

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



*(Affiliated to Bharathidasan University)*  
(Accredited with "A" Grade by NAAC; An ISO 9001:2015 Certified Institution)

**SUNDARAKKOTTAI, MANNARGUDI – 614016.  
TAMILNADU, INDIA.**

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**B.Sc., COMPUTER SCIENCE  
COURSE STRUCTURE WITH REVISED SYLLABUS UNDER CBCS**  
*(For the candidates admitted in the academic year 2021–2022)*

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**B.Sc., COMPUTER SCIENCE COURSE STRUCTURE UNDER CBCS**

*(For the candidates admitted in the academic year 2021 – 2022)*

**ELIGIBILITY:** Those who have completed in 10<sup>th</sup> ,+2 examinations with Mathematics as one the core subject

Sem	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hours/ Week	Credit	Exam Hours	Marks			
								CIA	ESE	Total	
I	I	Language Course – I (LC) – Tamil*/Other Languages **	21LC101	Ikkala Ilakkiyam	6	3	3	25	75	100	
	II	English Language Course -I(ELC)	21ELC101	Prose and Communication Skills	6	3	3	25	75	100	
	III		Core Course – I (CC)	21CS101	C Programming	6	5	3	25	75	100
			Core Practical - I (CP)	21CS102P	C Programming Lab	3	2	3	40	60	100
			First Allied Course –I (AC)	21AMA101	Algebra and calculus	4	3	3	25	75	100
		First Allied Course – II (AC)	21AMA102	Numerical analysis	3	2	3	25	75	100	
	IV	Value Education	18UGVED	Value Education	2	2	3	25	75	100	
<b>TOTAL</b>					<b>30</b>	<b>20</b>				<b>700</b>	
I	I	Language Course – II (LC) - Tamil*/Other Languages **	21LC201	Idaikala Illakiyamum puthinamum	6	3	3	25	75	100	
	II	English Language Course – II (ELC)	21ELC201	Poetry and Communication Skills	6	3	3	25	75	100	
	III		Core Course – II (CC)	21CS203	Programming in C++	6	6	3	25	75	100
			Core Practical - II (CP)	21CS204P	Programming in C++ Lab	3	2	3	40	60	100
			First Allied Course – III(AC)	21AMA203	Statistics	3	2	3	25	75	100
		First Allied Course – IV(AC)	21AMA204	Operations research	4	3	3	25	75	100	
	IV	Environmental Studies	19UGCES	Environmental Studies	2	2	3	25	75	100	
<b>TOTAL</b>					<b>30</b>	<b>21</b>				<b>700</b>	
	I	Language Course – III(LC)– Tamil*/Other Languages **			6	3	3	25	75	100	

III	II	English Language Course - III (ELC)	-		6	3	3	25	75	100	
		Core Course – III (CC)	-		6	5	3	25	75	100	
		Core Practical - III (CP)	-		3	2	3	40	60	100	
		Second Allied Course – I (AC)	-		4	4	3	25	75	100	
III		Second Allied Course-II (AP)	-		3	2	3	40	60	100	
		Non Major Elective - I -for those who studied Tamil under Part -I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	-		2	2	3	25	75	100	
	<b>TOTAL</b>					<b>30</b>	<b>21</b>			<b>700</b>	
IV	I	Language Course –IV (LC) - Tamil*/Other Languages **	-		6	3	3	25	75	100	
	II	English Language Course– IV (ELC)	-		6	3	3	25	75	100	
	III		Core Course – IV (CC)	-		6	5	3	25	75	100
			Core Practical - IV (CP)	-		3	2	3	40	60	100
			Second Allied Course –III (AC)	-		3	2	3	25	75	100
			Second Allied Course –IV (AP)	-		3	2	3	40	60	100
	IV		Non Major Elective – II for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	-		2	2	3	25	75	100
		Skill Based Elective – I	-		2	2	3	25	75	100	
<b>TOTAL</b>					<b>31</b>	<b>21</b>			<b>800</b>		

	III	Core Course V [CC]	-		5	5	3	25	75	100	
		Core Course VI [CC]	-		5	5	3	25	75	100	
		Core Course VII [CC]	-		5	5	3	25	75	100	
V		Core Practical V [CP]	-		3	3	3	40	60	100	
		Major Based Elective - I	-		5	5	3	25	75	100	
	IV	Skill Based Elective - II	-		2	2	3	25	75	100	
		Skill Based Elective – III	-		2	2	3	25	75	100	
		Soft Skills Development	-		2	2	3	25	75	100	
	<b>TOTAL</b>					<b>29</b>	<b>29</b>				<b>800</b>
VI	III	Core Course VIII [CC]	-		6	6	3	25	75	100	
		Core Course IX [CC]	-		6	6	3	25	75	100	
		Core Practical VI [CP]	-		5	4	3	40	60	100	
		Major Based Elective - II	-		6	5	3	25	75	100	
		Project	-		6	5	3	25	75	100	
	V	Extension Activities	-		-	1	-	-	-	-	-
		Gender Studies	-		1	1	3	25	75	100	
	<b>TOTAL</b>					<b>30</b>	<b>28</b>				<b>600</b>
<b>Grand Total</b>					<b>180</b>	<b>140</b>	-	-	-	<b>4300</b>	

**CURRICULUM DESIGN  
LIST OF ALLIED COURSES**

**ALLIED COURSE I – MATHEMATICS**

**ALLIED COURSE II-PHYSICS**

<b>Subject</b>	<b>No. of Courses</b>	<b>Total Credits</b>
Language Part – I	4	12
English Part –II	4	12
Core Course	9	48
Core Practical	6	15
Allied Course	6	16
Allied Practical	2	4
Non-Major Elective	2	4
Skill Based Elective	3	6
Major Based Elective	2	10
Project	1	5
Environmental Studies	1	2
Value Education	1	2
Soft Skill Development	1	2
Gender Studies	1	1
Extension Activities	-	01 (Credit only)
<b>Total</b>	<b>44</b>	<b>140</b>

\* For those who studied Tamil upto 10<sup>th</sup> +2 (Regular Stream)

+ Syllabus for other Languages should be on par with Tamil at degree level

#those who studied Tamil upto 10<sup>th</sup> +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV

\*\* Extension Activities shall be outside instruction hours

**Note:**

	<b>CIA</b>	<b>ESE</b>
1. Theory	25	75
2. Practical	40	60
3. Separate passing minimum is prescribed for Internal and External marks		

**FOR THEORY**

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks[i.e. 30 marks]

## FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]

The passing minimum for University Examinations shall be 40% out of 60 marks [i.e. 24 marks]

### **NON MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT**

Semester	Part	Course	Title of the Paper
III	IV	NME -I	-
IV		NME -II	-

### **SKILL BASED ELECTIVE (SBE) OFFERED BY THE DEPARTMENT**

Semester	Part	Course	Title of the Paper
IV	IV	SBE-I	-
V		SBE-II	-
V		SBE-III	-

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**TAMILNADU, INDIA.**

**PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE  
B.Sc., COMPUTER SCIENCE**

(For the Candidates admitted in the academic year 2021 – 2022)

**Question Paper Pattern – (Theory)**

**Max time:3 Hours**

**Max Marks:75**

**Section – A (10 x 2 = 20)**

**Answer all the questions**

**Answer in One or Two sentences each**

1. }  
2. } Unit I
3. }  
4. } Unit II
5. }  
6. } Unit III
7. }  
8. } Unit IV
9. }  
10. } Unit V

**Section – B (5 x 5 = 25)**

**Answer all the questions**

**Each answer should not exceed 500 words**

11. a (or) }  
    b } Unit I
12. a (or) }  
    b } Unit II
13. a (or) }  
    b } Unit III
14. a (or) }  
    b } Unit IV
15. a (or) }  
    b } Unit V

**Section – C (3 x 10 = 30)**

**Answer any THREE questions in 1200 words**

16. -----Unit I
17. -----Unit II
18. -----Unit III
19. -----Unit IV
20. ----- Unit V

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# **SEMESTER I**

# SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2021 – 2022)

**DEPARTMENT OF COMPUTER SCIENCE**

B.Sc., COMPUTER SCIENCE



**Semester: I- CC-I: C Programming**

**Ins. Hrs. /Week: 6**

**Course Credit: 5**

**Course Code:**

## OBJECTIVES

- To acquire the basic knowledge of Programming Skills in C language
- To understand strengths of C, which provide the means of writing efficient, maintainable, and portable code
- To obtain the knowledge in C language with the wide variety of examples and applications

### UNIT- I : Introduction to Computer

**(16 Hours)**

Importance of Computers- History and development –Classification of Computers-Generation of Computers- Benefits and limitations of Computers-Hardware-Software- **Computer Architecture:** Input / Output Unit-CPU-ALU-Memory Systems-RAM-ROM- Comparison between low level and high level language.

### UNIT- II: Introduction to C

**(18 Hours)**

C fundamentals - Character set - Identifier and keywords - Data types -Constants - Data input and output functions- Variables Declarations - Library functions- Declaration of Storage classes - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators.

### UNIT -III: Flow control and Decision Making

**(20 Hours)**

If, if-else, ladder if. **Looping:** while, do-while, for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator- **Functions:** Definition– User defined function - Definition of functions - Category of functions-Nesting of functions - Passingarguments – Recursions – Scope visibility and life time of variables.

### UNIT -IV: Arrays

**(20 Hours)**

Defining and Processing -Types of arrays-One dimensional arrays-Two dimensional arrays- Passing arrays to functions – Multidimensional arrays - Arrays and String- **Structures:** Introduction-Defining a Structure- Size of structures - Passing structures to functions – Unions- Difference between array, structure and union- Bit field.

### UNIT –V: Pointers

**(16 Hours)**

Introduction –Declaring pointer variables - Pointers to Functions - Pointer and Arrays - Arrays of Pointers - Structures and Pointers-**Files:** Creating Processing, Opening and Closing a data file – Preprocessors – ASCII Values of character - Applications of C Programming.

**Total Lecture Hours-90**

## **COURSE OUTCOME**

Students are able to

1. Understand the basic terminology used in computer programming
2. Write, compile and debug programs in C language
3. Design programs involving decision structures, loops and functions
4. Understand the use of Arrays and Structures
5. Use different data structures, pointers and create / update basic data files

## **TEXT BOOK(S)**

1. Alexis Leon ,Mathews Leon 2009, Fundamentals of Information Technology, Leon Press Vikas Publishing Pvt.Ltd, New Delhi.
2. Balagurusamy .E 2018, Programming in ANSI C, Eighth Edition, McGraw-Hill Publication, USA.

## **REFERENCE BOOK(S)**

1. Bichkar R.S. 2012, Programming with C, University Press, Oxford.
2. Herbert Schildt 2017, C -The Complete Reference, Fourth Edition McGraw Hill Education, USA.
3. Mike Mcgrath,C 2018, Programming in Easy Steps, Fifth Edition , In Easy Steps Limited, UK.

## **E- RESOURCES**

1. <https://cutt.ly/pbhDNFv>
2. <https://www.learnpick.in/prime/documents/ppts/details/42/structures-in-c>
3. <http://www.d.umn.edu/~rmaclin/cs1622/Chapter09-10/Chapter09-10.PPT>

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**DEPARTMENT OF COMPUTER SCIENCE**

B.Sc., COMPUTER SCIENCE



**Semester: I - CP-I: C Programming Lab**

**Ins. Hrs. /Week: 3**

**Course Credit:2**

**Course Code:**

## OBJECTIVES

- To write, compile and debug programs in C language
- To formulate problems and implement algorithms in C
- To effectively choose programming components that efficiently solves computing problems in real-world environment

## EXERCISES

1. Write a Program to convert temperature from degree Centigrade to Fahrenheit.
2. Write a Program to find whether given number is Even or Odd.
3. Write a Program to find greatest of three numbers.
4. Write a program to check alphabet, digit or special characters.
5. Write a Program to print Multiplication table of N.
6. Write a program to display the pyramid star pattern.
7. Write a Program to swap two numbers using temporary variable.
8. Write a Program to using switch statement to display Monday to Sunday.
9. Write a Program to display first Ten Natural Numbers and their sum.
10. Write a Program to find Multiplication of Two Matrices.
11. Write a Program to find the maximum number in Array using pointer.
12. Write a Program to reverse a number using pointer.
13. Write a Program to solve Quadratic Equation using functions.
14. Write a Program to String Operations( length, copy, concatenation, comparison )
15. Write a Program to find factorial of a number using Recursion.
16. Write a Program to show Call by Value and Call by Reference.
17. Write a Program to add two numbers using pointer.
18. Write a Program to create a file containing Student Details.

## **COURSE OUTCOME**

Students are able to

1. Apply and implement basic C Programming concepts
2. Understand the role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language
3. Identify the data structure to develop program for real time applications
4. Develop programs using Array and Pointers for dealing memory management
5. Implement file handling for permanent storage of data

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## DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS

ALLIED COURSE – I

(For CS & BCA)

### Semester: I - AC - I: Algebra and Calculus

Ins.Hrs./Week:4

Course Credit: 3

Course Code:

#### OBJECTIVES

- To learn the basic concept in the integration.
- To train the students to solve the problems in Theory of Equations.
- To introduce the basic concept of Theory of equations, Matrices and Differentiation.

#### UNIT- I: Theory of Equations

(12 Hours)

Introduction - Relation between roots and coefficients – Transformations of Equations – Diminishing, Increasing and multiplying the roots by a constant.

#### UNIT-II: Matrices

(15 Hours)

Singular matrices – Inverse of a non-singular matrix using adjoint method - Rank of a Matrix – Consistency - Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton's Theorem (proof not needed) – Simple applications only.

#### UNIT-III: Differentiation

(13 hours)

Maxima & Minima – Concavity, Convexity – Points of inflexion- Partial differentiation – Euler's Theorem - Total differential coefficients (proof not needed) – Simple problems only.

#### UNIT-IV: Integration

(15 Hours)

Evaluation of Integrals of Types,

$$1] \int \frac{px+q}{ax^2+bx+c} dx \quad 2] \int \frac{px+q}{\sqrt{ax^2+bx+c}} dx \quad 3] \int \frac{dx}{a+b\cos x} \quad 4] \int \frac{dx}{a+b\sin x}$$

Evaluation using Integration by parts – Properties of definite integrals – Reduction formula

$$1] \int x^n e^{ax} dx \quad 2] \int \cos^n x dx \quad 3] \int \sin^n x dx.$$

#### UNIT- V: Differential Equations

(15 Hours)

Linear equations – Second order of types  $(aD^2 + bD + c)y = F(x)$  where a,b,c are constants and F(x) is one of the following types (i)  $e^{ax}$  (ii)  $\sin(ax)$  or  $\cos(ax)$  (iii)  $x^n$ , n being an integer (iv)  $e^{ax}f(x)$

**Total Lecture Hours - 60**

## **COURSE OUTCOME**

Students are able to

1. Find solutions of transformation of equation by increasing and decreasing roots.
2. Acquire the Knowledge of pertaining to consistency of equations of matrices, Eigen value and Eigen vector
3. Understand the concept of maxima and minima and partial differential equation.
4. Understand the different types of Integral Equations and their properties.
5. Do the problems in different methods of Differential Equation.

## **TEXT BOOK(S)**

1. Manickavasagam Pillai. T.K & others. 1985. Algebra Volume I & II. Revised Editions. S.V Publications, Uttar Pradesh.
2. Narayanan.S, Manicavachagam Pillai.T.K.2003. Calculus Volume I & Volume II. S.Viswanathan Pvt. Limited, Chennai.
3. Narayanan.S, Manicavachagam Pillai.T.K. 2003. Differential Equations. S.Viswanathan Pvt. Limited, Chennai.

UNIT-I Chapter 6: Sec. 11,15 and 17 of [1].

UNIT- II Chapter 2: Sec. 1 to 16 of [1].

UNIT -III Chapter 5: Sec. 1,2 of [2].

Chapter 8: Sec. 1.1,1.3 and 1.6 of [2].

UNIT -I Chapter 1: Sec. 7.3,8,9,11,12,13.1,13.3,13.4 of [2].

UNIT -V Chapter 5: Sec. 1, 2, 3 and 4 of [3].

## **REFERENCE BOOK(S)**

1. Arumugam, Issac. 2007. Allied Mathematics, New Gamma Publishing House, Palayamkottai.
2. Khanna. M.L. 2004. Differential Calculus. Jai prakash Nath and Co., Meerut.
3. Khanna. M.L. 1994. Integral Calculus. 19 th Edition. Jai Prakash Nath & Co. Meerut.
4. Sannu Rahi. 2009. Algebra. Tata McGraw Hill Publishing Company Limited, New Delhi.
5. Singh.U.P, Srivastava. R.J, Siddiqui. N.H. 2003. Calculus. Dominant publishers and Distributors, New Delhi.

## **E\_RESOURCES**

1. <https://www.pdfdrive.com/calculus-volume-1-d33472743.html>.
2. [https://www.academia.edu/38014615/Lecture\\_Notes\\_on\\_Differentiation](https://www.academia.edu/38014615/Lecture_Notes_on_Differentiation)
3. [https://www.researchgate.net/publication/323401207\\_ELEMENTS\\_OF\\_LINEAR\\_ALGEBRA\\_AND\\_MATRIX\\_THEORY\\_Course\\_by\\_E\\_Kogan](https://www.researchgate.net/publication/323401207_ELEMENTS_OF_LINEAR_ALGEBRA_AND_MATRIX_THEORY_Course_by_E_Kogan)
4. [https://www.researchgate.net/publication/319449049\\_Integral\\_Calculus](https://www.researchgate.net/publication/319449049_Integral_Calculus)
6. <https://ocw.mit.edu/courses/mathematics/18-03-differential-equations-spring-2010/lecture-notes>

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## DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS

ALLIED COURSE – II

(For CS & BCA)

### Semester: I- AC-II: Numerical Analysis

Ins. Hrs./Week: 3

Course Credit: 2

Course Code:

#### OBJECTIVES

- To introduce the concept of algebraic and transcendental equations.
- To enable students to learn the numerical techniques of interpolation.
- To acquaint the student with an understanding of numerical techniques of differentiation and integration.

#### UNIT-I: Solutions of Algebraic and Transcendental equations

(8 Hours)

Introduction-The Solution of Algebraic and Transcendental Equations -Bisection method, Steps for finding roots of equations using bisection method-Method of false position-Newton Raphson method-Theory and problems.

#### UNIT-II: Interpolation

(10 Hours)

Introduction-Errors in polynomial Interpolation - Finite differences - Formula for finding Forward differences-Formula for finding Backward differences -Some basic problems-Formula for finding Newton's forward and backward Interpolation -Problems based on Newton forward and backward interpolation -Lagrange's Interpolation formula -Theory and problems

#### UNIT-III: Numerical differentiation and integration

(11 Hours)

Introduction-Numerical Differentiation-Errors in numerical differentiation-Formula for finding Numerical differentiation-Problems based on Numerical differentiation-Numerical Integration: Trapezoidal Rule - Simpson's 1/3 Rule, Simpson's 3/8-Rule.

#### UNIT-IV: Solutions of linear systems

(10 Hours)

Introduction - Solutions of linear systems- Theory and problems of linear systems using Gauss Elimination Method – Theory and problems of linear systems using Gauss Jacobi Method –Theory and problems of linear systems using Gauss Seidel Method.

#### UNIT-V: Numerical solution of ordinary differential equations

(6 Hours)

Introduction-Method of finding Solution of ordinary differential equations by Taylor's Series - Formula for Euler's method- Runge Kutta Second and Fourth order method, Theory and Problems.

**Total Lecture Hours- 45**

## **COURSE OUTCOME**

Students are able to

1. Acquire knowledge about Algebraic and Transcendental Equations.
2. Gain about the knowledge of interpolation.
3. Enhance about the concept of numerical differentiation and integration.
4. Develop the knowledge of solutions of linear systems.
5. Assimilate the concept of numerical solutions of ordinary differential equations.

## **TEXT BOOK(S)**

1. Sastry S.S. 2012. A First Course in Introductory methods of Numerical Analysis. PHI learning private limited, New Delhi.

UNIT- I Chapter 2 : Sec.2.1, 2.2, 2.3, 2.5

UNIT- II Chapter 3 : Sec3.1, 3.2, 3.3(3.3.1&3.3.2), 3.6, 3.9.1

UNIT -III Chapter 6 : Sec.6.1, 6.2, (6.2.1), 6.4 (6.4.1, 6.4.2, 6.4.3)

UNIT -IV Chapter 7 : Sec.7.5, 7.5.1, 7.6

UNIT- V Chapter8 : 8.1, 8.2, 8.4, 8.5

## **REFERENCE BOOK(S)**

1. Arumugam.S, Thangapandi issac, and Somasundaram. A. 2012. Numerical Methods. Scitech publications,Chennai.
2. David Kincaid, Ward Cheney. 1991. Numerical Analysis. Books/cole Publishing company, California.
3. Jain M.K, Iyengar S.R.K and Jain. R.K. 2001. Numerical Methods for Scientific and Engineering Computation. New Age International Private Limited, Bangalore.
4. Mathew. J.H. 1992. Numerical Methods for Mathematics. Science and engineering, prentice hall.
5. Veerarajan.T and Ramachandran.T. 2008. Numerical methods with programming in C. MC Graw Hill education, New York.

## **E- RESOURCES**

1. <http://www.math.iitb.ac.in/~baskar/book.pdf>
2. <http://spartan.ac.brocku.ca/~jvr/bik/MATH2P20/notes.pdf>
3. <https://www.math.ust.hk/~machas/numerical-methods.pdf>
4. <https://rahulpatel121.files.wordpress.com/2018/07/s-s-sastry-introductory-methods-of-numerical-analysis-2012-phi-learning-pvt-ltd.pdf>
5. <https://authors.library.caltech.edu/25061/1/NumMethChE84.pdf>

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**SEMESTER II**

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(For the Candidates admitted in the academic year 2021 – 2022)

**DEPARTMENT OF COMPUTER SCIENCE**

B.Sc., COMPUTER SCIENCE

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## Semester: II –CC-II-Programming in C++

Ins. Hrs. /Week: 6

Course Credit: 6

Course Code

### OBJECTIVES

- To acquire knowledge about object-oriented concepts
- To understand object oriented programming through C++
- To study how to design C++ classes with code reuse

### UNIT-I: Basic Concepts of Object Oriented Programming

(17 Hours)

Benefits of OOP – Object Oriented languages- Applications of OOP – Difference between C and C++ - Structure of C++ Program – Tokens – Keywords –Identifiers and Constants – Basic Data Types – User Defined Data Types – Derived DataTypes – Declaration of Variables – Operators – Manipulators – Expressions and their types – Control Structures.

### UNIT- II : Classes and Objects

(16 Hours)

Constructors- C++ Default Constructor- Parameterized Constructor-copy constructor and Destructors – **Type Conversions:** Implicit Type Conversion- Explicit Type Conversion- **Operator Overloading:** Types of Overloading-Overloading unary operator – Overloading binary Operator- Overloading Binary using friend function- Function Overloading.

### UNIT- III : Inheritance

(20Hours)

Extending Classes – Defining Derived Classes – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Virtual Base Classes – Virtual Functions and Polymorphism – Pointers: Pointers to Objects – this Pointer – Pointers to Derived Classes – Virtual Functions – PureVirtual Functions.

### UNIT -IV : Manipulating Strings

(20Hours)

Basic String Operations –string copy- string length- string comparison-string concatenation – **Managing Console I/O Operations:** C++ Streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operations – Working with Files – Classes forFile Stream Operations – Opening and Closing a File – Detecting End-of-file.

### UNIT -V: Templates

(17 Hours)

Generic Functions-Applying Generic Functions-Generic Classes-The Power of Templates-**Exception Handling:** Exception Handling - Fundamentals-Handling Derived Class Exceptions Handling Options- Understanding terminate() and unexpected()- The Uncaught Exception() Function.

**Total Lecture Hours-90**

## **COURSE OUTCOME**

Students are able to,

1. Gain basic knowledge on Object Oriented concepts
2. Develop applications using Object Oriented Programming Concepts
3. Understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code
4. Understand I/O operations and file handling
5. Implement Templates and Exception handling mechanisms in C++

## **TEXT BOOK(S)**

1. Balagursamy E 2018, Object Oriented Programming with C++, Seventh Edition, Tata McGraw Hill Publications, India.
2. Herbert Schildt 2019, C++, The Complete Reference, Fourth Edition TATA McGraw Hill, USA.

## **REFERENCE BOOK(S)**

1. Ashok Kamthane 2013, Programming in C++, Pearson Education, UK.
2. Bjarne Stroustrup 2013, C++ Programming Language, ; 4th Edition, Addison-Wesley, USA.
3. Stanley Lippman, Josée Lajoie, Barbara Moo 2012, C++ Primer, Fifth Edition, Addison-Wesley, USA.

## **E- RESOURCES**

1. <https://cutt.ly/QbhD3Vf>
2. <https://cutt.ly/nbhD7rh>
3. [http://www.cs.fsu.edu/~xyuan/cop3330/16\\_template.pptx](http://www.cs.fsu.edu/~xyuan/cop3330/16_template.pptx)

# SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2021 – 2022)

**DEPARTMENT OF COMPUTER SCIENCE**

B.Sc., COMPUTER SCIENCE



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**Semester: II-CP-II-Programming in C++ Lab**

**Ins. Hrs. /Week: 3**

**Course Credit:2**

**Course Code**

## OBJECTIVES

- To identify and practice the object-oriented programming concepts and techniques in C++
- To practice the use of C++ classes and class libraries
- To develop programs with C++ classes for simple applications

## EXERCISES

1. Write a Program in C++ to display various types of arithmetic operations using mixed data type.
2. Write a program in C++ to compute quotient and remainder.
3. Write a program in C++ to input a single digit number and print a rectangular form of four columns and six rows.

### 4. Classes

Write a Program using a class to represent a Bank Account with Data Members – Name of depositor, Account Number, Type of Account and Balance and Member Functions – Deposit Amount – Withdrawal Amount. Show name and balance. Check the program with own data.

### 5. Constructor & Destructor

Write a program to read an integer and find the sum of all the digits until it reduces to a single digit using constructor, destructor and default constructor.

### 6. Default & Reference Argument

Write a program using function overloading to read two matrices of different data types such as integers and floating point numbers. Find out the sum of the above matrices separately and display the total sum of these arrays individually.

### 7. Operator Overloading

- a) Addition of Two Complex Numbers.
- b) Matrix Multiplication

### 8. Function Overloading

To find the volume of cube, cuboid, Cylinder.

### 9. Inheritance

Prepare Pay Roll of an employee using Inheritance.

### 10. Overriding

To implement the concept of Overriding.

### 11. Templates

Create program to add, subtract, multiply and divide two numbers using class template

### 12. Pointers

- a. Write a Program to find the number of vowels in a given text
- b. Write a Program to check for Palindrome

### **13.Files**

Prepare Students Mark List in a file with Student Number, Mark in four subjects and Mark Total. Write a program to arrange these records in the ascending order of MarkTotal and write them in the same file overwriting the earlier records.

### **14.Exception Handling**

a. Prepare Electricity Bill for customers generating and handling any two Exceptions.

### **15.To develop a C++ Program using the following concept**

- a) Virtual Functions
- b) Abstract classes

### **COURSE OUTCOME**

Students are able to

1. Apply object-oriented programming features in C++
2. Develop programs using Classes in C++
3. Understand implementation issues related to object-oriented techniques
4. Analyze, use and create functions and overloading operators
5. Write programs that make appropriate use of advanced object-oriented facilities such as classes, message passing, overloading and inheritance

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(For the Candidates admitted in the academic year 2021 – 2022)

**DEPARTMENT OF MATHEMATICS**

**ALLIED MATHEMATICS**

**ALLIED COURSE-III**

(For CS & BCA)



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**Semester: II- AC-III: Statistics**

**Ins. Hrs./Week: 3**

**Course Credit: 2**

**Course Code:**

**OBJECTIVES**

- To introduce the concept of Statistical problems.
- To enable students to analyse the data graphically using frequency distributions.
- To study the concept of measures of central tendency.

**UNIT-I: Introduction on Statistics**

**(8 Hours)**

Introduction- Origin and development of statistics- Scope of statistics- Limitations of statistics- Frequency distribution in statistics - Graphical representation of statistical data.

**UNIT-II: Measures of central tendency**

**(10 Hours)**

Introduction on Measures of central tendency-Arithmetic Mean-Geometric Mean – Harmonic Mean - Median - Mode, Definitions, Properties, Merits, Demerits, Examples.

**UNIT-III: Measures of dispersion**

**(11 Hours)**

Introduction on Measures of dispersion- Definition- Objectives- Properties- Methods of measuring dispersion- Range- Quartile deviation- Mean deviation- Standard deviation- Coefficient of dispersion.

**UNIT-IV: Correlation and Regression**

**(10 Hours)**

Introduction on Correlation-Definition-Properties of Simple Correlation – Correlation coefficients-Simple Problems - Regression-Definition- Properties-Regression coefficients-Simple Problems only.

**UNIT-V: Binomial distribution**

**(6 Hours)**

Introduction on Binomial distribution: Definition, properties, Moments- Recurrence relations for the Moments-Moment generating functions-Simple problems only-Additive property of Binomial distribution.

**Total Lecture Hours- 45**

**COURSE OUTCOME**

Students are able to

1. Expand knowledge about introduction on statistics.
2. Gain about the knowledge of measures of central tendency.
3. Enhance about the concept of measures of dispersion.
4. Develop the knowledge of correlation and regression.
5. Assimilate the concept of binomial distribution.

### **TEXT BOOK(S)**

1. Gupta. S.C and Kapoor. V.K. 2002, Fundamentals of Mathematical Statistics. Sultan Chand & Sons, New Delhi.  
UNIT- I Chapter 1 : Sec.1.1 to 1.4  
Chapter 2 : Sec. 2.1 to 2.3  
UNIT- II Chapter 2 : Sec. 2.4 to 2.9  
UNIT -III Chapter 2 : Sec. 2.13 to 2.14  
UNIT -IV Chapter 10 : Sec. 10.1 to 10.4  
Chapter 11 : Sec. 11.1, 11.2 (11.2.1 to 11.2.3)  
UNIT -V Chapter 8 : Sec. 8.4 (8.4.1, 8.4.2, 8.4.7 only)

### **REFERENCE BOOK(S)**

1. Freund J.E. 2001. Mathematical Statistics. Prentice Hall of India.
2. Goon A.M. Gupta M.K and Dos Gupta, B. 1991. Fundamentals of Statistics Volume I. World Press, Calcutta.
3. Gupta S.P. 1994. Statistical Methods. Sultan Chand & Sons, New Delhi.
4. Kapil Sharma. 2011. Statistical Methods. ABO Publishers, Jaipur, India.
5. Pillai R.S.N and Bagavathi. 2003. Practical statistics. S Chand & Company Ltd. New Delhi.

### **E- RESOURCES**

1. <https://www.math.arizona.edu/~jwatkins/statbook.pdf>
2. <http://www.cimt.org.uk/cmmss/S1/Text.pdf>
3. <https://stat.ethz.ch/~geer/mathstat.pdf>
4. <https://mason.gmu.edu/~jgentle/books/MathStat.pdf>
5. <http://fstroj.uniza.sk/kam/orsansky/pdf/eng/basicsofstatisticalmethods.pdf>

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**DEPARTMENT OF MATHEMATICS**

ALLIED MATHEMATICS

ALLIED COURSE-IV

(For CS & BCA)

**Semester: II – AC – IV : Operations Research**

**Ins. Hrs. /Week : 4**

**Course Credit: 3**

**Course Code :**

**OBJECTIVES**

- To train the students to solve Assignment problems, Transportation problems
- To train the students in Network problems
- To impart knowledge in concepts and tools of Operations Research

**UNIT–I: Operations Research**

**(12 Hours)**

Introduction of Operations Research - Basics of Operations Research – Operations Research & Decision making – Role of Operations Research - Linear programming formulations & graphical solution of two variables-Canonical & standard forms of Linear Programming Problem.

**UNIT – II: Simplex Method**

**(12 Hours)**

Simplex Method– Basic Definitions - Simplex Method Algorithm - Simplex Method for less than, equal to, greater than constraints – Big M method - Big M method Algorithm – Problems.

**UNIT –III: Transportation Problem and Assignment problem**

**(13 Hours)**

Transportation Problem –Introduction and mathematical formulation of Transportation Problem – North West Corner Method - Least Cost Method – Vogel's Approximation Method – Modi Method - Unbalanced Transportation problem-Assignment algorithm – Formulation of Assignment Problem - Unbalanced Assignment problem.

**UNIT –IV: Sequencing Problem**

**(11 Hours)**

Sequencing Problem– Definition - Processing of n jobs through two machines – Processing of n jobs through two machines algorithm - Processing of n jobs through three machines – Processing of two jobs through n machines –Processing of n jobs through three machines – Processing of two jobs through n machines algorithm - Related Problems in all these.

**UNIT –V: Networks**

**(12 Hours)**

Networks – Immediate Predecessor -Immediate Successor– Dummy activity – Critical Path - Fulkerson's rule - Measure of activity –PERT computation –Earliest Time – Latest Time - Total Float – Free Float – Independent Float - CPM computation - Resource scheduling.

**Total Lecture Hours - 60**

## **COURSE OUTCOME**

Students are able to

1. Understand the advantages and limitations of operation research.
2. Understand the LPP and to know methods of solving problems.
3. Understand the concepts of transportation and assignment problems.
4. Learn about the sequencing problems.
5. Assimilate the concept of Network scheduling by CPM and PERT.

## **TEXT BOOKS**

1. Kalavathy. S. 2012. Operations Research. Fourth Edition. Vikas Publishing House Pvt. Ltd, Chennai.  
UNIT -I Chapter 1  
Chapter 2 : Sec. 2.1, 2.2  
Chapter 3  
UNIT -II Chapter 4  
Chapter 5 : Sec. 5.1, 5.2  
UNIT -III Chapter 8 : Sec. 8.1 to 8.5  
Chapter 9 : Sec. 9.3 to 9.5  
UNIT -IV Chapter 14 : Sec. 14.1 to 14.3, 14.5  
UNIT -V Chapter 15 : Sec. 15.1 to 15.8

## **REFERENCE BOOK(S)**

1. Hamdy A. Taha. 2005. Operations Research. 7<sup>th</sup> Edition. Prentice Hall of India Private Limited, New Delhi.
2. KantiSwarup, Gupta.P.K, ManMohan. 2014. Operations Research. Fourteenth Edition. Sultan Chand & Sons, New Delhi.
3. Prem Kumar Gupta and Hira.D.S. 1976. Operations Research - An Introduction. Sultan Chand, New Delhi.
4. SharmaJ.K. 2001. Operations Research. MacMillan India Ltd, New Delhi.
5. Sundaresan.V, Ganapathy Subramanian. K.S and Ganesan.K. 2002. Resource Management Techniques. A.R.Publications, Chennai.

## **E\_RESOURCES**

1. [http://ebooks.lpude.in/commerce/bcom/term\\_5/DCOM303\\_DMGT504\\_OPERATION\\_RESEARCH.pdf](http://ebooks.lpude.in/commerce/bcom/term_5/DCOM303_DMGT504_OPERATION_RESEARCH.pdf)
2. <http://www.ggu.ac.in/download/class-note14/operation%20research07.04.14.pdf>
3. [file:///C:/Users/Commerce2/Downloads/Operations%20Research%20\(%20PDFDrive%20\).pdf](file:///C:/Users/Commerce2/Downloads/Operations%20Research%20(%20PDFDrive%20).pdf)
4. [https://www.google.co.in/books/edition/\\_/6khDDAAAQBAJ?hl=en](https://www.google.co.in/books/edition/_/6khDDAAAQBAJ?hl=en)
5. [https://www.researchgate.net/publication/333748649\\_Chapter\\_-1\\_Operations\\_Research](https://www.researchgate.net/publication/333748649_Chapter_-1_Operations_Research)

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