

B. Com C.A SYLLABUS

Allied Syllabus

2026-2027



**SENGAMALA THAYAAR EDUCATIONAL TRUST
WOMEN'S COLLEGE (AUTONOMOUS)**

(Affiliated to Bharathidasan University,

Tiruchirappalli)(Accredited by

NAAC)|(AnISO9001:2015 Certified Institution)

Sundarakkottai,

Mannargudi-614016,

QUESTION PAPER PATTERN

Part A:

Part A1 (5X1=5 marks)

One word question/ Fill in/ True or False/ Multiple Choice

Questions Two Questions from Each unit

Part A2 (4X2=8 marks)

Match the following / Short Answers

One question from Each unit

Total Marks – 10

Part B: (3X4=12 marks)

Paragraph Answers

Either/ or type, One Questions from each unit

Part C: (2X10=20)

Essay Type Answers

Answer 3 out of 5

Questions One Question

from each unit

Part A: K1 Level

Part B: K2, K3 and K4 Level

Part C: K5 and K6 Level

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No.	Level	Parameter	Description
1	K1	Knowledge/Remembering	It is the ability to remember the previously learned
2	K2	Comprehension/ Understanding	The learner explains ideas or concepts
3	K3	Application/Applying	The learner uses information in a new way
4	K4	Analysis/Analysing	The learner distinguishes among different parts
5	K5	Evaluation/Evaluating	The learner justifies a stand or decision
6	K6	Synthesis /Creating	The learner creates a new product or point of view

WEIGHTAGE of K – LEVELS IN QUESTION PAPER

(Cognitive Level) K- LEVELS →	Lower Order Thinking			Higher Order Thinking			Total
	K1	K2	K3	K4	K5	K6	
END SEMESTER EXAMINATIONS (ESE)	10	15			20		45
Continuous Internal Assessment (CIA)	10	15			20		45

QUESTION PATTERN FOR SEMESTER EXAMINATION/ Continuous Internal Assessment	
PART	MARKS
PART –A I. (No choice ,One Mark) TWO questions from each unit (5x1 =5)	13
II. (No choice ,Two Mark) ONE question from each unit (4x2 =8)	
PART -B (Either/ or type ,5-Marks) ONE questions from each unit (3x4 =12)	12
PART -C (3 out of 5) (10 Marks) ONE question from each unit (2x10 =20)	20
Total	45

BLUE PRINT OF QUESTION PAPER FOR SEMESTER EXAMINATION							
DURATION: 3. 00 Hours.				Max Mark : 100			
K- LEVELS	K1	K2	K3	K4	K5	K6	Total Marks
PART							
PART –A (One Mark, No choice) (5x1 =5)	5						5
(2-Marks, No choice) (4x2=8)		8					8
PART –B (5- Marks) (Either/or type) (4x3=12)			5	10			12
PART -C (10 Marks) (2 out of 3) (2x10=20)					10	10	20
Courses having only K5,K6 levels, K5 level- 3 Questions, K6 level- 2 Questions (One K6 level question is compulsory)							
Total	4	6	5	10	10	10	45

PROGRAMME OUTCOMES FOR B.C.A.,DEGREE PROGRAMMES

PO No.	Programme Outcomes (Upon completion of the B.C.A. Degree Programme, the Undergraduate will be able to)
PO-1	Disciplinary knowledge: Demonstrate comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate program of study in Bachelor Of Computer Applications.
PO-2	Critical thinking, Problem Solving and Reflective thinking: think critically about the issues and identify, critically analyze and solve problems from the disciplines of concern using appropriate tools and techniques and the knowledge, skills and attitudes acquired and extrapolate the same to real life situations; show critical sensibility to life experiences, with self awareness and reflexivity of both self and society.
PO-3	Analytical & Scientific Reasoning: evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints; critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.
PO-4	Research-related Skills: develop a sense of capability for relevant/appropriate inquiry and asking questions, synthesize, articulate and report results and to recognize and predict cause and effect relationships, define problems, formulate and establish hypothesis, analyze and interpret and draw conclusions from data, execute and report the results of an experiment or investigation.
PO-5	Digital literacy and Effective Communication: use ICT in a variety of learning situations and speak, read, write and listen clearly in person and through electronic media in English and in one or more Indian languages, and make meaning of the world by connecting people, ideas ,books, media and technology; efficiently communicate thoughts and ideas in a clear and concise manner.
PO-6	Individual and Team Work: effectively accomplish tasks individually as well as work effectively and respectfully as member or leader with diverse teams, facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interest so for a common cause and work efficiently as a member of a team.
PO-7	Multicultural Competence and Social Interaction: understand the values and beliefs of multiple cultures, global perspectives, engage and interact respectfully with diverse groups and elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO-8	Awareness of Ethical issues, Human values and Gender Issues: embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work and understand the value of relationship between self and the community and aware of the various issues concerning women and society.
PO-9	Awareness of Environment and Sustainability: understand the impacts of technology and business practices in societal and environmental contexts, and sustainable development.
PO-10	Self-directed and Lifelong learning: acquire knowledge and skills, including learning "how to learn", that are necessary for participating in learning activities throughout life and to engage in independent and life-long learning in the broadest context of socio-Technological changes.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO No.	Program Specific Outcomes (<u>B.C.A., DEGREE</u>)
PSO1	Think in a critical and logical based manner
PSO2	Familiarize the students with suitable software tools of computer science and industrial applications to handle issues and solve problems in mathematics or statistics and real time application related sciences.
PSO3	Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
PSO4	Understand, formulate, develop programming model with logical approaches to address issues arising in social science, business and other contexts.
PSO5	Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of Computer science and Industrial statistics.



SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS)

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SUNDARAKKOTTAI, MANNARGUDI-614016,

TAMILNADU,INDIA.

BACHELOR OF COMMERCE COMPUTER APPLICATIONS COURSE STRUCTURE UNDER CBCS

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS-LOCF)

(For the candidates admitted in the academic year2026-2027)

Sem	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hour/ Week	Credit	Exam Hours	Marks		Total
								CIA	ESE	
I	III	Allied Course (AC) –I	U26ACA101	Programming in C and Lab	3	3	3	30	70	100
	III	Allied Course (AC) –II	U26ACA102	Python Programming and Lab	3	3	3	30	70	100
II	III	Allied Course (AC) –III	U26ACA203	Office Automation and Lab	3	3	3	30	70	100
	III	Allied Course (AC) IV	U26ACA204	Programming in C++ and Lab	3	3	3	30	70	100



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(For the Candidates admitted in the academic year 2026–2027)

DEPARTMENT OF COMPUTER APPLICATIONS

Semester: I Allied Course –I-Programming in C and Lab

Ins. Hrs./Week:3

Course Credit:3

Course Code: U26ACA101

(Theory -65 Marks UE: 45 Marks IA:20 Marks)

COURSE OBJECTIVES:

- Explain the fundamentals of C programming.
- Apply control statements to solve programming problems.
- Develop programs using arrays and strings.
- Implement functions and recursion in C programs.
- Analyze pointers and user-defined data types.
- Design efficient C programs for real-world applications.

Unit I: Introduction to C Language and Identifiers

C Language Introduction -Features of C Language-Benefits of C - Compilation of C Program-Variables, Data Types & Operators: Variables and Keywords in C- Scope rules in C-Data Types in C-Operators & Its Types-Typecasting in C.

Unit II: Control Flow Statements and Arrays

Decision Making Statements-Switch Statement in C-C Loops & Control Structure Practice problems-Continue Statement, Break Statement Array & String Handling in C: Arrays in C- Strings in C- Multidimensional Arrays in C.

Unit III: Pointers

String functions in C-: Function Prototype-Parameter Passing Techniques in C- Storage Classes in C-Recursion Concept - Functions in C Practice problems Pointers, Structures, and Unions: Pointers in C-Structures-Union - Enumeration in C- Pointer vs. Array in C .

Unit-IV:

1. Write a C program to find roots of a Quadratic equation.
2. Write a C program to find the total no. of digits and the sum of individual digits of a positive integer.
3. Write a C program to generate the Fibonacci sequence of first N numbers.
4. Write a Program to display Monday to Sunday using switch statement.
5. Write a C program to input two matrices and perform matrix multiplication on them.

UNIT-V:

1. Write a C program to check whether the given string is palindrome or not without using Library functions.
2. Write a C program to count the number of lines, words and characters in a given text.
3. Write a C program to generate Prime numbers in a given range using user defined function.
4. Write a C program to find factorial of a given number using recursive function.
5. Write a C program to maintain a record of n student details using an array of structures with four fields - Roll number, Name, Marks and Grade. Calculate the Grade according to the following conditions.

Marks Grade ≥ 80 A

≥ 60 B

≥ 50 C

≥ 40 D

< 40 E

Print the details of the student, given the student roll number as input.

UNIT VI: Continuous Internal Assessment (CIA)

C Program Development – Variables and Operators – Control Statements – Arrays and Strings – Functions and Recursion – Pointers – Structures, Unions and Enumerations – Debugging Programs – Assignments – Quiz – Seminar – Practical/Laboratory Evaluation.

COURSE OUTCOMES

Upon the completion of the course, the students will able

1. Apply the concept of Control Structures to solve any given problem.
2. Apply the concept of single and multi-dimensional arrays to solve problems related to searching, sorting and matrix operations.
3. Apply the concept of Strings for writing programs related to character array.
4. Write programs using concept of user defined and recursive functions
5. Apply concept of structures to write programs
6. Apply the concepts of pointers and unions to develop efficient C programs.

TEXTBOOKS

1. E. Balaguruswamy, “Programming in ANSI C”, 8th Edition, 2019, McGraw Hill Education, ISBN:978-93-5316-513-0.
2. Pradip Dey, Manas Ghosh, “Programming in C”, 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6
3. Kernighan B.W and Dennis M. Ritchie, “The C Programming Language”, 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9

REFERENCE BOOKS

1. Yashavant P. Kanetkar, “Let Us C”, 16th Edition, 2019, BPB Publications, ISBN: 978-93-8728-449-4.
2. Jacqueline A Jones and Keith Harrow, “Problem Solving with C”, Pearson Education. ISBN: 978-93-325-3800-9
3. Dr. Guruprasad Nagraj, “C Programming for Problem Solving”, Himalaya Publishing House. ISBN-978-93-5299-361-1

E-RESOURCES

- 1 <http://elearning.vtu.ac.in/econtent/courses/video/BS/14CPL16.html>
- 2 <https://nptel.ac.in/courses/106/105/106105171/>
- 3 <https://www.tpointtech.com/c-programming-language-tutorial>
- 4 <https://www.tpointtech.com/c-identifiers>
- 5 <https://www.tpointtech.com/c-if-else>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3		2		2	3	2	2	3	3
CO2	3		3	3	3	3		2		3	3	2	2		2
CO3	3		3	3		3		2		3		2	2		2
CO4	3		3	3		3		2		3		2	2		2
CO5	3	3	3	3		3		3		2		2	2	3	3
CO6	3	2	3	3	3	3		2		3	3	2	3	3	3

S-Strong(3)

M-Medium(2)

L-Low(1)

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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SUNDARAKKOTTAI, MANNARGUDI-614016.

(For the Candidates admitted in the academic year 2026–2027)

DEPARTMENT OF COMPUTER APPLICATIONS

Semester: I Allied Course II -Python Programming and Lab

Ins. Hrs./Week:3

Course Credit:3

Course Code: U26ACA102

(Theory -65 Marks UE: 45 Marks IA:20 Marks)

COURSE OBJECTIVES:

- Explain the fundamentals of Python programming.
- Apply control structures to solve programming problems.
- Develop programs using strings, lists, and dictionaries.
- Implement functions and recursion in Python.
- Demonstrate modules, objects, and exception handling.
- Design Python applications using file handling and modular programming.

UNIT I: Introduction and Control Structure

Computer algorithms-Computer Hardware Computer Software-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types, Input/ output- Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi- Way Selection - - Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flag.

UNIT II: String and Functions

String, List and Dictionary, Manipulations Building blocks of python programs, Understanding and using ranges. Program Routines- Defining Functions- More on Functions: Calling Value- Returning Functions- Calling NonValue-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python Variable Scope. Recursion: Recursive Functions

UNIT III Objects and Dictionaries

Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules Dictionary type in Python - Set Data type. Text Files: Opening, reading and writing text files – Exception Handling.

(Practical -35 Marks UE: 25Marks IA: 10 Marks)

UNIT-IV

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Write a Python program to construct the following pattern, using a nested loop

```
      *
     **
    ***
   ****
  *****
 *****
  *****
   ****
    ***
     **
      *
```

3. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria: Grade A: Percentage ≥ 80 Grade B: Percentage ≥ 70 and < 80 Grade C: Percentage ≥ 60 and < 70 Grade D: Percentage ≥ 40 and < 60 Grade E: Percentage < 40
4. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
5. Write a Python script that prints prime numbers less than 20.

UNIT-V

1. Program to find factorial of the given number using recursive function.
2. Write a Python program to count the number of even and odd numbers from array of N numbers.
3. Write a Python class to reverse a string word by word.
4. Read a file content and copy only the contents at odd lines into a new file.
5. Create a Turtle graphics window with specific size.

UNIT VI: Continuous Internal Assessment (CIA)

Python Programming Practice – Control Structures – Functions – Strings, Lists and Dictionaries – Recursion – Modules – File Handling – Exception Handling – Debugging Programs – Assignments – Quiz – Seminar – Practical/Laboratory Evaluation.

COURSE OUTCOMES

Upon the completion of the course, the students will able

1. Develop and execute simple Python programs
2. Write simple Python programs using conditionals and looping for solving problems
3. Decompose a Python program into functions
4. Represent compound data using Python lists, tuples ,
5. Represent Dictionaries in Python and Developing set data type and Text files.
6. Apply exception handling and modular programming concepts to develop robust Python applications.

TEXT BOOKS

1. Charles Dierbach, "Introduction to Computer Science using Python - A computational Problem-solving Focus", Wiley India Edition, 2015.
2. Wesley J. Chun, "Core Python Applications Programming", 3rd Edition , Pearson Education, 2016
3. Mark Lutz, "Learning Python Powerful Object Oriented Programming", O'reilly Media 2018, 5th Edition

REFERENCE BOOKS

1. Timothy A. Budd, “Exploring Python”, Tata McGraw Hill Education Private Limited 2011, 1 st Edition.
2. John Zelle, “Python Programming: An Introduction to Computer Science”, Second edition, Course Technology Cengage Learning Publications, 2013, ISBN 978- 1590282410
3. Michel Dawson, “Python Programming for Absolute Beginners” , Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1435455009

E-RESOURCES

1. https://onlinecourses.swayam2.ac.in/cec22_cs20/preview
2. <https://www.geeksforgeeks.org/python-programming-language-tutorial/>
3. <https://www.geeksforgeeks.org/python-programming-language-tutorial/>
4. <https://www.w3schools.com/python/>
5. https://www.w3schools.com/python/python_dictionaries.asp

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	3		3	3		2		2		2	2	3	3
CO2	2	3	3		3	3				3		2	2		2
CO3	2	2	3		3	3				3		2	2		2
CO4	3	3	3	3	3	3				3	3	2	2		2
CO5	3	3	3	3	3	3		3		2	3	2	2	3	3
CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

S-Strong(3)

M-Medium(2)

L-Low(1)



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(For the Candidates admitted in the academic year 2026–2027)

DEPARTMENT OF COMPUTER APPLICATIONS

Semester: II Allied Course III –Office Automation and Lab

Ins. Hrs./Week:3

Course Credit: 3

Course Code: U26ACA203

(Theory -65 Marks UE: 45 Marks IA:20 Marks)

Course Objectives (COs)

- Explain the fundamentals of computers and operating systems.
- Apply word processing tools to create professional documents.
- Develop spreadsheets using formulas and formatting techniques.
- Analyze data using charts and spreadsheet features.
- Design multimedia presentations using PowerPoint.
- Utilize office automation tools for professional documentation and presentations.

Unit I: Introduction to Computer and Word Processing

Hardware and Software - Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems - Introduction to Programming Languages. Word Processing: File menu operations - Editing text – tools, formatting, bullets and numbering - Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, printing – Preview, options, merge.

Unit II: Spreadsheets and Charts

Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying. **Charts:** Creating, formatting and printing, analysis tables, preparation of financial statements, and introduction to data analytics.

Unit III: Power point

Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects, audio inclusion, timers.

(Practical -35 Marks UE: 25Marks IA: 10 Marks)

UNIT IV:

Word

- 1. Using word** to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.
- 2. Creating project abstract** Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.
- 3. Creating a Newsletter:** Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs

Excel

- 4. Creating a Scheduler** - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text
- 5. Calculations** - Features to be covered:- Cell Referencing, Formulae in excel – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP
- 6. Performance Analysis** - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

UNIT V:

MS Power Point

- 1.** Create PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows
- 2.** Create Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts
- 3.** Create **Master** Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides. Auto content wizard, Slide Transition, Custom Animation, Auto Rehearsing

UNIT VI: Continuous Internal Assessment (CIA)

Hands-on exercises in MS Word, MS Excel, and MS PowerPoint, assignments, quizzes, seminars class tests, and practical evaluations based.

COURSE OUTCOMES:

Upon the completion of the course, the students will able

1. Understand the basics of computer systems and its components.
2. Understand and apply the basic concepts of word processing package electronic spreadsheet software.
3. Create and apply the basic concepts of Word Processing.
4. Create and apply the basic concepts of Excel.
5. Create and apply the basic concepts of MS Power Point.
6. Create professional documents, spreadsheets, and presentations using MS Office applications.

TEXT BOOKS

1. Peter Norton, "Introduction to Computers" –Tata McGraw-Hill.

REFERENCE BOOKS

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGraw- Hill.
2. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech,2005
3. The Complete Computer upgrade and repair book,3rd edition Cheryl A Schmidt, WILEY Dreamtech
4. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
5. PC Hardware and A + Handbook – Kate J. Chas PHI (Microsoft)

WEB RESOURCES

1. [Web content from NDL / SWAYAM or open source web resources](#)
2. <https://en.wikipedia.org/wiki/Spreadsheet>
3. <https://www.w3schools.com/excel/>
4. <https://www.tutorialspoint.com/word/index.htm>
5. <https://www.tutorialspoint.com/powerpoint/index.htm>

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	3		3		2	3	2	2	2	3
CO2	3	2	3	2				2		3	2	2	2	3	2
CO3	3			2	2		3	3		3	2	2		3	2
CO4	3	3	3	3	2			3		2	3	2		3	2
CO5	3	3	3	3	2	3		3		2	3	2	3	3	3
CO6	3	3	3	3	2			3		2	3	2		3	2

S-Strong(3)

M-Medium(2)

L-Low(1)



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DEPARTMENT OF COMPUTER APPLICATIONS

Semester: II Allied Course IV –Programming in C++ and Lab

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26ACA204

(Theory -65 Marks UE: 45 Marks IA:20 Marks)

COURSE OBJECTIVES :

- Explain the principles of object-oriented programming in C++.
- Apply classes, objects, constructors, and destructors in C++ programs.
- Implement arrays, pointers, references, and dynamic memory allocation.
- Develop programs using function and operator overloading.
- Apply inheritance and polymorphism to build reusable software.
- Design generic C++ applications using templates.

Unit I: Object Oriented Programming Concepts:

Complexity in software - The need for object-orientation – Abstraction – Encapsulation – Modularity – Hierarchy. Basic Elements of C++: Classes – Objects – Data members and member functions – private and public access specifiers - Static members - Constructors – Singleton class – Destructors

Unit II : Array

Friend Functions and Friend Classes - Array of objects – Pointer to objects - this pointer – References – Dynamic memory allocation - Namespaces. Function Overloading: Function Overloading: Overloading a function - Default arguments – Overloading Constructors. Operator Overloading: Overloading an operator as a member function – Overloading an operator as a friend function

Unit III: Inheritance and Function Overriding

Inheritance: Types of inheritance – protected access specifier – Virtual Base Class – Base class and derived class constructors. Run-time Polymorphism: Virtual Functions. Function overriding - Pure virtual function – Abstract base class. Templates: Function templates – Overloading a function template – Class templates.

UNIT IV:

1. Write a class to represent a complex number which has member functions to do the following
 - a. Set and show the value of the complex number.
 - b. Add, subtract and multiply two complex numbers.
 - c. Multiplying the complex number with a scalar value.
2. Write a Point class that represents a 2-d point in a plane. Write member functions to
 - a. Set and show the value of a point.
 - b. Find the distance between two points.
 - c. Check whether two points are equal or not.
3. Design and implement a class to represent a Solid object.
 - a. Apart from data members to represent dimensions, use a data member to specify the type of solid.
 - b. Use functions to calculate volume and surface area for different solids.

UNIT – V:

4. Design a class representing time in hh:mm:ss. Write functions to
 - a. Set and show the time.
 - b. Find the difference between two time objects.
 - c. Adding a given duration to a time.
 - d. Conversion of the time object to seconds.
5. Design a 3x3 matrix class and demonstrate the following:
 - a. Addition and multiplication of two matrices using operator overloading.
 - b. Maintaining a count of the number of matrix object created.
6. Design a class called C String to represent a string data type. Create a data member in the class to represent a string using an array of size 100. Write the following functionality as member functions:
 - a. Copy Constructor.
 - b. Concatenate two strings.
 - c. Find the length of the string.
 - d. Reversing a string.
 - e. Comparing two strings.

UNIT VI: Continuous Internal Assessment (CIA)

Programming Assignments – Class Tests – Quiz – Debugging Exercises – Seminar – Case Study – Laboratory Exercises – Viva Voce – Mini Project – Practical Evaluation.

COURSE OUTCOMES

UPON THE COMPLETION OF THE COURSE, THE STUDENTS WILL BE ABLE TO

1. Explain the various basic concepts of Object-orientation.
2. Understand the concept of Arrays.
3. Understand the concept of Inheritance and Overriding.
4. Implement functions, friend functions, static members, constructors and compile-time polymorphism.
5. Implement templates and exceptions. Use STL class library. Implement File I/O.
6. Develop object-oriented C++ applications using classes, inheritance, polymorphism, and templates.

TEXT BOOKS

1. Herbert Schildt, *C++ - The Complete Reference*, Third Edition, TMH, 1999.
2. Grady Booch, *Object Oriented Analysis and Design*, Pearson Education, 2008.

REFERENCE BOOKS

1. Bjarne Stroustrup, *The C++ Programming Language*, Addison Wesley, 2000.
2. J. P. Cohoon and J. W. Davidson, *C++ Program Design – An Introduction to Programming and Object-Oriented Design*, Second Edition, McGraw Hill, 1999.
3. C. J. Lippman, *C++ Primer*, Third Edition, Addison Wesley, 2000.

WEB RESOURCES

1. https://www.w3schools.com/cpp/cpp_intro.asp
2. https://www.w3schools.com/cpp/cpp_comments.asp
3. https://www.w3schools.com/cpp/cpp_arrays.asp
4. https://www.tutorialspoint.com/cplusplus/cpp_storage_classes.htm
5. https://www.tutorialspoint.com/cplusplus/cpp_storage_classes.htm

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	3	3	3		2		2	3	2	2	3	3
CO2	3	3		3	3			2		3	3		2		2
CO3	3		2	3	3			2		3	3	3	2		2
CO4	3	3	3	3	3			2		3	3	3	2		2
CO5	3		3	3	3			3		2	3	2	2		3
CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

S-Strong(3)

M-Medium(2)

L-Low(1)