SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

1

ABOUT THE DEPARTMENT

The Department of Computer Science was established during the year 1987–88 with B.Sc. Computer Science Programme. Since then, the Department has been functioning successfully producing young Computer Science graduates every year, with well trained and experienced faculty members and supporting staff. So far, the Department has produced more than 1000 (33 batches) Computer Science graduates and they are all well placed in India & Abroad. The Department has been producing excellent results over a period of 35 years. The Department has adequate infrastructure with a well-equipped Computer Laboratory with LCD Projector, a well stacked Department Library, well-furnished class rooms. From 2023 onwards we have got approval for Cloud Computing and Cyber Security Programme.

VISION

- Apply a broad understanding of the fundamental theories, concepts, and applications of Computer Science in their career.
- Analyze a multifaceted computing problem and to apply principles of computing and other relevant disciplines to identify solutions and compare alternative solutions to computing problems.
- Apply Computer Science theory and software development fundamentals to produce computing–based solutions.
- To attain an ability to use current techniques, skills, and tools necessary for computing practice.
- To affiance in a wide range of careers and/or graduate studies in computer science or related fields with a zeal for lifelong learning.
- To communicate effectively, both orally and in writing and engaged in collaborative teamwork.
- Recognize the social and ethical errands of a professional working in the discipline.

MISSION

The Mission of the Department is to impart computer education to the students in the rural area of Madurai district, so that they become enlightened and intelligent, and to improve the standards of their life, as well as to produce graduates who excel in research and service. We also aim to inculcate the attitudes and values that will motivate them towards the continuous process of learning and leadership. We strive to educate ground–breaking skills and technology for the benefit of learners through incessant upgradation of curriculum.

Signature of the Chairman

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

GRADUATE ATTRIBUTES

1. **(KB) A knowledge base for Computer Science**: Demonstrated competence in university level mathematics, natural sciences, Computer Science fundamentals, and specialized Computer Science knowledge appropriate to the program.

2. **(PA) Problem analysis**: An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex Computer Science problems in order to reach substantiated conclusions

3. **(Inv.) Investigation**: An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data and synthesis of information in order to reach valid conclusions.

4. **(Des.) Design:** An ability to design solutions for complex, open-ended Computer Science problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.

5. **(Tools) Use of Computer Science tools**: An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern Computer Science tools to a range of Computer Science activities, from simple to complex, with an understanding of the associated limitations.

6. **(Team) Individual and teamwork**: An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.

7. **(Comm.) Communication skills**: An ability to communicate complex Computer Science concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.

8. **(Prof.) Professionalism**: An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.

9. **(Impacts) Impact of Computer Science on society and the environment**: An ability to analyze social and environmental aspects of Computer Science activities. Such ability includes an understanding of the interactions that Computer Science has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.

10. **(Ethics) Ethics and equity**: An ability to apply professional ethics, accountability, and equity.

11. **(Econ.) Economics and project management**: An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of Computer Science and to understand their limitations.

12. **(LL) Life-long learning**: An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge

SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE)(with effect from 2024 – 2025)

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The **B.Sc. Computer Science** (**Cloud Computing & Cyber Security**) Graduates of the Sourashtra College will:

PEO 1	attain a professional career by acquiring knowledge in scientific, mathematical, computing, and engineering principles.
PEO 2	apply, analyze, design, optimize, and implement skills to formulate and solve computer science, engineering, and multidisciplinary problems effectively.
PEO 3	utilize fundamental domain knowledge gained from core courses to develop innovative computing solutions, employing creativity and logical reasoning.
PEO 4	provide professional services using the latest technologies in the field of computer science.
PEO 5	cultivate leadership skills while adhering to ethical standards, promoting teamwork, and demonstrating effective communication and time management in the profession.
PEO 6	pursue higher studies, certifications, and research programs in alignment with market demands and emerging trends.

UNDERGRADUATE (UG) PROGRAMME OUTCOMES (POs)

Undergraduate (B.A., **B.Sc.,** B.Com., B.C.A., B.B.A., etc.,) is a 3 – year degree Programme with 6 semesters consisting the following Programme Outcomes (POs) under various criteria including critical thinking, problem solving, effective communication, societal/ citizenship/ ethical credibility, sustainable growth and employable abilities.

PO 1	**Critical Thinking**: Intellectual exploration of knowledge towards actions in clear and rational manner by understanding the logical connections between ideas and decisions.
PO 2	**Problem Solving**: Understanding the task/ problem followed by planning and narrow execution strategy that effectively provides the solution.
PO 3	**Effective Communication**: Knowledge dissemination by oral and verbal mechanisms to the various components of our society.
PO 4	**Societal/ Citizenship/ Ethical Credibility**: Realization of various value systems/ moral dimensions and demonstrate the empathetic social concern as well as equity in all the decisions, executions and actions.
PO 5	**Environmental Concern and Sustainable Growth**: Understanding the emerging environmental challenges and provide the possible contribution in sustainable development that integrates environment, economy and employment.
PO 6	**Skill Development and Employable Abilities**: Adequate training in relevant skill sector and creating employable abilities among the under graduates.

PROGRAMME SPECIFIC OUTCOMES

On completion of **B.Sc. (Cloud Computing & Cyber Security) Programme**, the students are expected /will be able to

PSO 1	demonstrate critical and logical thinking skills when addressing issues in the fields of cloud computing and cyber security.
PSO 2	be familiar with relevant software tools used in computer science and industrial applications to effectively address and solve mathematical, statistical, and real-time application-related problems.
PSO 3	develop the ability to recognize the need for information, locate, evaluate, and utilize it effectively to resolve issues and challenges.
PSO 4	apply logical approaches to formulate and develop programming models for addressing issues in various contexts, including social sciences and business.
PSO 5	attain a strong knowledge base and understanding, enabling them to solve both theoretical and applied problems in advanced areas of computer science and industrial statistics.
PSO 6	be ready and willing to embark on new ventures and initiatives, with a focus on critical thinking and a strong desire for continuous learning, particularly in the realm of life skills.

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

DISTRIBUTION OF CREDITS (UG PROGRAMME)

PART	SEM	COURSES	NO. OF COURSES	HOURS	CREDITS	TOTAL CREDITS
I	I–IV	LANGUAGE	4	6	3	12
II	I–IV	ENGLISH	4	6	3	12
III	I–VI	CORE	16	5–6	4	64
III	I–IV	ALLIED	4	4	4	16
III	V–VI	ELECTIVE	3	5	5	15
IV	I–IV	SKILL BASED SUBJECT	6	2	2	12
IV	I	VALUE EDUCATION	1	2	2	2
IV	I	ENVIRONMENTAL STUDIES	1	2	2	2
IV	III, IV	NON MAJOR ELECTIVE	2	2	2	4
V	IV	EXTENSION ACTIVITY	1	0	1	1
	V	SELF – STUDY (SOFT SKILLS)	1	0	0	0
	VI	SELF –STUDY (G.K. (ONLINE))	1	0	0	0
TOTAL						140
Any online courses in SWAYAM PORTAL						

SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE)(with effect from 2024 – 2025)

**B.Sc. COMPUTER SCIENCE
(CLOUD COMPUTING & CYBER SECURITY) – COURSE STRUCTURE
SEMESTER – I**

S. No	Course Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	24UACT11	**Part – I: Tamil** – கவிதையும் சிறுகதையும்	6	3	25	75	100	3
	24UACH11	**Hindi** – Hindi – I						
	24UACS11	**Sanskrit** –Poetry, Grammar and History of Sanskrit Literature						
2.	24UACE11	**Part – II: English** – Communicative English	6	3	25	75	100	3
3.	24UCDC11	**Part – III: Core – 1:** Programming in C	5	3	25	75	100	5
4.	24UCDCP1	**Part – III: Core – 2: Lab :** C Programming	5	3	40	60	100	3
5.	24UCDA11	**Part – III: Allied – 1:** Discrete Mathematical Structures	4	3	25	75	100	4
6.	24UCDS11	**Part – IV: SBS – 1:** Digital Principles and Computer Organization	2	3	25	75	100	2
7.	24UACVE1	**Part – IV:** Value Education	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

SEMESTER – II

S. No	Course Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	24UACT21	**Part – I: Tamil** – பக்தி இலக்கியமும் புதினமும்	6	3	25	75	100	3
	24UACH21	**Hindi** – Hindi – II						
	24UACS21	**Sanskrit** – Prose, Grammar and History of Sanskrit Literature						
2.	24UACE21	**Part – II: English** – Business English	6	3	25	75	100	3
3.	24UCDC21	**Part – III: Core – 3:** Data Structures and Algorithms	5	3	25	75	100	5
4.	24UCDCP2	**Part – III: Core – 4: Lab :** Data Structures and Algorithms Using C	5	3	40	60	100	3
5.	24UCDA21	**Part – III: Allied – 2:** Probability and Statistics	4	3	25	75	100	4
6.	24UCDS21	**Part – IV: SBS – 2:** Foundations of Cryptography	2	3	25	75	100	2
7.	24UACES1	**Part – IV:** Environmental Studies	2	3	25	75	100	2

		TOTAL	**30**				**700**	**22**

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

SEMESTER – III

S. No	Course Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.		**Part – I:Tamil** – காப்பியமும் நாடகமும் **Hindi** – Hindi – III **Sanskrit** – Sanskrit – III	6	3	25	75	100	3
2.		**Part – II: English** – English For Enrichment – III	6	3	25	75	100	3
3.		**Part – III: Core – 5:** Cloud Computing	5	3	25	75	100	5
4.		**Part – III: Core – 6:** **Lab :** Cloud Computing	5	3	40	60	100	3
5.		**Part – III: Allied – 3:** Resource Management Techniques	4	3	25	75	100	4
6.		**Part – IV: SBS – 3:** **Lab:** Python Programming	2	3	40	60	100	2
7.		**Part – IV: NME – 1:** Office Automation	2	3	25	75	100	2
		TOTAL	30				700	22

SEMESTER – IV

S. No	Course Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.		**Part – I: Tamil** – சங்க இலக்கியமும் அற இலக்கியமும் **Hindi** – Hindi – IV **Sanskrit** – Sanskrit – IV	6	3	25	75	100	3
2.		**Part – II: English** – English For Enrichment – IV	6	3	25	75	100	3
3.		**Part – III: Core – 7:** Programming in Java	5	3	25	75	100	5
4.		**Part – III: Core – 8:** **Lab :** Java Programming	5	3	40	60	100	3
5.		**Part – III: Allied – 4:** Numerical Methods	4	3	25	75	100	4
6.		**Part – IV: SBS – 4:** **Lab :** Web Application Development Lab Using PHP	2	3	40	60	100	2
7.		**Part – IV: NME – 2:** Introduction to Internet	2	3	25	75	100	2
8.		**Part–V:** Extension Activities	–	–	–	–	100	1
		TOTAL	30				800	23

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

9

SEMESTER – V

S. No	Course Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.		**Part – III: Core – 9:** Software Engineering	5	3	25	75	100	4
2.		**Part – III: Core – 10:** Operating System Concepts	5	3	25	75	100	4
3.		**Part – III: Core – 11:** Computer Networks	5	3	25	75	100	4
4.		**Part – III: Core – 12:** Lab : Ethical Hacking	6	3	40	60	100	4
5.		**Part – III: Elective – 1*** Ethical Hacking Information Security Grid Computing Artificial Intelligence	5	3	25	75	100	5
6.		**Part – IV: SBS – 5:** Quantitative Aptitude	2	3	25	75	100	2
7.		**Part – IV: SBS – 6:** Lab : Operating System	2	3	40	60	100	2
8.		Soft Skills (Self–Study)	–	–	–	–	100	–
		TOTAL	**30**				**800**	**25**

*One elective course to be chosen from FOUR courses

SEMESTER – VI

S. No	Course Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.		**Part – III: Core – 13:** Internet of Things	5	3	25	75	100	5
2.		**Part – III: Core – 14:** Big Data Analytics	5	3	25	75	100	5
3.		**Part – III: Core – 15:** Cryptography	5	3	40	60	100	3
4.		**Part – III: Core – 16:** Lab : Cryptography and Network Security	5	3	40	60	100	3
5.		**Part – III: Elective – 2*** Cyber Crime and Cyber law Block Chain & Crypto currency Distributed Computing Machine Learning	5	3	25	75	100	5
6.		**Part – III: Elective – 3:** Project & Viva–Voce	5	3	40	60	100	5
7.		General Knowledge (Self–Study)	–	–	–	–	100	–
		TOTAL	**30**				**700**	**26**

*One elective course to be chosen from FOUR courses

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

COURSE STRUCTURE – I SEMESTER

S. No	Course Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	24UACT11	**Part – I: Tamil** – கவிதையும் சிறுகதையும்	6	3	25	75	100	3
	24UACH11	**Hindi** – Hindi – I						
	24UACS11	**Sanskrit** – Poetry, Grammar and History of Sanskrit Literature						
2.	24UACE11	**Part – II: English** – Communicative English	6	3	25	75	100	3
3.	24UCDC11	**Part – III: Core – 1:** Programming in C	5	3	25	75	100	5
4.	24UCDCP1	**Part – III: Core – 2: Lab :** C Programming	5	3	40	60	100	3
5.	24UCDA11	**Part – III: Allied – 1:** Discrete Mathematical Structures	4	3	25	75	100	4
6.	24UCDS11	**Part – IV: SBS – 1: :** Digital Principles and Computer Organization	2	3	25	75	100	2
7.	24UACVE1	**Part – IV:** Value Education	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

CA   – **Class Assessment (Internal)**

SE   – **Summative Examination**

SBS   – **Skill Based Subject**

NME – **Non –Major Elective**

T   – **Theory**

P   – **Practical**

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCDC11	PROGRAMMING IN C	CORE – 1	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course helps to provide the fundamental knowledge of a programming language and its features which enhances the user to write general purpose application programs.

COURSE OBJECTIVES:
- To inculcate fundamental knowledge of programming
- To develop programming skills using the fundamentals and basics of C language
- To stress the importance of clarity, simplicity and the efficiency in writing programs

COURSE OUTCOMES (COs):

After the completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	apply the basic concepts and develop program to find solutions for simple problems	Upto K3
CO 2	design programs to solve complex problems by using suitable control statements	Upto K3
CO 3	analyze the problem and design efficient program using functions	Upto K3
CO 4	use array and structure to handle volume of data	Upto K3
CO 5	use advanced data structures pointers and files for data processing	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

12

PROGRAMMING IN C

UNIT – I:
C fundamentals: Character set – Identifier and keywords – data types –constants – Variables – Declarations – Expressions – Statements – Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators – Library functions.

UNIT – II:
Data input output functions - Simple C programs – Flow of control – if, if–else, while, do–while, for loop, Nested control structures – Switch, break and continue, go to statements – Comma operator.

UNIT – III:
Functions: Definition – proto type – Passing arguments – Recursions. Storage Classes: Automatic, External, Static, Register Variables – Multi–file programs – Preprocessor directives – Macro substitution – File inclusion – Compiler Control Directives.

UNIT – IV:
Arrays: Defining and processing – Passing arrays to functions – Multi– dimension arrays – Arrays and String. Structures: User defined data types – Passing structures to functions – Self–referential structures – Union - Bit wise operations.

UNIT – V:
Pointers: Declarations – Passing pointers to Functions – Operation in Pointers– Pointer and Arrays – Arrays of Pointers – Structures and Pointers – Files: Sequential and random file Creation and Processing – Command line arguments.

TEXT BOOK:

   E.Balagurusamy, ***Programming in ANSI C***, 7th Edition, Tata McGraw Hill, 2017.

REFERENCE BOOKS:

1. B.W. Kernighan and D. M. Ritchie, ***The C Programming Language***, 2nd Edition, PHI, 1988.
2. H. Schildt, ***C: The Complete Reference***",4thEdition.TMHEdition,2000.
3. Gottfried B.S, "***Programming with C***, Second Edition, TMH Pub. Co. Ltd., New Delhi1996.
4. Kanetkar Y., ***Let us*** , BPB Pub., NewDelhi,1999.

DIGITAL TOOLS:

1. http://www.kciti.edu/wp–, content/uploads/2017/07/cprogramming_tutorial.pdf
2. https://www.skiet.org/downloads/cprogrammingquestion.pdf
3. https://phy.ntnu.edu.tw/~cchen/pdf/ctutor.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	1	3
CO2	2	2	1	1	1	1
CO3	1	1	2	3	1	1
CO4	1	3	1	1	1	3
CO5	1	1	2	2	2	2

3. Advanced Application   2. Intermediate Development   1. Introductory Level
COURSE DESIGNER: Dr. T.D.VENKATESWARAN

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

13

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCDCP1	**LAB: C PROGRAMMING**	**CORE–2 LAB**	**–**	**5**	**3**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	**I**	**40**	**60**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	✓

COURSE DESCRIPTION:
This course helps to provide the fundamental knowledge of a programming language and its features which enhances the user to write general purpose application programs.

COURSE OBJECTIVES:
- To inculcate fundamental knowledge of programming.
- To develop programming skills using the fundamentals and basics of C language.
- To stress the importance of clarity, simplicity and the efficiency in writing programs.
- It aims to train the student to the basic concepts of the C–programming language.
- To improve the programming skills through C language.

COURSE OUTCOMES (COs):
After the completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	demonstrate the understanding of syntax and semantics of C programs.	**Upto K3**
CO 2	identify the problem and solve using C programming techniques.	**Upto K3**
CO 3	identify suitable programming constructs for problem solving.	**Upto K3**
CO 4	analyze various concepts of C language to solve the problem in an efficient way.	**Upto K3**
CO 5	develop a C program for a given problem and test for its correctness.	**Upto K3**

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

14

LAB: C PROGRAMMING

LIST OF EXPERIMENTS

Expression Evaluation
1. Finding Simple Interest and Compound Interest
2. Centigrade to Fahrenheit and Fahrenheit to Centigrade
3. Finding roots of a quadratic equation
4. Finding Standard Deviation and Variance

Conditional Statements
1. EB Bill Generation
2. Print Grade of a student
3. Checking Prime Number, Perfect Number, Armstrong Number, Adam Number
4. Sum of the digits of a number

Summation of Series
1. Sin(x), 2. Cos(x), 3. Exp(x) (Comparison with built in functions)

String Manipulation
1. Counting the number of vowels, consonants, words, white spaces in a line of text and array of lines.
2. Reverse a string and check for palindrome.
3. Sub string detection, count and removal.
4. Finding and replacing substrings.

Functions
1. Finding Factorial
2. Finding NCP value using recursion
3. Finding biggest element

Recursion
1. $^{n}P_{r}, ^{n}C_{r}$
2. GCD of two numbers
3. Fibonacci sequence
4. Maximum & Minimum

Matrix Manipulation
1. Addition and Subtraction
2. Multiplication
3. Transpose, and trace of a matrix
4. Determinant of a Matrix

Structures
1. Mark Sheet Preparation using structure
2. Paybill Preparation using structure

Preprocessor Directives
1. Simple programs using Preprocessor Directives

Files
1. Inventory Control
2. Library Management

COURSE DESIGNER: Dr. T. D.VENKATESWARAN

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCDA11	**DISCRETE MATHEMATICAL STRUCTURES**	**ALLIED – 1**	**4**	**–**	**4**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	**I**	**25**	**75**	**100**

NATURE OF COURSE	Employability	✔	Skill Oriented	✔	Entrepreneurship	

COURSE DESCRIPTION:

This course helps to provide the fundamental knowledge of Discrete structures like Set theory, Relations, Functions, Matrices, Logic, Graph Theory

COURSE OBJECTIVES:
- To teach the basic concepts of set theory.
- To impart knowledge on solving problems using logic.
- To understand the mathematical concepts of combinatory.
- To solve various problems in number theory.
- To study the basic concepts of relations and its applications.

COURSE OUTCOMES (COs):

After the completion of the Course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain knowledge on set theory.	**Upto K3**
CO 2	understand different mathematical logics and functions.	**Upto K3**
CO 3	get an idea on Permutations and Combinations.	**Upto K3**
CO 4	understand the different form of number theory.	**Upto K3**
CO 5	understand Relations and its applications.	**Upto K3**

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLICATION

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

16

DISCRETE MATHEMATICAL STRUCTURES

UNIT– I:

Set Theory: Introduction- set and Its Element – Set Description (Roster, Set Builder and cardinal number method) Types of Sets- Set Operations and Laws of set Theory. Partition of sets. Minsets-Countable and un Countable set. Algebra of sets and Duality.

UNIT– II:

Mathematical Logic: Basic Logic and Proof, logical operations – Logic Propositional equivalence, Predicates and Quantities, Tautology-Contradiction-Methods of proofs(Direct and Indirect)- Function- Definition-Notation- Types of Function- Composition of Functions.

UNIT– III:

Number Theory: The Integers and Division, Integers and Algorithms, (Multiplication, Addition and Division -Sequences and Summations, Recursive algorithms, Program correctness

UNIT– IV:

Combinatorics: The basics of counting, the pigeonhole principle, Permutations and Combinations, Binomial coefficients, Generalized permutations and combinations

UNIT– V:

Relations: Relations – Relations and their properties, Representing Relations, Closures of relations, Equivalence relations, Partial orderings - Recurrence Relations Binary Relations.

TEXT BOOKS:
1. Rosen K.H*. Discrete Mathematics and its Applications*, 5th edition, Tata McGraw – Hills, 2003.
2. J.K Sharma, *Discrete Mathematics,* 3rd Edition, Macmillan Reprint 2011.

REFERENCE BOOK:
Modern Algebra, S. Arumugam & A. Thangapandi Issac, Scitech publications, 2005

DIGITAL TOOLS:
1. **https://www.coursera.org/specializations/discrete–mathematics**
2. **https://www.javatpoint.com/discrete–mathematics–tutorial**
3. **https://medium.com/basecs/a–gentle–introduction–to–graph–theory–7969829ead8**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	1	3
CO2	2	2	1	1	1	1
CO3	1	1	2	3	1	1
CO4	1	3	1	1	1	3
CO5	1	1	2	2	2	2

3. Advanced Application   2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: S.K. GANESHBABU

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

17

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCDS11	**DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION**	**SBS – 1**	**2**	**–**	**2**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	**I**	**25**	**75**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:
The course enables the students to design digital circuits using basic logic gates and to understand concepts of sequential combinational circuits. The students gain the knowledge and understands hardware components of a computer and impart knowledge about internal architecture of a computer system.

COURSE OBJECTIVES:
- To give knowledge about basic number systems like Binary, Octal, Decimal, Hexadecimal number system.
- To give knowledge on the physical internal components of computers like Multiplexers, Decoders, Encoders, Flipflops, Registers and Counters.
- To understand the basic structure and operation of a digital computer.
- To study the design of data path unit, control unit for processor and to familiarize with the hazards.
- To understand the concept of various memories and I/O interfacing.

COURSE OUTCOMES (COs):
After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	explore number system and logic gates.	**Upto K3**
CO 2	design various combinational and sequential digital circuits using logic gates.	**Upto K3**
CO 3	state the fundamentals of computer systems and analyze the execution of an instruction.	**Upto K3**
CO 4	analyze different types of control design and identify hazards.	**Upto K3**
CO 5	identify the characteristics of various memory systems and I/O communication.	**Upto K3**

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

18

DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION

UNIT – I:
Binary number system – Binary to Decimal conversions–Decimal to Binary–Octal–Hexadecimal numbers - ASCII code -Excess–3 code – The basic gates - Inverter– OR Gates–AND Gates– Universal logic gates – NOR Gates - NAND Gates.

UNIT – II:
Combinational Circuits – Karnaugh Map – Analysis and Design Procedures – Binary Adder - Subtractor – Decoder – Encoder – Multiplexers -Demultiplexers.
Introduction to Sequential Circuits – Flip-Flops and its types – operation and excitation tables - Registers and types – Counters and its types.

UNIT – III:
Functional Units of a Digital Computer: Von Neumann Architecture – Operation and Operands of Computer Hardware Instruction – Instruction Set Architecture (ISA): Memory Location, Address and Operation – Instruction and Instruction Sequencing – Addressing Modes, Encoding of Machine Instruction – Interaction between Assembly and High Level Language.

UNIT – IV:
Instruction Execution – Building a Data Path – Designing a Control Unit – Hardwired Control, Microprogrammed Control – Pipelining – Data Hazard – Control Hazards.

UNIT – V:
Memory Concepts and Hierarchy – Memory Management – Cache Memories: Mapping and Replacement Techniques – Virtual Memory – DMA – I/O – Accessing I/O: Parallel and Serial Interface – Interrupt I/O.

TEXT BOOK:
Digital Principles and Application, Albert Paul Malvino and Donald P. Leach, Sixth Edition, Tata McGraw–Hill–Education, 2006.
Computer System Architecture, M. Morris Mano, 3rd Edition, 2007, Pearson, New Delhi.

REFERENCE BOOKS:
1. ***Digital Computer Fundamentals*** , by Thomas C.Bartee TMH 2007.
2. ***Digital Circuits and Design***, by S.Salivahanan and S.Arivazhagan ,Vikas Publishers.2005.
3. ***Computer Organization,*** by V. Carl Hamacher, Zconko G. Vranesic, Safwat G. Zaky 4th Edition, McGraw–Hill International Editions.

DIGITAL TOOLS:
1. **https://www.mheducation.co.in/digital–principles–and–applications–sie–9789339203405–india**
2. **http://jnujprdistance.com/assets/lms/LMS%20JNU/B.Sc.(IT)/Sem%20I/Digital%20Co mputer% 20Fundamentals/Version%201/Digital%20Computer%20Fundamentals.pdf**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	1	1	2	-
CO2	2	2	1	2	2	-
CO3	2	1	-	1	1	-
CO4	2	1	2	2	2	1
CO5	2	2	1	1	1	-

3. Advanced Application   2. Intermediate Development   1. Introductory Level
COURSE DESIGNER: Dr.K.ANURATHA

SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE)(with effect from 2024 – 2025)

COURSE STRUCTURE – II SEMESTER

S. No	Course Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1	24UACT21	**Part – I: Tamil** – பக்தி இலக்கியமும் புதினமும்	6	3	25	75	100	3
	24UACH21	**Hindi** – Hindi – II						
	24UACS21	**Sanskrit** – Prose, Grammar and History of Sanskrit Literature						
2	24UACE21	**Part – II: English** – Business English	6	3	25	75	100	3
3	24UCDC21	**Part – III: Core – 3:** Data Structures and Algorithms	5	3	25	75	100	5
4	24UCDCP2	**Part – III: Core – 4: Lab :** Data Structures and Algorithms Using C	5	3	40	60	100	3
5	24UCDA21	**Part – III: Allied – 2:** Probability and Statistics	4	3	25	75	100	4
6	24UCDS21	**Part – IV: SBS – 2:** Foundations of Cryptography	2	3	25	75	100	2
7	24UACES1	**Part – IV:** Environmental Studies	2	3	25	75	100	2
		TOTAL	**30**				**700**	**22**

CA – Class Assessment (Internal)

SE – Summative Examination

SBS – Skill Based Subject

NME – Non –Major Elective

T – Theory

P – Practical

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCDC21	**DATA STRUCTURES AND ALGORITHMS**	**CORE – 3**	**5**	**–**	**5**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	**II**	**25**	**75**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course aims to impart fundamental knowledge to organize and structure data to the design and implementation of efficient algorithms and program development. And also learn on application of data structures in problem solving using several predefined algorithms.

COURSE OBJECTIVES:

- To impart knowledge and skill on identifying apt data structures to solve problems efficiently.
- To impart skill to write time and space efficient algorithms.
- To give knowledge on the concepts and applications of (i) linear data structures viz., arrays, stacks, queues (ii) linked linear data structures viz., linked lists, linked stacks and linked queues and (iii) Non–linear data structures viz.,trees, binary trees
- To give knowledge on various sorting and searching algorithms
- To impart knowledge on solving problems using algorithmic techniques viz., Divide and Conquer, Greedy Approach

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	Identify data structures needed to solve specific problems	**Upto K3**
CO 2	Analyze the data structures for effective use in problem solving	**Upto K3**
CO 3	Design and develop efficient algorithms in terms of Space and Time	**Upto K3**
CO 4	Troubleshoot algorithms	**Upto K3**
CO 5	Analyze time complexity of algorithms	**Upto K3**

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

21

DATA STRUCTURES AND ALGORITHMS

UNIT – I:

Introduction – Basic Terminology; Elementary data organization – Data structure operations – Complexity of algorithms – other asymptotic notations for complexity of algorithms

Arrays – Introduction – Linear Arrays – Representation of Linear Arrays in memory – Traversing Linear Arrays –Inserting and Deleting – Searching – Linear Search, binary Search – Multi dimensional arrays

UNIT – II:

Linked List – Introduction – Representation on Linked list in memory – Traversing a linked list – searching in a linked list – **Memory Allocation**: Garbage Collection – Inserting into a linked list – Deletion from a linked list

UNIT – III:

Stack : Introduction – Array representation of stacks – Linked list representation of stacks – **Arithmetic Expression** : Polish Notation – Evaluation of a Postfix expression – transforming infix expression to postfix expression – **Recursio**n : Factorial , Fibonacci – Towers of Hanoi. **Queue** – Linked Representation of Queues – DeQueue

UNIT – IV:

Trees – Binary Trees – Representing binary trees in memory – Traversing binary trees – Binary Search Trees – Searching and inserting in binary search trees – deleting a binary search tree

Algorithms – Introduction– What is an Algorithm – Algorithms Specification – Performance Analysis

Divide and Conquer – General Method – Binary Search – Finding the maximum and Minimum – Merge Sort – Quick Sort – Selection

UNIT – V:

The Greedy Method – General Method – Knapsack problem – Job sequencing with deadlines – **Minimum cost spanning tree**: Prim's Algorithm – Kruskal Algorithm – Optimal Storage on tapes – optimal merge patterns – single source shortest path

TEXT BOOKS:

1. *Data Structures* by Seymour Lipschutz, Schaum's outlines, Tata McGraw Hill Education Private Limited, New Delhi. 2006.
2. *Fundamentals of Computer Algorithms*, Ellis Horowitz, Sartaj Shani, Galgotia publications Pvt Ltd, 2010, New Delhi.

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

22

REFERENCE BOOKS:

1. *Data structures Using C* Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein, Kindersley (India) Pvt. Ltd., 2009.
2. *Data structures and Algorithms*, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, Pearson Education Pvt.Ltd., 2002.

DIGITAL TOOLS:

1. https://www.computer–pdf.com/programming/781–tutorial–data–structure–and–algorithm–notes.html
2. https://www.cs.princeton.edu/courses/archive/spr11/cos247/lectures/08DsAlg.pdf
3. https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_DS_LECTURE_NOTES_2.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	1	1	1	2
CO2	2	2	1	2	1	3
CO3	3	2	1	1	2	2
CO4	2	1	2	2	2	3
CO5	1	1	1	1	1	1

3. Advanced Application   2. Intermediate Development   1. Introductory Level

COURSE DESIGNER: D.V. JEYANTHI

SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE)(with effect from 2024 – 2025)

23

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCDCP2	LAB: DATA STRUCTURES AND ALGORITHMS USING C	CORE – 4 LAB	5	–	3

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	✓

COURSE DESCRIPTION:

This course aims to impart fundamental knowledge to organize and structure data to the design and implementation of efficient algorithms and program development. And also learn on application of data structures in problem solving using several predefined algorithms.

COURSE OBJECTIVES:

- To understand the concepts of Linked List, Stack and Queue, Concepts of Trees and Graphs.
- To Perform traversal operations on Trees and Graphs.
- To enable the applications of Trees and Graphs.
- To apply searching and sorting techniques
- To determine the concepts of Greedy Method to apply searching techniques.
- To give knowledge on various sorting and searching algorithms

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand and implement data structures using C	Upto K3
CO 2	understand and implement various types of linked lists and their applications	Upto K3
CO 3	understand and implement Tree Traversals	Upto K3
CO 4	understand and implement various algorithms in C	Upto K3
CO 5	understand and implement different sorting and searching algorithms	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

LAB: DATA STRUCTURES AND ALGORITHMS USING C

LIST OF EXPERIMENTS

1. Perform stack operations

2. Perform queue operations

3. Perform tree traversal operations

4. Search an element in an array using linear search.

5. Search an element in an array using binary search

6. Sort the given set of elements using Merge Sort.

7. Sort the given set of elements using Quick sort.

8. Search the Kth smallest element using Selection Sort

9. Find the Optimal solution for the given Knapsack Problem using Greedy Method.

10. Find all pairs shortest path for the given Graph using Dynamic Programming method

11. Find the Single source shortest path for the given Travelling Salesman problem using Dynamic Programming method

12. Find all possible solution for an N Queen problem using backtracking method

13. Find all possible Hamiltonian Cycle for the given graph using backtracking method

COURSE DESIGNER: Dr. K. ANURATHA

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCDA21	**PROBABILITY AND STATISTICS**	**ALLIED – 2**	**4**	**–**	**4**

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	**II**	**25**	**75**	**100**

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:
This course helps to provide the fundamental knowledge about Probability and Statistics

COURSE OBJECTIVES:
- To give knowledge about various types of statistical measures such as mean, median, mode, geometric mean, harmonic mean, standard deviation etc.,
- To give a foundation in statistical data analysis
- To solve real life problems using Correlation coefficient, regression, and theoretical probability distributions.

COURSE OUTCOMES (CO):
After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO 1	identify the basic concepts Central tendencies	**Upto K3**
CO 2	gain knowledge about Measures of Dispersion	**Upto K3**
CO 3	receive the idea of Curve Fitting, Correlation & Regression	**Upto K3**
CO 4	get knowledge about the basic concepts of Probability & Random variables	**Upto K3**
CO 5	acquire knowledge about theoretical Discrete & Continuous distributions	**Upto K3**

K1– KNOWLEDGE(REMEMBERING), K2–UNDERSTANDING, K3–APPLICATION

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

26

PROBABILITY AND STATISTICS

UNIT – I:

Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Pie-diagrams' – Graphical Representation of data – Histograms, Frequency polygon, Ogives.

UNIT – II:

Measures of dispersion – characteristics – coefficient of dispersion - Coefficient of variation-Moments – skewness and kurtosis – Pearson's coefficient of skewness - Bowley's coefficient of Skewness – Coefficient of skewness based upon moments.

UNIT – III:

Simple correlation – Karl Pearson's coefficient of correlation – correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression lines of regression – Properties of regression coefficient.

UNIT – IV:

Events and sets – sample space – concept of probability – addition and multiplications Theorem on probability – conditional probability and independence of evens – Baye's Theorem – concept of random variable – Mathematical Expectation.

UNIT –V:

Concept of sampling distributions – standard error – Tests of significance based on t, Chi- square and F distributions with respect to mean, variance.

TEXT BOOKS:

1. *Statistical Methods*, S.P.Gupta, Sultan Chand and sons Publications, 4th Edition 2011.
REFERENCE BOOKS:
1. *Fundamentals of Mathematical Statistics* by S.C.Gupta & V.K.Kapoor, Sultan Chand and Sons, 2004.
2. *Elements of Mathematical Statistics* By S.C. Gupta & V.K. Kapoor, Sultan Chand & Sons, Third Edition, 2000
DIGITAL TOOLS:
1. http://math.iisc.ernet.in/~manju/UGstatprob16/statprob.pdf
2. http://wwwf.imperial.ac.uk/~ejm/ISE.2.6/NOTES.PDF

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	1	3
CO2	2	2	1	1	1	1
CO3	1	1	2	3	1	1
CO4	1	3	1	1	1	3
CO5	1	1	2	2	2	2

3. Advanced Application   2. Intermediate Development   1. Introductory Level

COURSE DESIGNER: Prof. S. K. GANESHBABU

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
24UCDS21	FOUNDATIONS OF CRYPTOGRAPHY	SBS – 2	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course covers fundamental aspects of security in a modern networked environment. It also dwells into the fundamentals of encryption and decryption techniques and symmetric and asymmetric key cryptography.

COURSE OBJECTIVES:
- Enable the students to learn fundamental concepts of computer security.
- Learn the fundamentals of encryption and decryption techniques.
- Explore both symmetric and asymmetric key cryptography.

COURSE OUTCOMES (COs):

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

CO	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand computer security concepts and types of attacks.	Upto K3
CO 2	analyze and design substitution techniques.	Upto K3
CO 3	analyze and design transposition techniques.	Upto K3
CO 4	understand and analyze data encryption standard.	Upto K3
CO 5	understand and analyze public-key cryptography, RSA and other public-key cryptosystems.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

SOURASHTRA COLLEGE, MADURAI – 625004
(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)
B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS
(Under CBCS based on OBE)(with effect from 2024 – 2025)

28

FOUNDATIONS OF CRYPTOGRAPHY

UNIT I:
Attacks on Computers and Computer Security: Introduction - Need for Security- Security Approaches- Principles of Security- Security services- Types of Attacks – General View - Technical View- Programs that Attack- Specific Attacks.

UNIT II:
Cryptography Concepts and Techniques: Introduction to Cryptography- Cryptography - Cryptanalysis - Plain Text and Cipher Text- Types of attacks - Substitution Techniques - Caesar Cipher and Modified Caesar Cipher- Mono Alphabetic cipher- Poly-Alphabetic Cipher- Playfair Cipher- Symmetric Cipher Model.

UNIT III:
Cryptography Concepts and Techniques: Transposition Techniques- Rail Fence technique- Simple Columnar transposition Technique- Encryption and Decryption-Symmetric and Asymmetric key cryptography- Steganography.

UNIT IV:
Symmetric Key Algorithms and AES: Introduction – algorithm types and modes – an overview of symmetric key - Data Encryption Standard- a DES example- AES- structure- AES transformation functions.

UNIT V:
Asymmetric Key Algorithms: Principles of public key cryptosystems - public key cryptosystems - applications for public key cryptosystems- RSA algorithm - algorithm and example- Deffie Hellman key exchange algorithm and example.

TEXT BOOK:
AtulKahate, *Cryptography and Network Security*, 4th Edition,2019

REFERENCE BOOK:

1. William Stallings, *Cryptography and Network Security: Principles and Practices,* 7th Edition,2019.
2. W. Mao, "*Modern Cryptography – Theory and Practice*", Pearson Education.
3. Charles P. Pfleeger, Shari Lawrence Pfleeger, "*Security in computing",* Prentice Hall of India.

DIGITAL TOOLS:

- http://nptel.ac.in/courses/106105031/lecture by Dr. Debdeep MukhopadhyayIIT Kharagpur.
- https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-033-computer-system-engineering-spring-2009/video-lectures/ lecture by Prof. Robert Morris and Prof. Samuel Madden MIT.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	1	2
CO2	2	2	1	1	1	1
CO3	1	1	2	2	1	1
CO4	1	2	1	1	1	2
CO5	1	1	2	2	2	2

3. Advanced Application   2. Intermediate Development   1. Introductory Level
COURSE DESIGNER: Dr.K.ANURATHA