

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.Sc COMPUTER SCIENCE

(Choice Based Credit System)

(with effect from the academic year 2020-2021 onwards)

Sem	Part I/ II/ III/ IV/V	Sub No.	Subject Status	Subject Title	Contact Hrs / Week	Credits
I	I	1	Language	Tamil/Other Language	6	4
	II	2	Language	Communicative English	6	4
	III	3	Core - I	Programming in C	4	4
	III	4	Major Practical - I	Programming in C	4	2
	III	5	Add on Major (Mandatory)	Professional English for Physical Sciences - I	4	4
	III	6	Allied - I a) For the B.Sc.(CS) Programme	a) Discrete Mathematics	4	3
			b) For other U.G. Programme	b) Introduction to Computers		
	IV	7	Common	Environmental Studies	2	2
				Sub Total	30	23
II	I	8	Language	Tamil/Other Language	6	4
	II	9	Language	English	6	4
	III	10	Core - II	Object Oriented Programming in C++	4	4
	III	11	Major Practical - II	Programming in C++	4	2
	III	12	Add on Major (Mandatory)	Professional English for Physical Sciences - II	4	4
	III	13	Allied Practical – II a) For the B.Sc.(CS) Programmes	a) Linux	4	2
			b) For other U.G. Programmes	b) C Programming		
	IV	14	Common	Value Based Education / சமூக ஒழுக்கங்களும் பண்பாட்டு விழுமியங்களும் / Social Harmony	2	2
				Subtotal	30	22

Programming in C

L T P C

3 1 0 4

Objective: To obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

Unit – I: INTRODUCTION

C Declarations:- Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring Variable as Constant. Operators and Expressions:- Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Expressions. Managing Input and Output Operations:- getchar() – putchar() – scanf() – printf().

(14L)

Unit – II: CONTROL STRUCTURES

Decision Making and Branching:- Decision Making with IF Statement – Simple IF statement – The IF...Else Statement – Nesting of IF...Else Statements – The ELSE IF ladder – The Switch Statement – The ?: Operator – The GOTO statement. Decision Making and Looping:- The WHILE Statement – The DO Statement – The FOR statement. **(10L)**

Unit – III: ARRAYS

One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One- dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays – Multi- dimensional arrays. Character Arrays and Strings:- Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions. **(10L)**

Unit – IV: FUNCTIONS

User-Defined functions:- Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration – Category of functions – No Arguments and No return values – Arguments but No return Values – Arguments with return values – No arguments but a return a value – Recursion – Passing Arrays to functions – Passing Strings to functions – The Scope, Visibility and lifetime of a variables. Structures and Unions:- Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Arrays of structures –Unions.

(14L)

Unit – V: POINTERS AND FILES

Pointers:- Understanding pointers – Accessing the Address of a Variable – Declaring Pointer Variables – Accessing a variable through its pointer – Pointer Expressions –Pointers as function arguments. File Management in C:- Defining and Opening a file – Closing a File – Input/output Operations on files – Error Handling during I/O Operations.

(12L)

Text Book :

Programming in ANSI C – 6th Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

Reference Books:

1. Computer System and Programming in C by Manish Varhney, Naha Singh – CBS Publishers and Distributors Pvt Ltd.
2. Introduction to Computer Science, IITL Education Solutions Limited, Second Edition, Pearson Education
3. Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited
4. Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.

Major Practical – I Programming in C

L T P C

0 0 4 2

Objective: To develop skills in implementing algorithms through the programming Language C and to explore the features of C by applying sample problems.

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. To find all possible roots of a quadratic equation using if statement
2. Program to check vowel or consonant using switch case statement
3. Evaluate Sine series using while loop

$$\sin(x) = x - x^3 / 3! + x^5 / 5! - \dots x^n / n!$$

4. Sort a list of numbers in ascending order
5. Search an element in an array
6. Reverse a number
7. Check the given string is palindrome or not
8. Find the binomial coefficient (nC_r) value using recursion
9. Multiply two matrices (check for compatibility)
10. Transpose of a matrix
11. Find the sum of 'n' numbers by making function call
12. Alphabetical sorting (passing array as argument to function)
13. Exchange values using pointers and function
14. Prepare the student details using structure
15. Prepare mark sheet using file

Discrete Mathematics

L T P C
3 0 0 3

Objective: To apply basic concepts for clear understanding of mathematical principles and to solve practical problems.

Unit – I: RELATIONS

Introduction to Relations – Binary relation – Classification of Relations – Composition of Relations – Inverse of Relation – Closure operation on Relations – Matrix representation of Relation - digraphs. (9L)

Unit – II: FUNCTIONS

Introduction to Functions – Addition and Multiplication of Functions - Classifications of Functions – Composition of Function – Inverse Function. (6L)

Unit – III: MATHEMATICAL LOGIC

Introduction – Statement (Propositions) – Laws of Formal Logic –Basic Set of Logical operators/operations - Propositions and Truth Tables – Algebra Propositions - Tautologies and Contradictions – Logical Equivalence – Logical Implication – Normal Forms. (10L)

Unit – IV: MATRIX ALGEBRA

Introduction – Definition of a Matrix - Types of Matrices – Operations on Matrices – Related Matrices – Transpose of a Matrix – Symmetric and Skew-symmetric Matrices – Complex Matrix – Conjugate of a Matrix – Determinant of a Matrix – Typical Square Matrices – Adjoint and Inverse of a Matrix – Singular and Non-singular Matrices – Adjoint of a Square Matrix – Properties of Adjoint of a Matrix – Properties of Inverse of a Matrix. (10L)

Unit – V: GRAPH

Introduction – Graph and Basic Terminologies – Types of Graphs – Sub Graph and Isomorphic Graph – Operations on Graphs – Representation of Graph. (10L)

Text Book:

DISCRETE MATHEMATICS, Swapan Kumar Chakraborty and Bikash Kanti Sarkar, OXFORD University Press.

Reference Books:

1. DISCRETE MATHEMATICS, Third Edition, Seymour Lipschutz and Marc Lars Lipson, Tata McGraw Hill Education Private Limited.
2. Discrete Mathematical Structures with Applications to Computer Science by J.P.Tremblay, R.Manohar TMH edition

INTRODUCTION TO COMPUTERS

(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2020-21 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2017-18 batch)

Aim

The Allied paper is to gain fundamental knowledge in computer

Objectives

- To know the characteristic, parts and applications of computers
- To know the various devices and familiarize with their functions
- To know the usage of internet

UNIT I:

Computer Basics: Introduction, Characteristics of Computers - Generation of Computers, Classification of Computers: Micro computers, Mini Computers, Mainframe, Super Computer, Careers in IT industry. Data representation in Computer: Types of number system, Conversion between Number bases. Coding Schemes: ASCII, EBCDIC, and Unicode.

UNIT II:

Computer Memory and Storage: Introduction, memory hierarchy, Random Access memory (RAM), Read only memory (ROM), RAM, ROM and CPU interaction. Types of Secondary storage devices, Magnetic tape, magnetic disk, types of magnetic disk, optical disk, type of optical disks, USB drives.

UNIT III:

Multimedia Essentials: Introduction, Definition, Building blocks of Multimedia, multimedia system, multimedia applications, Virtual reality, Multimedia and the internet.

UNIT IV:

Operating system: Introduction, definition, Evolution of Operating System, Types of Operating System, Functions of Operating system.

Computer software: definition, categories of Software, Software Piracy.

UNIT V:

The Internet: Introduction, Evolution of Internet – Basic Internet terms – Getting connected to Internet – Internet Applications – Data over Internet.

Emerging trends in IT: Introduction, E-Commerce – Electronic Data Interchange – Mobile Communication – Bluetooth – Global Positioning System – Infrared Communication – Smart Card – Imminent Technologies.

Text Book

Introduction to Computers and Information Technology, Dr. D.Glory Ratna Mary, Mrs. S. Selvanayahi, Dr. V. Joseph Peter, Jupiter Publications

Reference Book

1. Introduction to Computer Science, Second Edition, ITL Education Solutions Ltd, Pearson Education
2. Introduction to Computers, Peter Norton, 7th Edition, Tata McGraw Hill Education
3. Fundamentals of Computers, V.Rajaram, 5th Edition, PHI

Object Oriented Programming in C++

L T P C
3 1 0 4

Objective: To gain the basic knowledge of object oriented programming concepts and to understand the detail idea of C++ streams, Inheritance, Overloading of operators, functions, constructors, File Handling and templates concepts of C++ programming.

Unit – I: Principles of Object Oriented Programming

Basic Concepts of Object Oriented Programming. **Classes and Objects:** Introduction – Specifying a Class – Defining Member Functions – Making an Outside Function Inline – Nesting of Member Functions - Private Member Functions – Static Data Members – Static Member Functions – Arrays of Objects – Objects as function arguments – Friendly Functions – Returning Objects . (12L)

Unit – II: Constructors and Destructors

Introduction – Constructors – Parameterized Constructors – Multiple Constructors in a class – Constructors with Default Arguments – Dynamic Initialization of Objects – Copy Constructors – Dynamic Constructors – const objects - Destructors. (12L)

Unit – III: Operator Overloading, Type Conversions and Inheritance

Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operators using Friends – Rules for Overloading Operators – Type Conversions. **Inheritance (Extending Classes):** Introduction – Defining Derived Class – Single Inheritance - Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes - Abstract Classes. (14L)

Unit – IV: Pointers, Virtual Functions and Polymorphism

Pointers - Pointers to Objects – this Pointer – Pointers to Derived Classes – Virtual Functions - Pure Virtual Functions. **Managing Console I/O Operations:** Introduction – C++ Streams – C++ Stream Classes – Unformatted I/O operations – Managing Output with Manipulators. (12L)

Unit – V: Files and Templates

Working with Files: Introduction – Classes for File Stream Operations – Opening and Closing a file – Detecting end-of-file – File Modes – Sequential Input and Output Operations.

Templates: Introduction - Class Templates – Function Templates. **(10L)**

Text Book:

Object Oriented Programming with C++, Sixth Edition by E. Balagurusamy, Tata McGraw Hill Publishing Company Limited.

Reference Book:

1. Programming with ANSI C++, Bhushan Trivedi, 2010, Oxford University Press
2. The Complete Reference C++, Fourth/ Fifth Edition Herbert Schildt, Tata McGraw Hill Publishing Company Limited.
3. Programming With C++ Third Edition by D. Ravichandran, Tata McGraw Hill Education, 2011.
4. Programming in C++ Second Edition by Ashok N. Kamthane, Pearson Education

**MSU/ 2020-21 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – II / Major
Practical - II**

Programming in C++

L T P C

0 0 4 2

Objective: To gain knowledge about the object oriented programming concepts and C++ streams, Inheritance, Overloading of operators, functions, constructors, File Handling and templates concepts of C++ programming by implementing sample programs.

Each exercise should be completed within three hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

- 1) Program with a Class and Member Functions.
- 2) Program to Overload Function.(minimum three geometric figures)
- 3) Program to implement Parameterized Constructor.
- 4) Program to implement Friend Function (minimum two classes)
- 5) Program to Overload Unary Minus Operator.
- 6) Program to Overload Binary Plus Operator.
- 7) Program to implement Multiple Inheritance for Family Details.
- 8) Program to implement Multilevel Inheritance for Bank Customer Details.
- 9) Program to implement Hierarchical Inheritance for Students Details.
- 10) Program to implement Virtual Function.

LINUX

L T P C

0 0 4 2

Objective: To understand and make effective use of Linux utilities and Shell scripting language to solve problems.

Each exercise should be completed within three hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Use any text editor in linux(say vi) to enter a C program to find the largest of three numbers, compile using gcc and display the output.
2. Use any text editor in linux(say vi) to enter a C program to find the factorial of a given number, compile using gcc and display the output.
3. Linux commands
 - a. ls, mkdir, rmdir, cd, pwd, find, du(Directory oriented)
 - b. cat, cp, rm, mv, wc (File oriented)
 - c. ps, kill, batch, grep(Process oriented)
 - d. write, mail, wall (Communication oriented)
4. Linux commands
 - a. date, who, who am i, man, cal, echo, bc(General purpose)
 - b. Pipe, Filter
5. Write a shell script to display date in the mm/dd/yy format, time, username and current directory.
6. Write a shell script to find the sum of digits of a given number.
7. Write a program to generate Fibonacci series.
8. Write a program to check whether given string is palindrome or not
9. Write a shell script to find factorial of a given integer.
10. Write a shell script to generate mark sheet of a student. Take 3 subjects, calculate and display total marks, percentage and Class obtained by the student.

Reference Books:

1. Linux: A practical approach, B. Mohamed Ibrahim, Firewall Media
2. Comdex Linux and Open Office course kit revised and upgraded, Gupta, Wiley India.
3. A practical guide to Linux command, editors, and shell programming 2/e; Mark G Sobell, Prentice Hall.
4. Linux Lab - Open source Technology : Ambavade - Dreamtech

C Programming - List of Practicals

(For the Institutions with B.Sc. (Maths) Programme not opting Physics / Chemistry as Allied Subjects with effect from 2021-21 and onwards for Semesters - I & II and also for Semesters - III & IV of the 2017-18 batch)

1. Write a program to convert the temperature from Fahrenheit to Celsius.
2. Write a program to test whether the given year is leap year or not.
3. Write a program to read two integers m and n and print the prime numbers in between them.
4. Write a program to evaluate the series $ex=1+ x/1!+x^2/2!+\dots$
5. Write a program to arrange the given set of numbers in ascending order.
6. Write a program to read two matrices and to find the sum and product of the matrices.
7. Write a program to check whether a given string is Palindrome or not.
8. Write a program to find Factorial value, Fibonacci, GCD value-Recursion.