

**MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI**

UG COURSES – AFFILIATED COLLEGES

**B.C.A.**

(Choice Based Credit System)

(with effect from the academic year 2020-21 onwards)

Se m.  (1)	Pt. I/II/ III/ IV/V (2)	Sub No. (3)	Subject Status  (4)	Subject Title  (5)	Con- tact Hrs/ Week (6)	L Hrs./ Week (7)	T Hrs./ Week (8)	P Hrs./ Week (9)	C Credi ts (10)
I	I	1	Language	Tamil / Other Language	6	6	0	0	4
	II	2	Language	Communicative English	6	6	0	0	4
	III	3	Core-I	Programming in C	4	4	0	0	4
	III	4	Major Practical - I	C Programming Lab	4	0	0	4	2
	III	5	Add on Major (Mandatory)	Professional English for Physical Sciences - I	4				4
	III	6	Allied - I	Digital Design	4	4	0	0	3
	IV	7	Common	Environmental Studies	2	2	0	0	2
<b>Subtotal</b>					<b>30</b>				<b>23</b>
II	I	8	Language	Tamil/Other Language	6	6	0	0	4
	II	9	Language	English	6	6	0	0	4
	III	10	Core-II	Object Oriented Programming with C++	4	5	0	0	4
	III	11	Major Practical - II	Object Oriented Programming with C++ Lab	4	0	0	4	2
	III	12	Add on Major (Mandatory)	Professional English for Physical Sciences - II	4				4
	III	13	Allied - II	Mathematical Foundation for Computer Science	4	3	0	0	3
	IV	14	Common	Value Based Education / சமூகஒழுக்கங்களும் பண்பாட்டு விழுமியங்களும் / Social Harmony	2	2	0	0	2
<b>Subtotal</b>					<b>30</b>				<b>23</b>

## Programming in C

### Unit I

#### Overview of C:

Introduction- Importance of C - Sample C Programs - Basic structure of C - Executing C program

#### Constant, variables and data types:

Introduction- Character set - tokens – keywords and identifiers – constants – variables- data types – declaration of variables – assigning values of variables.

#### Operators and expressions:

Introduction – arithmetic of operations- relational operator – assignment operator – increment and decrement operator – conditional operator – bitwise operator – special operator – evaluation of expressions – precedence of arithmetic operators – type conversion in expression- operator precedence and associatively- mathematical functions

### Unit II

#### Managing input and output operators:

Introduction: Reading a character- writing a character – formatted input – formatted output

#### Decision making and branching:

Introduction – decision making with IF statement- simple IF statement – The IF ELSE statement- nesting of IF –ELSE statement –ELSE IF ladders- The switch statement – The?: operators – The GOTO statement

#### Decision making and looping:

The While statement – The Do statement – The for statement- Jump in loops

### Unit III

#### Arrays:

**One dimensional arrays** – two dimensional arrays -Initializing two dimensional arrays – multi dimensional arrays

## **Handling of character strings:**

Introduction: declaring and Initializing string variables- Reading string from terminal- writing string to screen – arithmetic operation on characters – putting strings together – comparison of two strings together – string handling functions

## **Unit IV**

### **User defined functions:**

Introduction – need for user- define functions- A multi- function program – The form of C functions- return values and their types – calling a function- category of function – no argument and no return values – argument with no return values -argument with return values – handling of non integer functions – nesting of functions – recursion – function with arrays – the scope and life time of variables in functions.

## **Unit V**

### **Pointers**

Introduction: understanding pointers – accessing the address of variables – declaring and initializing pointers – accessing a variable through its pointer – pointer expressions – pointer increments and scale factor – pointers and character strings – pointers and functions – points on pointer.

**TOTAL: 60 HOURS**

### **Text Book:**

**Programming in ANSI C – By E.Balagurusamy, Tata Mc Graw-Hill Publishing Company**

### **Reference Book:**

**Programming with ANSI and TURBO C – by Ashok N. Kamthane**

**C Programming Lab**

**Practical List**

1. Find the area of the Triangle
2. To Solve the possible roots of the quadratic equation
3. To arrange a List of numbers in Descending order
4. To Find Ncr Value using Functions
5. To Check given string is palindrome or not
6. To find Transpose of a Matrix
7. To Multiply two matrices
8. To Prepare a Mark list
9. To sort a List of names in alphabetical order

## DIGITAL DESIGN

### **Unit I : Digital System and binary numbers:**

Digital systems – binary numbers – number base conversion – Octal and hexa decimal numbers – complements – signed binary numbers – binary codes – binary storage and registers – binary logic

#### **Boolean algebra:**

Introduction – basic definition – axiomatic definition of Boolean algebra – basic theorem and properties and of Boolean algebra – Boolean functions.

### **Unit II : Logic gates:**

Canonical and standard forms – other logic operations – digital logic gates and integrated circuits

#### **Gate-Level minimization:**

Introduction : The Map method – Four- variable Maps –Five-variable Map – Product –of-sums simplifications- Don't conditions

### **Unit III : NAND and NOR implementation-** other two level implementations – Exclusive OR Functions

**Combinational Logic:** Introduction – Combinational circuits – Analysis Procedure - Design Procedure – Binary Adder – Subtractor – Decimal Adder - Binary Multiplier - Magnitude Comparator

### **Unit IV : Decoders - Encoders – Multiplexers**

#### **Synchronous Sequential Logic:**

Introduction –Sequential Circuits – Storage Element Latches - Storage Element Flip- Flops - Analysis of Clocked Sequential Circuits

### **Unit V :**

**Registers and Counters:** Registers – Shift Registers – Ripple Counters – Synchronous Counters – Other counters

Memory : Introduction – Random access memory – Memory Decoding – Error Detection and Correction – Read Only Memory.

**TOTAL: 45 HOURS**

#### **Text Book:**

Digital Design Fourth Edition – M, Morris Mano, Michael D Ciletti ,Prentice Hall of India Pvt Ltd.

#### **Reference Books:**

1. Digital Principles and Applications Fourth Edition – Albert Paul Malvino, Donald P Leach, Tata Mc Graw Hill Publishing Company Ltd.

2. Digital Principles and Design – Donald d.Givone, Tata McGraw – Hill Publishing Company Limited

## OBJECT ORIENTED PROGRAMMING WITH C++

### UNIT I

**Principles of Object-oriented Programming:** Software Evolution – A look at Procedure-Oriented Programming – Object-Oriented Programming Paradigm – Basic concepts of object-Oriented Programming – Benefits of OOP – Object-Oriented Languages- Applications of OOP

**Beginning with C++ :** What is C++? – Applications of C++ - A simple C++ Program – More C++ statements – An example with Class- Structure of C++ Program – Reference Variables – Operators in C++ - Scope Resolution Operator – Member De referencing Operators – Memory Management Operators – Manipulators – Type Cast Operators

### UNIT II

**Functions in C++:** Introduction – The Main Function – Function prototyping – Call by Reference – Return by reference – Inline Functions - Default Arguments – const Arguments – Function Overloading – Math Library Functions

**Classes and Objects:** Introduction - C Structure Revisited – Specifying a Class – Defining Member Function-A C++ Program with Class -Making an outside Function Inline –Nesting of Member Function – Private member functions- Arrays with in a class – Memory allocation for objects – Static Data Members – Static Member Functions, Arrays of objects – Objects as Function arguments – Friendly Functions – Returning Objects - Pointers to Members – Local Classes

### UNIT III

**Constructors and Destructors :** Introduction – Constructors – Parameterized constructors – multiple constructors in a class – Constructors with Default arguments – Dynamic Initialization of Objects- Copy Constructors – Dynamic Constructors – Constructing two dimensional Arrays – Destructors

#### **Operator Overloading and Type Conversion:**

Introduction – Defining Operator Overloading – Overloading unary operators – Overloading Binary Operators – Overloading binary operators using Friends – Manipulation of strings using operators – Rules for overloading operators – Type conversions

## UNIT IV

**Inheritance :** Extending Classes : Introduction – Defining Derived Classes – Single inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes -Abstract Classes – Constructors in Derived Classes – Member Classes –Nesting of Classes

## Unit V

**Managing Console I/O Operations:** Introduction - C++ Streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operation – Managing output with Manipulators

**Working with Files:** Introduction – Classes for File Stream Operators – Opening and closing a File – Detecting end-of-file \_ File Pointers and their Manipulators – Sequential Input and Output Operations – Error Handling during File Operations – Command –Line Arguments.

**TOTAL: 60 HOURS**

### Text Book:

Object Oriented Programming C++ Third Edition – E Balagurusamy, Tata McGraw-Hill Publishing Company Limited

### Reference Book:

1. Complete Reference C++ - Herbert Schildt, Fourth Edition, Tata McGraw-Hill Publishing Company Limited
2. Object Oriented Programming with ANSI and Turbo C++ - Ashok N. Kamthane, Pearson Edition
3. C++ How to Program – Deitel, Fifth Edition Prentice Hall of India
4. Programming with C++ - D.Ravichandran, Second Edition , Tata McGraw-Hill Publishing Company Limited

**OBJECT ORIENTED PROGRAMMING WITH C++ LAB**

1. Finding the Volume of any three geometric figures using function Overloading
2. Exchange values between two class objects using friend functions
3. Define a class to represent a bank account

**Data Members:**

1. Name of the Depositor
2. Account Name
3. Type of Account
4. Balance amount in the Bank

**Member Functions**

1. To Assign initial values
2. To withdraw an amount
3. To Deposit an amount
4. To display name and balance

Write a main Program to test the program

4. Find the minimum of two objects using friend function
5. Using Dynamic Constructors , concatenate two strings
6. Overload unary minus operator to change the sign of given vectors ( 3 elements)
7. Overload Binary + Operator to add two complex numbers
8. Add two vector objects . Use >> and << overloading
9. Process student Mark List using multilevel inheritance
10. Using Hierarchical inheritance process employee details



**MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE**

**UNIT I**

**Set Theory :** Basic Concepts of Set Theory - Inclusion and Equality of Sets – Power Set – Operations on Sets – Cartesian Products – Relations – Equivalence Relations

**UNIT II**

**Functions:** Definition – Examples – One and Onto Functions – Bijective Functions – Identify Functions - Composition of Functions – Inverse Functions

**Unit III**

**Mathematical Logic :** Statements and Notation – Connectives – Negation, Conjunction, Disjunction – Statement Formulas and Truth Tables – Conditional and Bi conditional – well formed Formulas – Tautology – Equivalence of Formulas – Duality Law – Principle Disjunctive Normal Forms – Principal conjunctive Normal Forms

**Unit IV**

**Graph:** Definition – Examples – Sub graphs – Finite and Infinite Graph – Degree of a Vertex – Isolated and Pendent Vertices – Types of Graphs – Examples

**Unit V**

**Paths and Circuits:** Walk, Path and Circuits – Connected and Disconnected Graphs – Euler Graphs – Operations on Graphs – Trees – Properties of Trees – Rooted and Binary Trees .

**Text Book:**

Mathematical Foundations for Computer Science – Part I - D Glory Ratna Mary, Y.S.Irine Viola, Veda Publications

**Reference Books:**

1. Modern Algebra – Arumugam and Isaac, SciTech Publications
2. Graph Theory - Arumugam and Isaac
3. Discrete Mathematics for Computer Science – Hary Haggard, John Schlipf and Sue Whitesides, Thomson Publications.

**TOTAL: 45 HOURS**