • Transition to E-Commerce in India • The Information Technology Act 2000 **Business Models for E-Commerce** • based on Relationship of Transaction Parties • based on Relationship of Transaction Types	4	10
Unit 2 Marketing	• Traditional Marketing • Identifying Web Presence Goals • Online Marketing • Internet Marketing Trends • Target Markets • Marketing Strategies	4	10

Unit 3 Security	• Security on the Net • E-Business Risk Management Issues	3	10
Unit 4 Payment Systems	• Digital Payment Requirements • Digital Token-based • Classification of New Payment Systems • Properties of Electronic Cash (E-Cash) • Risk and E-Payment Systems • Digital Signature	4	10
Unit 5 Customer Relationship Management	• Customer Relationship Management • Typical Business Touch-Points	3	10
Unit 6 Supply Chain Management	• E-Supply Chain goals • E Supply advantages and benefits • E supply and value creation for customer	4	10
Unit 7 Strategy	• Information and Strategy • The Virtual Value Chain • Seven Dimensions of E-Commerce Strategy • Value Chain and E-Strategy • Strategies for Web Site Development	4	10
Unit 8 Mobile Commerce	• Origins of WAP • WAP Programming Model • Wireless Technologies	4	10
		30	80

Reference Books:

1. Internet marketing and E-commerce by Ward Hanson & kirthi Kalyanam
2. E-Commerce Concepts, Models, & Strategies by G.S.V Murthy
3. E-Commerce Kamlesh K Bajaj and Debjani Nag
4. E-COMMERCE, Fifth Edition: AN INDIAN PERSPECTIVE by By P.T. JOSEPH, S.J.

Advance JAVA (CMP514)

Unit No. & Name	Details	Counseling Sessions	Weightage
Unit 1: **JDBC**	JDBC Architecture, Overview of Drivers, DBC Driver Manager, Steps for accessing database using JDBC API, Statements Prepared, Statement Callable, Statement Scrollable and Updatable ResultSet, ResultSetMetaData and DatabaseMetaData, Working with Rowset Interface.	4	10
Unit 2: **Servlet**	Introduction To Java Servlets, Servlet API, Servlet Life- Cycle, Working With Apache Tomcat, GenericServletsHttpServlet, HttpSession, Session Binding/Tracking, Inter-Servlet Communication.	4	10
Unit 3: **JSP**	JSP SYNTAX, Page Directve, Include Directive, Data Declaration and Method Definition, ScripletsImplicit Objects, Custom Tags, Session Tracking in JSP, Page Context, Exception	3	10
Unit 4: **Hibernate**	Why Hibernate?, Understanding ORM, Objects and Persistence, Hibernate Architecture, Mapping Documents, Hibernate Database Connection, Creating Persistent Classes, Mapping Collection of Objects, Persistent Object Life Cycle, Hibernate with Servlets, HQL: Hibernate Query Language.	4	10
Unit 5: **Spring Core**	Introduction to Spring Framework, Inversion of Control and Dependency Injection, IOC Container, Bean Creation, Construction Injection, Setter Injection,	4	10
Unit 6: **Spring MVC**	Spring Web MVC, MVC Architecture, Front Controller and DispatcherServlet.	4	10
Unit 7: **Java Mail**	Introduction to Java API, Using Java Mail API to send mail using Java Codes, Sending Text Mail, Sending HTML Mail, Sending Mail with Attachments.	2	10
Unit 8: **Java with JSON**	JSON Syntax, DataTypes, Objects, Arrays in JSON, JSON Library in Java, Encoding a JSON Object in Java, Decoding a JSON Object in Java, Publishing a Service using JSON in JSP.	2	10
	Revision and Practice	3	
		30	80

References:

1 .Title: Jdbc, Servlets, and Jsp Black Book, New Edition
2. The Complete Reference – JAVA Herbert Schildt
3. JavaMail API: Sending and Receiving Email with Java by Elliotte Harold, O'Reilly pub.

4. Getting Started with Spring Framework by J Sharma, Ashish Sarin
5. Just Hibernate by Madhusudhan Konda, O'Reilly pub.

Linux Administration (CMP515)

Unit No. & Name	Details	Counseling Sessions	Weightage
Unit 1 Introduction to Linux	**Introduction to Linux**: Open Source and Red Hat, Origins of Linux, GNU & Linux Distributions, Versions of Linux, Architecture of Linux. **Duties of the System Administrator:** The Linux System Administrator, Installing and Configuring Servers, Installing and Configuring Application Software, Creating and Maintaining User Accounts, Backing Up and Restoring Files, Monitoring and Tuning Performance, Configuring a Secure System, Using Tools to Monitor Security.	3	10
Unit 2 Installation of Redhat Linux	Installation of Redhat Linux on Virtual Machine, Understanding Partitions of Linux, Booting and shutting down Linux, Understanding Boot loaders: GRUB & LILO, Bootstrapping, Init process, rc scripts, Enabling and disabling services. Different Run levels in Linux, Understanding Linux file system structure.	4	10
Unit 3 Using Command Line and Managing Software	**Command Line:** Working with the Bash Shell, Working with basic linux command, Working with advanced linux commands, Working with Directories, Piping and Redirection, Finding Files, Using Vi Editor **Managing Software:** Understanding RPM, Understanding Meta Package Handlers, Creating Your Own Repositories, Managing Repositories, Installing Software with Yum, Querying Software, Extracting Files from RPM Packages.	5	10
Unit 4 Working with Users, Groups and Permissions	Managing Users and Groups, Commands for User Management, Managing Passwords, Modifying and Deleting User Accounts, Configuration Files, Creating Groups, Using Graphical Tools for User, and Group Management, Using External Authentication Sources, the Authentication Process, sssd, nsswitch, Pluggable Authentication Modules, Managing Permissions, the Role of Ownership, Basic Permissions: Read, Write, and Execute, Advanced Permissions, Working with Access Control Lists, Setting Default Permissions with umask, Working with Attributes	2	10
Unit 5 TCP/IP Networking and Network File System	**TCP/IP Networking:** Understanding Network Classes, Setting Up a Network Interface Card (NIC), Understanding Subnetting, Working with Gateways and Routers, Configuring Dynamic Host Configuration Protocol, Configuring the Network Using the Network **The Network File System:** NFS Overview, Planning an NFS Installation, Configuring an NFS Server, Configuring an NFS Client, Using Automount Services, Examining NFS	4	10

	Security.		
Unit 6 Configuring DNS and DHCP	Introduction to DNS, The DNS Hierarchy, DNS Server Types, The DNS Lookup Process, DNS Zone Types, Setting Up a DNS Server, Setting Up a Cache-Only Name Server, Setting Up a Primary Name Server, Setting Up a Secondary Name Server, Understanding DHCP, Setting Up a DHCP Server	3	10
Unit 7 Connecting to Microsoft Networks and Setting up a Mail Server	Connecting to Microsoft Networks: Installing Samba, Configuring the Samba Server, Creating Samba Users 3, Starting the Samba Server, Connecting to a Samba Client, Connecting from a Windows PC to the Samba Server Setting up a Mail Server: Using the Message Transfer Agent, the Mail Delivery Agent, the Mail User Agent, Setting Up Postfix as an SMTP Server, Working with Mutt, Basic Configuration, Internet Configuration, Configuring Dovecot for POP and IMAP	3	10
Unit 8 Securing Server with iptables and Configuring Web Server	Securing Server with iptables: Understanding Firewalls, Setting Up a Firewall with system-config-firewall, Allowing Services, Trusted Interfaces, Masquerading, Configuration Files, Setting Up a Firewall with iptables, Tables, Chains, and Rules, Composition of Rule, Configuration Example, Advanced iptables Configuration, Configuring Logging, The Limit Module, Configuring NAT Configuring a Web Server: introducing Apache, Configuring Apache, Implementing SSI, Enabling CGI, Enabling PHP, Creating a Secure Server with SSL	3	10
	Revision and Practice	3	
		30	80

Reference Books:

1. Linux kernel by linus kernel
2. Red hat Linux Networking and System Administration, Terry Collings and Kurt Wall, wiley pub.
3. Unix the ultimate guide by sumitabha das.
4. Advanced programming in the Unix environments. W.R. Stevens, O'Reilly Media,

Lab: E Commerce Technologies (CMP713)

Practical No.	Practical	Activities
1	Home page design	Design a Home page for a Business to Consumer website
2	Form validation (Ajax enabled)	Design a page to enter customer details such as name address phone number apply proper validation.
3	Customer payment System	Explain with diagram working of e Payment System (Debit, Credit Card, Smart Card)
4	Internet and Networking	Explain types of Network and Role of Internet in eCommerce.
5	Search Engines	Study any popular search engine and note down the features.
6	Access control mechanism of a e-Commerce website	Study session management feature of e Commerce website.
7	ISP	State the role of ISP.
8	Digital signature	State the Importance of Digital signature in online business.
9	Catalogue Design	Design a Catalogue using any web technologies.
10	Cookies	Explain cookies, write steps to create a cookie.
11	Case Study 1	M commerce
12	Case Study 2	Bitcoin
13	Case Study 3	Use of SMO and SEO
14	Case Study 4	B2B and B2C
15	Case Study 5	C2C and C2B

Lab: Advance JAVA (CMP714)

<table>
<tr><th>Practical No.</th><th>Practical</th><th>Activities</th></tr>
<tr><td>1</td><td>Servlet -I</td><td>1. Write a servlet to determine whether the number is prime or not.
2. Write a servlet to determine whether the entered name from the html form is palindrome or not.
3. Write a Servlet program to print all the even numbers between the two entered numbers by the user, let say user enters 5 and 500 , so print the even numbers between 5 and 500</td></tr>
<tr><td>2</td><td>Servlet -II</td><td>1. Write a servlet program where user enters a name from a form and you send back the length of the name to him.
2. Write aHttpServlet to accept the values for following table and insert into it.
<table><tr><td>id</td><td>name</td><td>actor</td><td>actress</td><td>director</td><td>releaseDate</td><td>ratepoint</td></tr></table>
3. Write a servlet to fetch the movie at id 9.
4. Write a servlet to fetch all the movies released between 3rd Jan 2015 and 3rd Jan 2016.</td></tr>
<tr><td>3</td><td>Servlet -III</td><td>1. Write a servlet program to accept a number, if number is even redirect to purplesq.com if number is odd redirect togoogle.com
2. Write a servlet program to redirect the request to another servlet which requires a String as the parameter and the other servlet converts the string to lower case.
3. Write a Java program to get the name from a html form, put the name in session and redirect the flow to another servlet and the other servlet displays the name put into the session.</td></tr>
<tr><td>4</td><td>JSP - I</td><td>4. Write a JSP code to accept a number and revert whether the number is prime or not.
5. Write a servlet Program to accept a String and determine whether the String’s length is greater than 6.
6. Write a JSP Program to redirect to Google.com</td></tr>
<tr><td>5</td><td>JSP - II</td><td>1. Write a Java Program to print the following. 1 1
1 1 1
2 2 2 2
3 3 3
4 4
5
2. Write a JSP Code to store the data from a form into a database table using JDBC. (Use the form and table of your choice)
3. Make 2 JSP Pages, accept the username and password from first page, if the username is tom and password is tommy, login will be successful and redirect it to loggedin.jsp page and store the username in session from login and display it on loggedin.jsp.</td></tr>
</table>

<table>
<tr><td>6</td><td>JDBC</td><td>1. .Crete the database as given below. Enter the sample data
<table>
<tr><td>id</td><td>temp</td><td>city</td><td>precipitation</td><td>wind</td><td>humidity</td><td>date</td></tr>
<tr><td>int</td><td>float</td><td>varchar</td><td>float</td><td>int</td><td>float</td><td>date</td></tr>
<tr><td></td><td>25.5C</td><td>mumbai</td><td>3.0%</td><td>25 km/hr</td><td>20%</td><td>2016-04-18</td></tr>
</table>
2. Show the highest temperature for the city of Mumbai for the month of January 2016.
3. List the temperatures for the city of Mumbai and Delhi in order of their humidity (from lowest to highest)
4. List the temperature for the city of Bangalore for the month of February 2016.
5. Show all the days where temperature was above 30°C, using Set.
6. List the temperatures for the city of Bangalore in order of their precipitation (from highest to lowest)
7. Sort the list of temperature according to the name of the cities.</td></tr>
<tr><td>7</td><td>Java Email</td><td>1. Send a text email using Java code
2. Send a HTML Email using Java Code
3. Send an HTML with an attachment using Java Code</td></tr>
<tr><td>8</td><td>Hibernate-I</td><td>Table (Employee: id int Primary key, name varchar(200), dept varchar(50), designation varchar(100),salary float, dateofjoin date)
1. Write an Hibernate API to add an employee in given table.
2. Write an Hibernate API to update the name of employee on id 1
3. Write an Hibernate API to delete an employee on id 3</td></tr>
<tr><td>9</td><td>Hibernate-II</td><td>1. Write an Hibernate API to get all the employee working in IT department using Hibernate Query Language
2. Write a Hibernate API to get all the employee who joined after 2016-01-01 and work in HR department using Hibernate Criterion Query Language
3. Write a Hibernate API to find the maximum salary in IT department using Projection</td></tr>
<tr><td>10</td><td>Spring- I</td><td>1. Write a Spring API using ApplicationContext to load a Bean by name Hello with property message and load the property using spring bean xml.
2. Write a Spring API to demonstrate Setter Dependency Injection
3. Write a Spring API to demonstrate Constructor Dependency Injection</td></tr>
<tr><td>11</td><td>Spring- II</td><td>1. Write a Spring API to store value in backend table using HibernateTemplate
2. Write a Spring MVC API to accept two numbers and return their addition
3. Write a Spring MVC API to accept a string and determine if it is palindrome or not.</td></tr>
<tr><td>12</td><td>JAVA with JSON-I</td><td>Define a web service method that returns the contents of a database in a JSON string. The contents should be displayed in a tabular format.</td></tr>
<tr><td>13</td><td>JAVA with JSON-II</td><td>Write a JSP which accepts the parameter in JSON String and later convert that value and display on the screen.</td></tr>
</table>

14	JAVA with JSON- III	Convert following String into a JSON Object.
		{
		"colors":[
		{
		"color":"black",
		"category":"hue",
		"type":"primary",
		"code":{
		"rgba":[255,255,255,1],
		"hex":"#000"
		}
		},
		{
		"color":"white",
		"category":"value",
		"code":{
		"rgba":[0,0,0,1],
		"hex":"#FFF"
		}
		},
		{
		"color":"red",
		"category":"hue",
		"type":"primary",
		"code":{
		"rgba":[255,0,0,1],
		"hex":"#FF0"
		}
		},
		{
		"color":"blue",
		"category":"hue",
		"type":"primary",
		"code":{
		"rgba":[0,0,255,1],
		"hex":"#00F"
		}
		},
		{
		"color":"yellow",
		"category":"hue",
		"type":"primary",
		"code":{
		"rgba":[255,255,0,1],
		"hex":"#FF0"
		}
		},

		{
		"color":"green",
		"category":"hue",
		"type":"secondary",
		"code":{
		"rgba":[0,255,0,1],
		"hex":"#0F0"
		}
		},
		]
		}

15	JAVA with JSON- IV	Write a Java Code to print the String from a JSON Object

Lab: Linux Administration (CMP715)

Practical No.	Practical	Activities
1		Installation of Redhat Linux Installation.
2		Working with Grub and init file
3		Basic Linux Commands
4		Advanced Linux Commands.
5		Working with Vi Editor.
6		Working with Users, Groups, and Permissions.
7		Setting NFS File Server.
8		Setting up DNS server.
9		Setting Samba Server.
10		Setting IP address and connecting to internet.
11		Understanding Firewall configuration through graphical and command mode.
12		Configuring ftp on linux.
13		Configure Apache Web server to support html & PHP file.
14		Install gcc compiler and execute sample C program.
15		Install g++ compiler and execute sample C++ program.
16		Install java compiler and execute sample java program.

SEMESTER 6

Personality and Career Skills (OPN273)

Course Objective:

- To study the personality development of individuals in the micro perspective.
- To provide employability skills
- To know the process of Interview Techniques& Group discussion.
- To understand the needs and benefits of written communication.
- To understand stress and time management and to achieve work life balance
  To equip students with the necessary soft skills to enhance their competitive edge in the job market
- To imbibe in students positive attitude towards life and work
- To help students excel in their individual and professional lives using the soft skills
- Additional knowledge of sources of leadership, creativity, innovation etc.

Learning Outcomes:

On completion of the course, learner will be able to:

- Make use of techniques for self-awareness and self-development.
- Apply the conceptual understanding of communication into everyday Practice.
- Understand the importance of teamwork and group discussions skills.
- Develop time management and stress management skills.
- Apply business etiquette skills effectively an engineer requires.
- Application of gained knowledge for Decision Making, coordinating, stress management, time management.

Unit No	Detailed Syllabus of the Unit	Counseling Session	Weightage
01	**Soft Skills**: What are soft skills? Importance of soft skills, Selling your soft skills, Attributes regarded as soft skill, Soft skills, Social soft skills, Thinking soft skills, Negotiating, Exhibiting your soft skill, Identifying your soft skills, Improving your soft skills, Train yourself, Top 60 soft skills, Practicing soft skills, Measuring attitude **Self-Discovery**: Introduction, Importance of knowing yourself, Process of knowing yourself, SWOT analysis, Benefits of SWOT analysis, Using SWOT analysis, SWOT analysis grid, Questions to complete the grid Developing Positive Attitude: Introduction, Meaning, Features of attitudes, Attitude and behavior, Formation of attitudes, Change of attitudes, What can you do to change attitude? Ways of changing attitude in a person, Attitude in a workplace, The power of positive attitude, Developing positive attitude, Obstacles in developing positive attitude, Staying positive, Examples of positive attitudes, Positive attitude and its results, Staying negative, Examples of negative attitude, Overcoming negative attitude, Negative attitude and its results Forming Values: Introduction, Meaning, What is a value? A core of values, Values relating to education, Values relating to self and others, Values relating to civic responsibilities, Values and attitudes, Importance of values, Formation of values, Types of values, Terminal and instrumental values, Power of values, Personal values, Cultural values, Social values, Values some examples	07	10
02	**Improving Perception**: Introduction, Meaning, Factors influencing perception, Perceptual process, Improving perception, Perception and its application in organizations **Career Planning**: Introduction, Benefits of career planning, Guidelines for choosing a career, Myths about choosing a career, Tips for successful career planning, Developing career goals, Final thoughts on career planning **The Art of Writing E-mail**: Introduction, The mail magic, Use appropriate salutations, Make the subject matter significant, Keep a dictionary close by, Use commas, Use smileys, When in doubt, preface – include previous message, Shorten the file attachments, Reread before pressing the "send" button, Be polite and reciprocate good deeds, Anticipate, empathize, understand **Body Language**: Introduction, Body talk, Voluntary and involuntary body language, Forms of body language, Parts of body language, Origin of body language, Uses of body language, Body language in building industrial relations, Reasons to study body language, Improving your body language, Types of body language, Gender differences, Female interest and body language, Shaking hands with women, Interpreting body language	07	10

03	Etiquette and Manners: Etiquette introduction, Modern etiquette, Benefits of etiquette, Classification of etiquette, Accompanying women, Taboo topics, Proposing the toast. Manners Introduction, Poor manners noticed in youth, Why should you practice good manners? Practicing good manners, Manners at the wheel: driving, Manners in the flight, Respecting the sacred, Visiting holy places, Dealing with the challenged, Attending funeral, Professional manners, Social Skills or manners, Getting along with people, Manners to get respect from others **Team Building and Teamwork**: Introduction, Meaning, Aspects of team building, Skills needed for teamwork, A model of team building, Team vs group, Characteristics of effective team, Role of a team Leader, Role of Team Members, Nine persons a successful team should have, Inter–group collaboration, Advantages of inter–group collaboration, Difficulties faced in inter–group collaboration, Factors shaping inter– group collaboration **Group Discussion**: Introduction, Meaning of GD, Why group discussion? Characters tested in a GD, Tips on GD, Types of GD, Skills required in a GD, Consequences of GD, Behavior in GD, Essential elements of GD, Different characters in GD, Traits tested in GD, GD etiquette, Areas to be concentrated while preparing for a GD, Initiating a GD, Techniques to initiate a GD, Non–verbal communication in GD, Movement and gestures to avoided in a GD, Topics for GD	07	10
04	**Preparing Resume**: Introduction, Meaning, The terms, The purpose of Resume writing, Types of resumes, Interesting facts about resume, Resume writing tips, Resume preparation-the dos, Resume preparation-the don'ts, Resume checkup, Design of a Resume, The content of the resume, Electronic resume tips, References, Power words, Common resume blunders, Key skills that can be mentioned in the resume, Cover letters, Cover letter tips **Interview Skills**: Introduction, Why an interview? Types of interview, Interview panel, Types of questions asked, Reasons for selecting a candidate, Reasons for rejecting a candidate, On the day of interview, On to the interview table, Attending job fair, Common mistakes to avoid, Post–interview etiquette, How does one follow up? Telephonic interview, Dress code at interview, Typical questions asked, Interview mistakes, Quick tips, How to present well in interview, Job interview – basic tips, How to search for job effectively, Quotes to remember about interview **Time Management**: Introduction, The 80:20 rule, Take a good look at the people around you, Examine your work, Sense of time management, Time is money, Features of time, Three secrets of time management, Time management matrix, Analysis of time matrix, Effective scheduling, Grouping of activities, Five steps to successful time management, Difficulties in time management, Evils of not planning, Interesting facts about time, Ideal way of spending a day, Time wasters, Time savers, Realizing the value of time, Time circle planner **Stress Management**: Introduction, Meaning, At one level stress may be a positive aid to performance, At one stress may be a negative aid to performance, Effects of stress, Kinds of stress, Sources of stress, Few other common sources of stress, Case study, Behavior Identified with stress, Assessing the existence of stress, What are the signs of stress? Spotting stress in you, Stress management tips	07	10

Reference books:

1. **Emotional Intelligence: Why It Can Matter More Than IQ** by **Daniel Goleman**, Bloomsbury Publishing; 1st edition (20 July 2009)
2. **Critical Thinking Skills: Developing Effective Analysis and Argument** by **Stella Cottrell**, Palgrave Macmillan publication; Second edition (20 May 2011)
3**. The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change** by **Stephen R. Covey**, Mango publishing (1 January 2016)
4. **PERSONALITY DEVELOPMENT by Elizabeth Hurlock**, McGraw Hill Education; New edition (1 July 2017)
5. **Personality Development and Soft Skills** (Old Edition) by **Barun K Mitra.**
6. **Soft Skills Training**: A Workbook to Develop Skills for Employment by Frederick H Wentz

Android Programming (CMP516)

Course Objective

- To understand the fundamentals involved in technologies of Mobile computing
- To introduce Android & understand the basic of Android.
- Design the home screen using UI screen elements.
- Describe the platforms upon which the Android operating system will run.
- To understand android terminologies & resources
- Create an application that uses user interface elements under the Android operating system
- Access and work with databases under the Android operating system
- To share data with another application.

Course Outcomes:

- Students will be able to understand fundamentals of mobility computing.
- Students will be able to understand working of Android architectures and their applications.
- Students will be able understand the user interface elements and learn the database tools for developing applications on mobile platforms like Android.
- Student will be able to gain the knowledge of deployment of application in actual android device.

Unit No and Name	Title	Counseling Sessions	Weightage
Unit 1: Introduction to Mobile Development	❖Mobile Computing ❖Historical of Mobile Environments ❖Early Mobile Phones to Smartphone's ❖Tablets ❖Mobile Computing Architecture ❖Mobile Generation o Devices for 1G, 2G, 2,5G,3G o Applications for 1G, 2G, 2,5G, 3G ❖Handoff ❖Roaming ❖GSM & GSM Architecture	3	10
Unit 2: Introduction to Android	❖Android o 2.1.1 What is Android o 2.1.2 History and Version o 2.1.3 Android Architecture o 2.1.4 Hello Android example ❖Dalvik VM ❖Software Stack ❖R.java file ❖Screen Orientation ❖Android Operating System o Introduction o Android Versions with Features	3	10
Unit 3: User Interface Screen Elements	❖Toast & Snack Bar ❖Custom Toast ❖Button o Toggle Button o Switch Button	4	10

	○ Image Button ○ Radio Button ❖Text View and EditText, CheckBox ❖Alert Dialog and Button Sheets ❖Spinner ❖Date Picker and Time Picker ❖Rating Bar and Progress Bar ❖File Download		
Unit 4: Android Development Elements	❖Installing the Java Development Kit ❖Installing Android Studio ❖Set up Android Studio ❖Start a new Android Studio project ❖Update your Android Studio software often	4	10
Unit 5: Android Terminologies and Resource Handling	❖5.1 Terminologies ○ Context ○ Activity ○ Intent ○ Linking Activity using Intent ○ Calling Build-In Application using Intent ❖Notifications Service ❖ Broadcast ❖Adapter Resources ○ Working with different types of Resources	4	10
Unit 6: Android User Interface Elements	❖Layouts ○ Linear Layout ○ Absolute Layout ○ Frame Layout ○ Relative Layout ○ Table Layout ○ Creation of Layout Programmatically ❖View ○ ListView ○ GridView ○ RecyclerView ○ ScrollView ○ WebView	4	10
Unit 7: Data Storage and Introduction to SQLITE	❖File system in android ❖Internal and external storage ❖Creating SQLite database ❖Editing Tasks with SQLite ❖Cursors and content values ❖ Working with Android database ❖Publish Android Application in Android Market	4	10
Unit 8: Providers and Receivers	❖Content Provider ○ Content Provider Fundamental ○ Contact Content Provider ○ Other Built-in Content Providers ○ Creating Custom Content Provider ○ Understanding Content URI	4	10

	○ ContentResolver ○ Sharing Information from custom content provider ❖Broadcast Receivers ○ Broadcast receiver usage patterns ○ When and why to use them ○ Implementing a broadcast receiver ○ Registering a broadcast receiver via the manifest file and Programmatically ○ Call State BroadcastReceiver		

Text Books:

1. **Wireless and Mobile Network Architectures** by Yi Bang Lin, Wiley Publications
2. **Hello Android: Introducing Google's Mobile Development** by Ed Burnette, 3rd Ed., 2010, The Pragmatic Programmers
3. **Mobile and Personal Communication System and Services** by Raj Pandya, Prentice Hall, Eastren Economy Edition

Reference Books

1. **Android Wireless Application Development** by Lauren Darcey and Shane Conder, Pearson Education, 2nd Edition
2. **Professional Android 4 Application Development** by Reto Meier, John Wiley & Sons
3. **Android User Interface Design: Turning Ideas and Sketches into Beautifully Designed Apps** by Ian G. Clifton

PHP Programming (CMP517)

Course Objective

- To understand the fundamentals involved in technologies of Mobile computing
- To introduce Android & understand the basic of Android.
- Design the home screen using UI screen elements.
- Describe the platforms upon which the Android operating system will run.
- To understand android terminologies & resources
- Create an application that uses user interface elements under the Android operating system
- Access and work with databases under the Android operating system
- To share data with another application.

Learning Outcomes:

- Students will be able to understand fundamentals of mobility computing.
- Students will be able to understand working of Android architectures and their applications.
- Students will be able understand the user interface elements and learn the database tools for developing applications on mobile platforms like Android.
- Student will be able to gain the knowledge of deployment of application in actual android device.

Unit No and Name	**Title**		
Unit 1: Basics of PHP	❖Introduction o Getting started with PHP ❖Syntax ❖Echo / Print ❖Variables & Constants ❖Data Types ❖Comments ❖Attributes ❖Operators ❖Decision Making & Loops ❖Predefined Functions ❖Date and Time	❖	❖
Unit 2: PHP Form Handling	❖Strings ❖Arrays ❖GET ,POST and REQUEST methods ❖ Reading fields from HTML ❖PHP Validations	❖	❖
Unit 3: File Handling, Session, Cookies in PHP	❖File Open/Read ❖File Create/Write ❖File Deletion ❖File Upload ❖Cookies ❖Sessions ❖Filters	❖	❖
Unit 4: Errors and Exception Handling in PHP	❖Compilation of Errors and Warning o Parse error o syntax error	❖	❖

	○ Undefined index ❖Error Reporting ❖Exception Handling		
Unit 5: PHP MySQLi	❖MySQLi connect ❖Loop through MySQLi results ❖Prepared statements in MySQLi ❖Escaping Strings ❖Debugging SQL in MySQLi ❖MySQLi query ❖How to get data from a prepared statement ❖MySQLi Insert ID ❖Close connection ❖Joins	❖	❖
Unit 6: Object Oriented Programming	❖Defining PHP classes ❖Creating objects in PHP ❖Calling Member Functions. ❖Constructor functions ❖Destructor ❖Inheritance ❖Function Overriding ❖Access Specifiers ❖Interfaces ❖Abstract Classes ❖Static and Final Keywords ❖Calling Parent Constructors ❖Namespaces ❖Functions	❖	❖
Unit 7: PHP Frameworks and Laravel	❖Introduction to Framework ○ Laravel ○ CodeIgniter ○ CakePHP ❖Yii ❖MVC(Model View controller) Introduction ❖Laravel Installation ❖Laravel Database Connectivity	❖	❖
Unit 8: Content Management system and WordPress	❖Introduction to CMS ○ WordPress ○ Joomla ○ Drupal ○ Magento ❖WordPress ○ Home ○ Overview ○ Installation ○ Dashboard ○ Add, Delete, Publish Post ○ Media Library ○ Add, Delete, Publish Page	❖	❖

Reference Books:

1. **Php: The Complete Reference** by steven holzner, Publisher: Mcgraw Hill, Latest edition

2. **Learning PHP, MySQL & JavaScript**: With jQuery, CSS & HTML5 (Learning PHP, MYSQL, Javascript, CSS & HTML5) by Robin Nixon, O'Reilly Media, 5th edition (2018).
3. **The Joy of PHP Programming**: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL, Author –Alan Forbes, Latest Edition – Fifth Edition, Publisher – Plum Island Publishing LLC.
4. **Code Smart: The Laravel Framework** Version 5 for Beginners by Dayle Rees.
5. **Building Web Apps with WordPress**: WordPress As An Application Framework by Brian Messenlehner and Jason Coleman Foreword by Brad Williams.
6. **PHP Cookbook: Solutions & Examples For PHP Programmers** by Adam Trachtenberg and David Sklar

Lab: Android Programming (CMP716)

Practical No.	Practical	Activities
1	Introduction to Android and My first android application	Create an application with following functionalities: Print and show a simple message e.g. Hello Word
2	Android button & Toggle button	Android button & Toggle button from this create application
3	Use of Toast & Custom Toast	Use of Toast & Custom Toast creates android application.
4	Check Box & Alert Diaglog Box	Create Android application using CheckBox & AlertDiaglogBox
5	Spinner & Auto complete test view	Create Android application using Spinner & Auto complete test view
6	Calculator	Create an application with following functionalities: Calculator for Basic mathematical operations.
7	Rating Bar, Web view, Seek Bar	Create Android application using Rating Bar, Web view, Seek Bar
8	Android UI Design	Design an android application for "Registration Form" using different layout such as table layout, linear layout etc. Use Drawable Resources, option menu, List Views and Adapters.
9	Date picker & Time Picker	Create Android application using Date picker & Time Picker
10	Progress Bar, Implicit Intend	Create Android application using Progress Bar, Implicit Intend
11	Progress Bar, Explicit Intend	Create Android application using Progress Bar, Explicit Intend
12	Fragments	Create Android application using fragments
13	SQLite Database for an Android Application	Design and Implement a Registration Form using SQLite Database.
14	Notification/Working in background	Design and Implement a Timetable application with lecture and practical alert notifications.
15	Mini Project	Design and Implement an android application using android studio or eclipse adt bundle such as Simple MP3 Player with Play, Stop, Pause options, Torch application etc.

Lab: PHP Programming (CMP717)

Practical No.	Practical	Activities
1		Installation of XAMPP Server and print “hello world” in PHP.
2		te a PHP program to print sum of digits.
3		Write a PHP program to check prime number.
4		Write a PHP program to print factorial of a number.
5		Write a PHP program to sort elements in an array in ascending order.
6		Create a PHP program in which two values submitted using form and calculate its addition, subtraction, multiplication, modulation, average and division on the same page. Find the greatest number between them and square of each of them using PHP function
7		te a PHP program to change background color based on hour of a day.
8		Write a PHP Program to create a simple Registration form.
9		Write a PHP program to Insert and display records to the table in Database.
10		Write a PHP Program to perform various string operations.
11		Write a program for creating a user login and logout system with PHP and MySqli.
12		Write a program to merge 2 arrays with and without using predefined functions.
13		Write a program to create a file in write mode.
14		Write a program to read and display the contents of file.
15		Write a PHP script to display string, values, within a table.
16		Write a PHP Script to get Last occurred error.
17		Installation of Lavarel.
18		Installation of WordPress(Online/Offline).
19		Miniproject – Design a WordPress website.