



**DEPARTMENT OF COMPUTER SCIENCE WITH
CYBER SECURITY**

**CHOICE BASED CREDIT SYSTEM
&
LEARNING OUTCOME BASED CURRICULUM FRAMEWORK (LOCF)**

B.Sc. COMPUTER SCIENCE WITH CYBER SECURITY

2024-2027 BATCH

I	V	COM15SER	Community Service 30 Hours	GC	-	-	-	-	-	-	-	-
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*CA conducted for 25 and converted into 15, ESE conducted for 75 and converted in to 35

Only internal assessment

CC: Core Courses

CA: Continuous Assessment

GE: Generic Elective

ESE: End Semester Examination

AEC: Ability Enhancement Course

ACC: Additional Credit Course

Question Paper Pattern

2024-27 Batch:

CA Question Paper Pattern and distribution of marks UG

Language and English

Section A 5 x 1 (No choice) : 5 Marks

Section B 4 x 5 (4 out of 6) : 20 Marks (250 words)

Section C 2 x 10 (2 out of 3) : 20 Marks (500 words)

Total : 45 Marks

UG Core and Allied - (First 3 Units)

CA Question from each unit comprising of

One question with a weightage of 2 Marks : $2 \times 3 = 6$

One question with a weightage of 5 Marks (Internal Choice at the same CLO level) : $5 \times 3 = 15$

One question with a weightage of 8 Marks (Internal Choice at the same CLO level) : $8 \times 3 = 24$

Total : 45 Marks

ALC

Section A (Paragraph answer) (4 out of 6) 4 x 4 : 16 Marks

Section B (Essay type) 1 out of 2 : 9 Marks

Total : 25 Marks

End Semester Examination – Question Paper Pattern and Distribution of Marks

Language and English – UG

Section A 10 x 1 (10 out of 12) : 10 Marks

Section B 5 x 5 (5 out of 7) : 25 Marks (250 words)

Section A 4 x 10 (4 out of 6) : 40 Marks (600 - 700 words)

Total : 75 Marks

UG - Core and Allied courses:

ESE Question Paper Pattern: $5 \times 15 = 75$ Marks

Question from each unit comprising of

One question with a weightage of 2 Marks : $2 \times 5 = 10$

One question with a weightage of 5 Marks (Internal Choice at the same CLO level): $5 \times 5 = 25$

One question with a weightage of 8 Marks (Internal Choice at the same CLO level): $8 \times 5 = 40$

End Semester for UG / PG - Advance Learner Courses

Section A 5 questions out of 8 - open choice 5x5 :25 marks

Section B 5 questions out of 8-open choice 5x10 :50 marks

ESE Practical Pattern

The End Semester Examination will be conducted for a maximum of 75 marks respectively with a maximum 15 marks for the record and other submissions if any.

Project:

Evaluation of Individual / Group Project & Viva Voce for UG & PG

I Review - Selection of the field of study, : 5 Marks

Topic & literature collection

II Review - Research Design : 10 Marks

& Data Collection

III Review – Analysis & Conclusion : 10 Marks

Preparation of rough draft

Total : 25 Marks

End semester examination:

Evaluation of the project : 25 Marks

Viva Voce : 50 Marks

Total : 75 Marks

Total : 25 marks

ESE Practical Pattern

The End Semester Examination will be conducted for a maximum of 75 marks respectively with a maximum 15 marks for the record and other submissions if any.

COURSE	PROGRAMME OUTCOMES				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
CY24C01					
CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	M	S
CLO2	S	S	M	S	M
CLO3	M	S	S	S	S
CLO4	S	M	S	S	S
PP22C02					
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S
CY24C03					
CLO1	S	M	S	S	M
CLO2	S	S	S	S	M
CLO3	S	M	M	S	S
CLO4	S	M	S	S	S
CY24CP1					
CLO1	S	S	M	S	M
CLO2	S	S	S	S	S
CLO3	S	S	S	S	M
CLO4	S	S	M	S	S

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY24C01	PROGRAMMING IN C	Theory	58	2	-	3

Preamble

This course introduces fundamental programming constructs in C. It covers the concepts such as arrays, functions, structures, pointers and file handling. It provides comprehensive coverage on industry 4.0.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the programming constructs and structure of C programming and Industry 4.0 technologies	K1
CLO2	Understand the purpose of arrays, strings, structures, pointers and files to solve problems	K2
CLO3	Apply functions to solve problems using procedure oriented approach	K3
CLO4	Analyze the problems and solve it by applying appropriate logic	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

S- Strong; M-Medium

PROGRAMMING IN C – CY24C01

58 Hrs

Syllabus

Unit I

(12 Hrs)

Overview of C - Constants, Variables and Data types - Operators and Expressions - Managing Input and Output Operations - **Decision Making and Branching - Decision Making and Looping.**

Unit II

(12 Hrs)

Arrays: One-Dimensional - Two Dimensional - Multidimensional Arrays-Character Arrays and Strings: Declaring and Initializing String Variables - Reading Strings from Terminal - Writing Strings to Screen - String Handling Functions.

Unit III

(12 Hrs)

User-Defined Functions: Need - Return Values and Types - Function Calls - Function declaration - Category of Functions - No Arguments and No Return Values - Arguments but No Return Values - Arguments with Return Values - Recursion - Scope Visibility and Life time of Variables
Structure Definition: Structure Initialization - Comparison of Structure Variables - Arrays of Structures - Arrays within Structures

Unit IV

(12 Hrs)

Pointers: Understanding Pointers - Accessing the Address of a Variable - Declaring and Initializing Pointers - Accessing a Variable through its Pointers - **Pointers and Arrays - Pointers and Character Strings** - Pointers and Functions .

File Management in C: Defining and Opening a File - Closing File - **I/O Operations on Files - Error Handling during I/O Operations** - Command Line Arguments.

Unit V

(10 Hrs)

Introduction to Industry 4.0 - Need - Reasons for Adopting Industry 4.0 - Definition - Goals and Design Principles - **Technologies of Industry 4.0** - Skills required for Industry 4.0 - Advancements in Industry - **Impact of Industry 4.0 on Society, Business, Government and People - Introduction to 5.0.**

Text Book

S. No	Author	Title of the Book	Publisher	Year and Edition
1	E. Balagurusamy	Programming In ANSI C	Tata Mc Graw Hill	2019,8 th Edition
2	P. Kaliraj, T. Devi	Higher Education for Industry 4.0 and Transformation to Education 5.0	CRC Press - Taylor & Francis Group	2021,1 st Edition

Reference Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Byron Gottfried	Programming with C	Tata McGraw Hill	2018,4 th Edition
2	Yashwvant Kanetkar	Let Us C: Authentic Guide to C Programming Language	BPB Publications	2020,17 th Edition

Pedagogy

- Lectures, Group discussions, Demonstrations

Course Designer

Dr. Sabitha Banu A

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
PP22C02	COMPUTATIONAL AND ALGORITHMIC THINKING FOR PROBLEM SOLVING	Theory	45	-	-	3

Preamble

- This course aims to kindle the young minds to think like a computer scientist, with the idea that Computing and computers will enable the spread of computational thinking.
- Computational thinking is thinking recursively, reformulating a seemingly difficult problem into one which we know how to solve and taking an approach to solving problems, designing systems, and understanding human behavior that draws on concepts fundamental to computer science

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Define the basic principles of logical reasoning, problem solving in computational thinking	K1
CLO2	Understanding the applications of propositional logic, problem representation and techniques	K2
CLO3	Apply algorithmic thinking to problem solving using tools	K3
CLO4	Apply and analyze to solve domain specific problems using computational thinking concepts	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S

S - Strong; M - Medium

45 Hrs

COMPUTATIONAL AND ALGORITHMIC THINKING FOR PROBLEM SOLVING Syllabus

Unit I

(7 Hrs)

Basics: Introduction to Computational Thinking- Data Logic - History of Computational Thinking- Applications of Computational Thinking.

Unit II

(8 Hrs)

Data- Information and Data - Data Encoding - Logic - Boolean logic - Applications of simple Propositional Logic. Tool: Flowgorithm and Scratch.

Unit III**(10 Hrs)**

Problem Solving and Algorithmic Thinking: Problem definition- Logical reasoning- Problem decomposition- Abstraction- Problem representation via Algorithmic thinking: Name binding- Selection- Repetition and Control Abstraction- Simple Algorithms – Comparison of performance of Algorithms

Unit IV**(8 Hrs)**

Activities in Class: Sudoku-Towers of Hanoi- Graph Coloring-Geographical Map reading- Poem reading-Novel reading- Data analysis on news.

Unit V**(12 Hrs)**

Problem Solving Techniques- Factoring and Recursion Techniques- Greedy Techniques-Divide and Conquer- Search and Sort Algorithms- Text Processing and Pattern matching. Tool: iPython

Text Book

S. No	Author	Title of the Book	Publisher	Year and Edition
1	David Riley and Kenny Hunt	Computational Thinking for Modern Solver	Chapman & Hall/CRC	2014,1 st Edition
2	Paolo Ferragina, Fabrizio Luccio	Computational Thinking First Algorithms	Springer	2018,1 st Edition
3	Karl Beecher	Computational Thinking – A beginner’s guide to problem solving	BSC publication	2017,1 st Edition

Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies

Evaluation Pattern:

Assessment	Number	Marks
Quiz (online or offline)	5	50
Class Activity	5	25
Group Project (Domain Specific)	1	25
Total		100

Course Designer

Mrs.P.Yashodha

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY24C03	IT Fundamentals for Cyber Security	Theory	58	2	-	3

Preamble

This course provides the fundamentals of computers and understanding the key issues associated with protecting information assets. The purpose of the course is to provide an overview of the field of cyber security, cybercrime and information assurance.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the concepts of cyber security and Information Security	K1
CLO2	Understand the concepts of cyber security threats, importance and challenges in Cyber Security.	K2
CLO3	Develop the applications by cyber security tools.	K3
CLO4	Analyze & implement the real- time applications by Cyber Security tools.	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	M
CLO2	S	S	S	S	M
CLO3	S	M	M	S	S
CLO4	S	M	S	S	S

S- Strong; M-Medium

IT FUNDAMENTALS FOR CYBER SECURITY –CY24C03

SYLLABUS

58 HRS

Unit I

(12 Hrs)

Introduction: Generations of Computer, **Types of Computer** - Functional units of a computer system- **Input Devices -Output devices – Memory – Storage Devices**. Number Systems: Decimal, Binary, Octal and Hexadecimal – Conversion –Computer Codes- Binary Addition, Subtraction- Complements.

UNIT II

(12 Hrs)

Information security: History of IS-What is security -**characteristic of IS**-components of an Information system –**Security System Development Life Cycle model**. – Information Security for technical Administrators: server security- network security

Unit III**(12 Hrs)**

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Challenges and Constraints, Computer Criminals -Assets and **Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks- CIA Triad -Taxonomy of various attacks, IP spoofing-Types of Threats**

Unit IV**(12 Hrs)**

Cyber Security Tools-Kali Linux-Nmap-Wireshark-Metasploit-Burpsuite-Sql Injection-Password Cracking Tool.

UNIT V**(10 Hrs)**

Cybercrime: Definition and Origin of the World-Cybercrime and Information Security-CyberCriminals –Classification of Cybercrimes- Methods of defense, Security Models, risk management, Cyber Threats- Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage.

Text Books

S.No	Author	Title of the Book	Publishers	Year and Edition
1	P K Sinha&PritiSinha	Computer Fundamentals	BPB Publications	2017 ,6 th Edition
2	Donaldson, S., Siegel, S., Williams, C.K., Aslam, A	“Enterprise Cyber security - How to Build a Successful Cyber defense Program against Advanced Threats	A Press	2015,1 st Edition
3	Nina Godbole, Sumit Belapure	Cyber Security: Understanding Cyber Crimes,Computer Forensics and Legal Perspectives,	Wiley	2011,1 st Edition

Reference Books

S.No	Author	Title of the Book	Publishers	Year and Edition
1	Devan N. Shah	Information Security Principles and Practice	Wiley India	2009, 1 st Edition
2	George K.Kostopoulous	Cyber Space and Cyber Security	CRC Press	2013, 1 st Edition

Pedagogy

- Chalk and talk PPT, Discussion, Assignment, Demo, Quiz, Case study.

Course Designer

Dr.R.Divya

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY24CP1	C Programming and Cyber Security Tools Lab	PRACTICAL	-	-	45	2

Preamble

The course gives hands-on experience on C Programming and improves the practical skill set. The learner will be able to develop the logic for the given problem, recognize and understand the syntax and construction of C code. The course involved in compiling, linking and debugging C code and developing some complex programs

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Outline the logic using flowchart for a given problem and develop Programs using conditional and looping statements.	K1
CLO2	Develop programs with cyber security tools and concepts of arrays, functions, stringhandling functions and parameter passing techniques.	K2
CLO3	Construct programs with features of Structure and Pointers.	K3
CLO4	Develop readable programs with files for reading input and storing the output with perform operations.	K4

Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	S	M
CLO2	S	S	S	S	S
CLO3	S	S	S	S	M
CLO4	S	S	M	S	S

S- Strong; M-Medium

C PROGRAMMING AND CYBER SECURITY TOOLS LAB- CY24CP1

45 Hrs

Programs List

- Exercise in basics Operations Statement.
- Exercise in Control Structures.
- Exercise in arrays.

- Exercise in String handling functions.
- Exercise in User defined functions
- Exercise in Structure.
- Exercise in Pointers.
- Set up Kali Linux in a virtual machine and set up a network Adapter.
- Scan the network for Kali Linux and Windows target machines in local network and virtual network.
- Identify the open ports using NMAP.
- Sniffing using Wireshark Tool.

Pedagogy

Demonstration of working environment/Tools/Software/Program

Course Designer

Dr.R.Divya