PSGR
Krishnammal College for Women

DEPARTMENT OF COMPUTER SCIENCE WITH CYBER SECURITY

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

B.Sc. COMPUTER SCIENCE WITH CYBER SECURITY

2023-2026 BATCH

After Completion of the programme, the student will be able to

PLO1: Design, implement, and evaluate a computer network and information security needs of an organization.

PLO2: Analyze and evaluate the cyber security needs of an organization and society.

PLO3: Explore Current and emerging techniques and technologies to formulate solutions for systems and organizations.

PLO4: Pursue higher studies in the specialized area and also promote life-long learning for professional development.

PLO5: Recognize as world class professionals in IT and in cybercrime and produce women entrepreneurs to increase more employability.

PROGRAMME SPECIFIC OUTCOMES (PSO's)

The students at the time of graduation will

PSO1: Professionally be equipped in the areas of cyber security tools and cyber/computerforensics software/tools.

PSO2: Apply the knowledge of technology and characterize privacy, legal and ethical issues of information security.

PSO3: Analyze modern cyber security tools and applications for their successful Career, to create platforms to become an entrepreneur and a relish for higher studies.

PSGR Krishnammal College for Women

Department of Computer Science With Cyber Security
Choice Based Credit System & Learning Outcomes Based Curricular Framework
B.Sc. Computer Science with Cyber Security - 2023 -2026 Batch

Semester	Part	Subject Code	Title of Paper	Category	Instruction Hours / Week	Contact Hours	Tutorial Hours	Duration of Examination	Examination Marks			Credits
									CA	ESE	Total	
I	I	TAM2301A/ HIN2301A/ FRE2301A	Language I	Language	4	58	2	3	25	75	100	3
	II	ENG2301A	English Paper I	English	4	58	2	3	25	75	100	3
	III	IN23C01	Core 1: Computer Programming	CC	4	58	2	3	25	75	100	3
	III	PP22C02	Core 2: Computational and Algorithmic Thinking for Problem Solving	CC	3	45	-	-	100#	-	100	3
	III	CY23CP1	Lab 1: Computer Programming Lab	CC	3	45	-	3	15	35	50	2
	III	AP23C03	Core 3: Operating Systems Fundamentals - Linux	CC	4	58	2	3	25	75	100	3
	III	TH23A03	Allied A1: Numerical and Statistical Techniques	GE	6	88	2	3	25	75	100	5
	IV	NME23ES	Introduction to Entrepreneurship	AEC	2	30	-	-	100		100	2
		NME23A1/ NME23B1	Advance Tamil/ Basic Tamil			28	2	2				
II	I	TAM2302A / HIN2302A/ FRE2302A	Language II	Language	4	58	2	3	25	75	100	3
	II	ENG2302A	English Paper II	English	4	58	2	3	25	75	100	3
	III	IN23C04	Core 4: Computer Programming-II	CC	5	73	2	3	25	75	100	3

	III	IN23C05	Core 5: Data Structures and Algorithms.	CC	4	58	2	3	25	75	100	3
	III	CY23CP2	**Lab2:** Computer Programming Lab-II	CC	5	75	-	3	15*	35*	50	3
	III	TH23A32	**Allied A2:** Number Theory and Algebra	GE	6	88	2	3	25	75	100	5
	IV		Open Course: (Self study - Online Course)	AEC	-	-	-	-	-	-	-	Grade
		NME23A2/ NME23B2	**Advance Tamil/Basic Tamil-II	AEC	2	-	-	-	100	-	100	Grade
	V	23PEPS1	Professional English for Physical Sciences	AEC	2	25	5	-	100	-	100	2
	VI	NM23GAW	General Awareness	AEC	Self Study	-	-	OT	100	-	100	Grade
III	I	TAM2303A / HIN2303A/ FRE2303A	Language III- Tamil III/ Hindi III/ French III	L	4	58	2	3	25	75	100	3
	II	ENG2303A	English Paper III	E	4	58	2	3	25	75	100	3
	III	CY23C06	**Core 6**: Computer Networks and Security	CC	4	58	2	3	25	75	100	3
	III	CY23C07	**Core 7**:Fundamentals for Cyber Security and Cryptography	CC	4	58	2	3	25	75	100	3
III/IV	III	CY23SCE1/ CS23SBGP	**Coursera**:Foundations of Cyber Security/ **SBS I**:Gen-A1	SEC	3	45/44	-/1	-	100	-	100	3
III	III	TH23A13	**Allied 3**:Optimization Techniques	GE	4	58	2	3	25	75	100	3
	III	CY23CP3	**Lab 3:** Cyber Security Tools Lab-I	CC	5	75	-	3	15*	35*	50*	3
	IV	NM23DTG	Design Thinking	AEC	2	30	-	-	100	-	100	2
	IV	NM22UHR	Universal Human Values and Human Rights #	AECC	-	-	-	-	100	-	100	Grade
I-V	VI	16BONL1 16BONL2	Online Course I Online Course II	ACC	-	-	-	-	-	-	-	-
III	IV		Job Oriented course : Security +	-	-	-	-	-	-	-	-	-
IV	I	TAM2304A/ HIN2304A/ FRE2304A	Tamil Paper IV/ Hindi Paper IV/ French Paper IV	L	4	58	2	3	25	75	100	3
IV	II	ENG2304A	English Paper IV	E	4	58	2	3	25	75	100	3

IV	III	CY23C08	Vulnerability Assessment and Penetration Testing	**CC**	4	58	2	3	25	75	100	3
IV	III	CY23CP4	VAPT and DBMS Lab	CC	5	75	-	3	15*	35*	50*	2
IV	III	CY23C09	Database Management System	**CC**	4	58	2	3	25	75	100	3
IV	III	CY23A01 CY23A02	Cyber Security and Cyber Law Cyber Threats and Modeling	**GE**	4	58	2	3	25	75	100	3
III/IV	III	CS23SBGP/ CY23SCE1	Gen AI/ Foundations of Cyber Security	**SEC**	3	45	-	-	100	-	100	3
IV	IV	NM23EII	Entrepreneurship and Innovation(IgniteX)	**AECC**	2	30	-	-	100	-	100	2
I-IV	VI	COM15SER	Community Services 30 Hrs	GC	-	-	-	-	-	-	-	-
IV	V	COCOACT	Co-Curricular Activity	GC	-	-	-	-	100	-	100	1
IV	IV	NM23EVS	Environmental Studies	AECC	SS	-	-	-	100	-	100	Gr
IV	VI	16BONL1 16BONL2	Online Course-I Online Course-II	**ACC**	-	-	-	-	-	-	-	-

*CA conducted for 25 and converted in to 15, ESE conducted for 75 and converted in to 35

CC: Core Courses CA: Continuous Assessment

GE: Generic Elective ESE : End Semester Examination

AEC: Ability Enhancement Course SEC: Skill Enhancement Course

AECC: Ability Enhancement Compulsory Course

#-Self Study

ACC-Additional Credit Course

Question Paper Pattern

2023-24 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 x 3 = 6

One question with a weightage of 5 Marks (Internal Choice at the same CLO level) :5 x 3 =15One question with a weightage of 8 Marks (Internal Choice at the same CLO level) :8 x 3 =24 Total :45 Marks

ALC

Section A (Paragraph answer) (4 out of 6) 4 x 4 : 16 MarksSection
B (Essay type) 1 out of 2 : 9 Marks

Total : 25 Marks

End Semester Examination – Question Paper Pattern and Distribution of MarksLanguage 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 x 15 = 75 Marks

Question from each unit comprising of

One question with a weightage of 2 Marks : 2 x 5=10

One question with a weightage of 5 Marks (Internal Choice at the same CLO level): 5 x 5=25One question with a weightage of 8 Marks (Internal Choice at the same CLO level): 8 x 5=40

End Semester for UG / PG - Advance Learner Courses Section A 5 questions out of 8 - open choice 5x5 :25 marksSection 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 & PGI 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 MarksViva 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 respectivelywith a maximum 15 marks for the record and other submissions if any.

Evaluation Pattern of Entrepreneurship and Innovation (Ignite X)

Components	**Marks**
3 Quizzes (25 questions in each quiz)	50
30 Venture Activities (Assignment)	30
Milestone 3 (pitch deck presentation)	20
Total	100

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COURSE	PROGRAMME OUTCOMES				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
IN23C01					
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
CY23CP1					
CLO1	S	S	M	S	M
CLO2	S	S	S	S	S
CLO3	S	S	S	S	M
CLO4	S	S	M	S	S
AP23C03					
CLO1	M	M	S	S	S
CLO2	S	S	S	S	S
CLO3	S	S	S	S	S
CLO4	S	S	M	S	S
IN23C04					
CLO1	S	S	S	S	M
CLO2	S	S	S	M	S

CLO3	S	M	S	S	M
CLO4	S	S	S	S	S
IN23C05					
CLO1	S	M	M	S	S
CLO2	S	M	S	M	M
CLO3	M	M	S	M	S
CLO4	S	S	S	M	S
CY23CP2					
CLO1	S	S	M	S	M
CLO2	S	S	S	M	S
CLO3	S	M	S	S	M
CLO4	S	S	M	S	S
CY23C06					
CLO1	M	S	M	S	M
CLO2	S	M	M	S	M
CLO3	M	S	S	S	S
CLO4	S	S	S	S	S
CY23C07					
CLO1	S	M	S	S	M
CLO2	S	S	S	S	M
CLO3	S	M	M	S	S
CLO4	S	M	S	S	S
CS23SBGP					
CLO1	S	S	S	S	M
CLO2	S	S	S	S	S

CLO3	S	S	M	S	S
CLO4	S	M	S	M	S
CY23CP3					
CLO1	S	S	M	S	M
CLO2	S	S	S	S	M
CLO3	S	S	M	S	S
CLO4	S	S	S	S	S
CY23C08					
CLO1	S	S	M	M	S
CLO2	M	M	S	S	M
CLO3	S	S	S	M	S
CLO4	M	S	S	M	M
CY23CP4					
CLO1	M	M	S	S	S
CLO2	M	M	S	S	S
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S
CY23C09					
CLO1	M	S	M	S	M
CLO2	S	M	M	S	M
CLO3	M	S	S	S	S
CLO4	S	S	S	S	S
CY23A01					
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M

CLO3	S	S	S	M	M
CLO4	S	S	S	M	S
CY23A02					
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	M	M
CLO4	S	S	S	M	S

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN23C01	COMPUTER PROGRAMMING	Theory	58	2	-	3

Preamble

The course covers basic knowledge of Python Programming. It defines the Conditional Statements &Loops, Functions, Tuples, Python data structures and Exception & its tools.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the technical strengths, Python Interpreter and the program execution.	K1
CLO2	Understand the purpose of operations, strings, lists, tuples 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	M	S
CLO2	S	S	M	S	M
CLO3	M	S	S	S	S
CLO4	S	M	S	S	S

S- Strong; M-Medium; L-Low

Computer Programming- IN23C01 58 Hrs

Syllabus

UNIT I (10 Hrs)

Introduction: Why do people use python- Python a scripting language- **Users of Python- Need of Python- Python's Technical Strengths**- How Python runs programs: Introducing the Python Interpreter- Program Execution-Execution Model Variation: Python Implementation Alternatives.

UNIT II (12 Hrs)

Types & Operations: Numbers Types: Numeric type basics, Numbers in action, Other numeric types- Strings Fundamentals: String Basics, String Literals, Strings in action, String Methods – Lists and Dictionaries-Tuples- Files.

UNIT III (12 Hrs)

Control Flow: Statements& Syntax: Assignment-Expressions & Print- if tests-While& for loops. Functions: Function Basics: Why use functions- Coding Functions- Definition & Calls. Scopes: Python basics-Global Statement-Scopes Nested functions -Arguments: Arguments passing Basics- Special Arguments Matching Modes.

UNIT IV **(14 Hrs)**

Classes &OOP: OOP: Introduction-Class Coding Basics- Class Coding details: Class statement- **Methods-Inheritance**. Designing with classes: Python and OOP-OOP Inheritance, **Composition, Delegation-Methods and Classes act as Objects**-Multiple Inheritance- Exception &Tools: Exception Basics-Exception Coding Details.

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

Sno	Author	Title of the Book	Publisher	Year of Publication
1	Mark Lutz	Learning python(Unit I-IV)	O'Reilly Publication	5th edition, 2013
2	P.Kaliraj , T.Devi	Higher Eduaction for Industry 4.0 and Transformation to Education 5.0(unit-V)	CRC Press Taylor and Francis Group	1st Edition 2021

Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Mark Summerfield	Programming in python 3	Pearson Education	2009.
2	Mark Pilgrim	Dive into python 3	Apress publication	2011
3	Richard L. Halterman	Fundamentals of Python Programming	Southern Adventist University	2017

Pedagogy

- Lectures, Group discussions, Demonstrations

Course Designer

Dr . R. Divya

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; L – Low

COMPUTATIONAL AND ALGORITHMIC THINKING FOR PROBLEM SOLVING - PP22C02

45 Hrs

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 of Publication
1	David Riley and Kenny Hunt	Computational Thinking for Modern Solver	Chapman & Hall/CRC	2014
2	Paolo Ferragina, Fabrizio Luccio	Computational Thinking First Algorithms	Springer	2018
3	Karl Beecher	Computational Thinking – A beginner's guide to problem solving	BSC publication	2017

Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies

Course Designer

Mrs. V. Deepa

Evaluation Pattern:

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

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23CP1	COMPUTER PROGRAMMING LAB	PRACTICAL	-	-	45	2

Preamble

The course gives hands-on experience on Python 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 Python code. The course involved in compiling, linking and debugging Python 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	Identify the basic terminologies of Python programming such as data types, conditional statement, looping statements and functions.	K1
CLO2	Develop programs with implementation of operators & I/O operations	K2
CLO3	Construct programs with features of Lists, Strings.	K3
CLO4	Develop readable programs with files for Exception handling concepts.	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; L-Low

PYTHON PROGRAMMING LAB- CY23CP1 45 Hrs

Program List

- Exercise programs on basic control structures & loops.
- Exercise programs on operators & I/O operations.
- Exercise programs on Python Script.

- Exercise programs on Lists.
- Exercise programs on Strings.
- Exercise programs on functions.
- Exercise programs on recursion & parameter passing techniques.
- Exercise programs on Tuples.
- Exercise programs on file.
- Exercise programs on Exception handling concepts.
- Exercise program to ping two Network Machine using TCP code.
- Exercise program to Hash Encryption and Decryption giving data.

Pedagogy

- Demonstration of working environment/Tools/Software/Program

Course Designer

Dr. R. DIVYA

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
AP23C03	OPERATING SYSTEMS FUNDAMENTALS - LINUX	Theory	58	2	-	3

Preamble

This subject is designed to provide the students with a thorough discussion of the fundamentals of operating system.To explore the various memory management scheme and to perform administrative task on LINUX servers.

Course Learning Outcomes

CLOs Number	CLO Statement	Knowledge Level
CLO1	Recall the basic concepts with functions of operating systems and Linux system.	K1
CLO2	Understand the operating systems objectives and functionality along with system programs and system calls.	K2
CLO3	Compare and contrast various memory management schemes.	K2
CLO4	Demonstrate deadlock, prevention and avoidance algorithms, storage management, various scheduling algorithms and shell programming.	K3

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium; L-Low

OPERATING SYSTEMS FUNDAMENTALS - LINUX – AP23C03 (58 hours)

SYLLABUS

UNIT I **(12 Hrs)**

Introduction: What is operating systems do ? - **Computer System Architecture**- **Operating-System Operations.** Process Management: **Process Concept**-Process Scheduling- Operations on Processes- Interprocess communication.

UNIT II **(12 Hrs)**

Process Scheduling: **Basic Concepts- Preemptive and Nonpreemptive Scheduling**-Scheduling Criteria-SchedulingAlgorithms (FCFS, SJF & Round Robin only)

Synchronization: **Back ground**-The Critical Section Problem-Peterson's Solution-Semaphores-The Dining Philosopher's Problem.

Deadlock: **Deadlock Characterization**-Methods Handling Deadlocks-Recovery from Deadlock.

UNIT III **(11 Hrs)**

Memory Management Strategies: **Background-Contiguous Memory Allocation**-Paging- Basic Method. Virtual Memory Management: Demand Paging-Page Replacement - Basic Page Replacement, **FIFO Page Replacement**, Optimal Page Replacement, LRU Page Replacement, Counting-Based Page Replacement.

UNIT IV **(11 Hrs)**

What Linux Is – Becoming a Linux Power User: About Shells and Terminal Windows- Choosing your shell - **Running Commands-Recalling Commands Using Command History**-Connecting and Expanding Commands-Using Shell Variables.

UNIT V **(12 Hrs)**

Moving Around the File system: Using Basic File System Commands - Using Meta characters and Operators-**Listing Files and Directories**-Understanding File Permissions and Ownership-Moving, Copying, and Removing Files.

Text Books

S.no	Author	Title of book	Publisher	Year of publication
1	Abraham Silberschatz, Peter Baer Galvin, G Gagne	Operating Systems Concepts	Wiley Publishers, 10th Edition	2018
2	Christopher Negus	Linux Bible	Wiley,10th Edition	2020

Reference Books

S.no	Author	Title of book	Publisher	Year of publication
1	Archer J harries	Operating System	Tata Mc Graw Hill 2nd Edition	2011
2	Williams E. Shotts	The Linux Command Line: A Complete Introduction	John Wiley & Sons,, 2nd Edition	2019
3	Jason Cannon	Linux for Beginners	Createspace Independent Pub	2014

Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies

Course Designer

Mrs. G. Sangeetha

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN23C04	COMPUTER PROGRAMMING -II	THEORY	73	2	-	3

Preamble

- *This course introduces fundamental programming constructs in C.*
- *It covers the concepts such as arrays, functions, structures, pointers and file handling.*

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	K1
CLO2	Understand the concept and techniques 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	M
CLO2	S	S	S	M	S
CLO3	S	M	S	S	M
CLO4	S	S	S	S	S

S- Strong; M-Medium; L-Low.

Computer Programming-II- IN23C04 (73 Hrs)

Syllabus

Unit I **15 Hrs**

Overview of C - Constants –Variables - Keywords and Data types – Structure of C program, Compilation and Execution - Operators and Expressions - Managing Input and Output Operations - Decision Making and Branching: Decision Making , Looping and Case Control Structure

Unit II **15 Hrs**

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

Unit III **14 Hrs**

User-Defined Functions: Need - Types: Calling a Function - Category of Functions - No Arguments and No Return Values - Arguments but No Return Values - Arguments with Return Values – Nesting of Functions - Recursion – Scope Visibility and Life time of Variables.

Structure Definition: Structure Initialization - Comparison of Structure Variables - Arrays of Structures - Arrays within Structures.

Unit IV **15 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.

Unit V **14 Hrs**

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

Text Book

S. No	Author	Title of the Book	Publisher	Year of Publication
1	E. Balagurusamy	Programming in ANSI C (Unit I – V)	McGraw Hill Education	8th Edition, 2019

Reference Books

S. No	Author	Title of the Book	Publisher	Year of Publication
1	Byron Gottfried	Programming with C	Tata McGraw Hill	3rd Edition, 2013
2	Yashavant Kanetkar	Let us C	BPB Publications	13th Edition, 2014
3	Martin J. Gentile	An Easy Guide to Programming in C	Create Space Independent Publishing Platform	2nd Edition, 2012

Pedagogy

- Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar.

Course Designer

Dr. S. Nithya

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN23C05	DATA STRUCTURES AND ALGORITHMS	THEORY	58	2	-	3

Preamble

To provide an overview of data structures and algorithm design methods for programming and problem-solving process

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall about the concepts of Arrays, Stack, Queue, Link List, Trees and Graph.	K1
CLO2	Understand sorting, searching and hashing algorithm	K2
CLO3	Apply the data structures to solve various computing algorithms and sorting algorithms.	K3
CLO4	Analyze lists, queues, stacks, trees and graph according to the needs of different applications	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium; L-Low

DATA STRUCTURES AND ALGORITHMS- IN23C05 58 Hrs

Syllabus

UNIT-I 12 Hrs

Introduction to Data Structure: Definition, Basic Terminology, Elementary Data Organization - Types of Data Structures- Linear & Non-Linear Data Structures-Data Structure Operations. Algorithm Specifications: Performance Analysis and Measurement (Time and space analysis). **Abstract Data Types- Advantages of ADT.** Array: Representation of arrays, Types of arrays, Applications of arrays, Sparse matrix and its representation**.**

UNIT-II 12 Hrs

Stacks and Queues: Stack-Stack Representation & Implementation-Stack Operations-**Applications of Stack.** Queue-Queue Representation & Implementation-Queue Operations-**Types of Queues**.

UNIT-III 11 Hrs

Linked List: Linked List as Data Structures- Representation of Linked List-Operations on Linked List-Stack as Linked List-Queue as Linked List-**Doubly Linked List-Circular List**

UNIT-IV 13 Hrs

Trees: Preliminaries-Binary Trees-**B-Trees**. Graph: Graph Terminologies-**Types of Graphs**-Graph Representation. **Hashing: Hash Functions.** Sorting: Bubble Sort-Selection Sort-QuickSort-Heap Sort-Merge Sort

UNIT-V 10 Hrs

Algorithm Design Techniques: Greedy Algorithms - Prim's Algorithm, Kruskal's Algorithm. **Divide and Conquer: Running Time of Divide and conquer algorithms.** Decrease and Conquer- Depth First Search and Breadth First Search. Backtracking Algorithms - n Queens Problem, **Branch and Bound – Traveling Salesman Problem**

Text Books

S.No.	Authors	Title	Publishers	Year of Publication
1.	Rajesh K. Shukla	Data Structures using C & C++	Wiley India	2009
2.	Seymour Lipschutz, G A Vijayalakshmi Pai	Data Structures	Tata McGraw-Hill	2014

Reference Books

S.No.	Authors	Title	Publishers	Year of Publication
1.	Anany Levitin	Introduction to Design and Analysis of Algorithms	Pearson Education	2009
2.	Wisnu Anggoro	C++ Data Structures and Algorithms	Packt Publishing	2018
3.	YedidyahLangsam, Moshe J.Augentein, aron M.Tenenbaum	Data Structures using C & C++	PHI Learning, 2nd Edition	2009

Pedagogy

Chalk & talk, PPT, Group Discussion, Assignment, Demo, Quiz, Role play

Course Designer

Dr. R. Jeevitha

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23CP2	COMPUTER PROGRAMMING LAB-II	PRACTICAL	-	-	75	3

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 andconstruction of C code. The course involved in compiling, linking and debugging C code and developing some complex programs.

Course 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 concepts of arrays, functions, string handling 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	M	S
CLO3	S	M	S	S	M
CLO4	S	S	M	S	S

S- Strong; M-Medium; L-Low

Computer Programming Lab-II- CY23CP2 **75 Hrs**

Program 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 Recursion function.
- Exercise in Structure.
- Exercise in Pointers.

- Exercise in file operations.
- Exercise in Command Line Arguments
- Exercise of implementing queue.
- Exercise of implementing Linked List
- Create a C program to prevent buffer overflow attacks
- Create a C program to perform File Security System.

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23C06	Computer Networks and Security	Theory	58	2	-	3

Preamble

To provide security of the data over the network and to compare OSI and TCP/IP architectures

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 and terminologies of OSI model, network security and cryptography	K1
CLO2	Understand the OSI and TCP/IP models.	K2
CLO3	Apply various cryptographic algorithms	K3
CLO4	Analyze how the protocols and services work.	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

Computer Networks and Security-CY23CO6 **58 Hrs**

Syllabus

UNIT I **(11 Hrs)**

Introduction: Network, Uses of Networks, Types of Networks**, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Architecture of Internet. Physical Layer:** Guided transmission media, Wireless transmission media, Switching

UNIT II **(13 Hrs)**

Data Link Layer: Design issues, **Error Detection & Correction**, Elementary Data Link Layer Protocols, Sliding window protocols, Multiple Access Protocols, Data link layer switching. Network Layer: Network Layer Design issues, store and forward packet switching, connection less and connection-oriented networks-routing algorithms, IP addresses, IPv4 and IPv6 Protocol, ARP, RAR

UNIT III **(12 Hrs)**

Transport Layer: connection establishment, Connection release, Error Control & Flow Control, Crash Recovery. **The Internet Transport Protocols: UDP, TCP.** Application Layer: providing services, Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET

UNIT IV **(11 Hrs)**

Network security- Examples of security violations - **Computer security concepts**-confidentiality-Integrity-Availability-Accountability, Challenges of computer security Hacking-Vulnerability-threats-attacks- **Active attacks and passive attacks-types**- **Denial of service attacks**-Model for network security

UNIT V **(11 Hrs)**

Internet Security-Transport Layer Security-Web Security Considerations-**HTTPs-Secure Shell-Wireless Network Security**-**Mobile Device Security**-Electronic Mail Security-Internet Mail Architecture-Email Formats-Email Threats and Comprehensive Email Security-DNS-Based Authentication of Named Entities.

Text Book

S. No	Author	Title of the Book	Publisher	Year and Edition
1.	Andrew S. Tanenbaum, David J. Wetherall	Computer Networks	Prentice Hall Press	2018,2nd Edition
2.	William Stallings	Network Security Essentials Applications and Standards	Pearson Education	2018,6th Edition
3	William Stallings	Cryptography & Network Security	Pearson Education	2018,7th Edition

Reference Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Atul Kahate	Cryptography and Network Security	McGraw Hill	2011 ,3rd Edition
2	C K Shyamala, N Harini, Dr T R Padmanabhan	Cryptography and Network Security	Wiley India	2011,1st Edition

Pedagogy

- Chalk and talk PPT, Discussion, Assignment, Demo, Quiz, Flipped mode.

Course Designers

Dr.Sabitha Banu

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23C07	Fundamentals for Cyber Security and Cryptography	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

Fundamentals for Cyber Security and Cryptography -CY23C07

Syllabus **58 Hrs.**

UNIT I **(11 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 II **(13Hrs)**

Introduction to Cyber Security: Basic Cyber Security Concepts, **layers of security**, Vulnerability, threat, Harmful acts, Internet Governance – 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, Methods of defense, Security Models, risk management, **Cyber Threats- Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage.**

UNIT III **(12 Hrs)**

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

UNIT IV **(11 Hrs)**

Cryptography: Concepts and techniques-**Plain text and cipher text**- Encryption Principles-Cryptanalysis. Authentication methods-passwords-**keys versus passwords**-Attacking Systems via passwords-**Password verification**

UNIT V **(11 Hrs)**

Applications of cryptographic Hash Functions: Message authentication- **Digital Signatures**-Other Applications-**Two simple Hash Functions**—Steganography tools and techniques.

Text Book

S.No	Author	Title of the Book	Publishers	Year and Edition
1	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	2015,1st Edition
2	Nina Godbole, Sumit Belapure	Cyber Security: Understanding Cyber Crimes,Computer Forensics and Legal Perspectives	Willey	2018,1st Edition
3	William Stallings	Cryptography and Network Security: Principles and Practices	PHI	2020,7th 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	2009,1st Edition
2	George K.Kostopoulous	Cyber Space and Cyber Security	CRC Press	2013,1st Edition

Pedagogy

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

Course Designer

Mrs P.Yashodha

Course Number	Course Name	Category	L	T	P	Credit
CS23SBGP	**SBS I - Gen-AI**	Practical	44	1	-	3

Preamble

The objective of this course is to understand the breadth and depth of Generative Artificial Intelligence (Gen AI) and to impart knowledge on its ethical implications, practical applications, and emerging trends

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the fundamental concepts and ethical considerations of Generative AI.	**K2**
CLO2	Apply AI principles in practical settings using basic AI tools and platforms	**K3**
CLO3	Develop advanced skills in specialized AI applications such as text analysis, natural language processing, and image recognition.	**K3**
CLO4	Explore emerging trends in AI, integrating advanced AI tools into diverse professional practices.	**K4**

Mapping with Programme Outcomes

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

S- Strong; M-Medium

SBS I: Gen-AI - CS23SBGP (45 Hrs)

Unit 1: Introduction to Gen AI (9 hours)

Understanding Gen AI: Definition and scope of Gen AI - Overview of its applications in various fields - Introduction to essential skills needed for Gen AI. Ethical Considerations: Discussion on ethical guidelines and responsible use of AI - Understanding the impact of AI on society and individuals.

Hands-on Activity: Exploring AI Tools

- Working with appropriate content creation Gen-AI tools to engage with ChatGPT to explore various subjects, simulate interviews, or create imaginative written content.
- Working with appropriate writing and rephrasing Gen-AI tools to drafting essays on designated topics and refining the content with improved clarity, coherence, and correctness.

Unit 2: Basic AI Concepts (8 hours)

Introduction to AI: Basic concepts and terminology of artificial intelligence - Examples of AI in everyday life - Real-world examples of AI applications in different domains. Machine Learning Basics: Understanding the principles of machine learning - Overview of supervised and unsupervised learning.

Hands-on Activity: Simple AI Projects

- Working with appropriate educational content creation Gen-AI tools to generate quizzes and flashcards based on classroom material.
- Working with appropriate language learning Gen-AI tools to practice and enhance language skills through interactive exercises and games across multiple languages.

Unit 3: AI in Practice (9 hours)

Text Analysis and Natural Language Processing (NLP): Introduction to NLP concepts and techniques - Hands-on exercises analyzing text data and extracting insights. Image Recognition and Processing: Basics of image recognition algorithms and techniques - AI Tools for Text and Image Processing

Hands-on Activity: Text and Image Projects

- Working with appropriate image processing Gen-AI tools to experiment with AI-generated images.
- Working with appropriate object recognition Gen-AI tools to identify various objects such as text, images, products, plants, animals, artworks, barcodes, and QR codes

Unit 4: AI for Productivity and Creativity (9 hours)

AI-enhanced Productivity and creativity Tools: Overview of productivity and creativity tools enhanced with AI capabilities - Tips for integrating AI into daily tasks and workflows. AI and Jobs: Exploring how AI impacts jobs and industries - Discussion on opportunities and challenges - Exploration of AI-powered creative tools and applications.

Hands-on Activity: Productivity and Creativity

- Working with appropriate content creation Gen-AI tools to generate interactive videos / blog posts / art / drawing / music and storytelling experience.
- Working with appropriate resume generation Gen-AI tools to create professional resumes efficiently

Unit 5: Future of Gen AI and Final Project (9 hours)

Emerging Trends in Gen AI - Applications of Generative AI - Ethical and Societal Impact of Gen AI - Future Directions and Challenges - Case Studies in Generative AI.

Hands-on Activity: Trends in Gen AI

- Working with appropriate speech generation Gen-AI tools to customize synthetic speech for virtual assistance across different applications.
- Working with appropriate data analysis Gen-AI tools to perform data analysis, visualization, and predictive modeling tasks.
- Working with appropriate Gen-AI design tools to simplify the creation of visually appealing presentations.
- Working with appropriate website builder Gen-AI tools to develop professional websites with AI assistance

Pedagogy

Demonstration of AI Tools, Lectures and Case studies.

Course Designer

Mrs. S. Ponmalar

Evaluation pattern for Gen-AI

Quiz	: 50 Marks (5 quizzes with each 10 marks)
Case study	: 25 Marks
Online Exam	: 25 Marks (Departments to plan and conduct the exam)
Total	: 100 Marks

Course Number	Course Name	Category	L	T	P	Credit
CY23SCE1	**Coursera: Foundations of Cyber Security**	Practical	45	-	-	3

Coursera: Foundations of Cyber Security

Course Contents **45 Hrs**

Foundations of Cyber Security (8 Hrs)

Introduction to Cyber Security Essentials (12 Hrs)

Introduction to Cyber Security Foundations (3 Hrs)

Network Security (8 Hrs)

Operating Systems & Security (14 Hrs)

Course Number	Course Name	Category	L	T	P	Credit
CY23CP3	Cyber Security Tools Lab-I	PRACTICAL	-	-	75	3

Preamble

The course is designed to identify threats using Cyber Security tools. It helps to apply the concepts of Cyber Security tools in different applications.

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 tools	K1
CLO2	Develop programs with implementation of cyber security tools.	K2
CLO3	Analyze threats and attacks	K3
CLO4	Implement the real-time applications by cyber security tools.	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

Cyber Security tools Lab-I CY23CP3 **75 Hrs**

Programs List

- 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.
- Use password guessing tools to guess a ZIP file password.
- Extract password hashes from Windows machines.
- Experiments on metasploit framework.
- Website Information Gathering techniques
- Prevention against cross site scripting attacks.
- Experiments on SQL injections.
- Experiments on CUPP Tool.

Pedagogy

- Demonstration of working environment/Tools/Software/Program

Course Designer

Dr.R.Divya

JOB ORIENTED COURSE
Course Name:
Security +Duration:
60 Hrs

Introduction – Explore Microsoft Entra Features – Self managed ADDS, Microsoft Entra ID, managed Microsoft Entra Domain Services – Investigate role in Microsoft Entra ID – Entra Build in roles – Deployment of Entra Domain Services
– Create and manage Entra users – Managing Users with Entra groups – Configure Microsoft Entra Units – ImplementPasswordless Authentication

Deployment of Microsoft Entra Connect – Exploring Authentication – Configuring PHS – Implementing PTA – DeployFederation with Microsoft Entra ID – Authentication Decision Tree – Configure Password Writeback .

Microsoft Entra ID Protection – Configure Risk event Detections – Implementing user risk policy – Sign-in policy –Multifactor Authentication in Azure – Multifactor Authentication Settings – Explore Entra Conditional access – Configure Conditional Access Conditions
Configure Privileged Identity Management – Exploring Zero Trust model – Evolution of IM – Configure privilegemanagement Scope – privileged management on boarding – Implementing privilege management Workflow

Design an enterprise governance Strategy – Analyse the shared responsibility model – Exploring cloud security advantages – Review Azure hierarchy of systems – Configuring Azure policies – Enabling RBAC – Compare RBAC withAzure policies – Configure build in roles – Azure Blueprints – Design an Subscription management plan.

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23C08	Vulnerability Assessment and Penetration Testing (VAPT)	THEORY	58	2	-	3

Preamble

To create an overview about the security assessment risks, vulnerability and Penetration Testing

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 Networking Security, Vulnerability and Penetration testing .	K1
CLO2	Understand vulnerability and its implications	K2
CLO3	Applying the various techniques of Security, testing methods	K3
CLO4	Analyze the concept of Threats and Hacking methods	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

Vulnerability Assessment and Penetration Testing-CY23C08 58 HRS

UNIT 1 (12 Hrs)

Vulnerability Management Governance- Security basics- Understanding the need for security assessments- Types of security tests- **Security testing- Vulnerability assessment versus penetration testing- Security assessment-** Security audit- Penetration testing standards- Penetration testing lifecycle- OWASP- Benefits of the framework- Setting up a Kali virtual machine - List of tools to be used during assessment.

UNIT II **(12 Hrs)**

Security Assessment Prerequisites-Gathering Requirements-**Types of vulnerability assessment-Information Gathering-Passive information gathering**-Active information gathering-Enumeration and Vulnerability Assessment-Enumerating Services-Using Nmap scripts-Gaining Network Access-Cracking passwords- Identifying hashes-Cracking Windows passwords-Password profiling-**Password cracking with Hydra-Burpsuite.**

UNIT III **(12 Hrs)**

Vulnerability Scoring-Requirements for vulnerability scoring-Vulnerability scoring using CVSS-Threat Modeling-**Threat modeling techniques**-Threat modeling tools-Patching and Security Hardening-Patch Enumeration-**Security hardening and secure configuration reviews**- Vulnerability Reporting and Metrics-**Type of reports-Reporting tools**

UNIT IV **(11 Hrs)**

Penetration Testing - **Using Kali Linux** - Using the Metasploit Framework - Finding Vulnerabilities - **Capturing Traffic** - Attacks: exploitation – **Password attacks**.

UNIT V **(11 Hrs)**

Client-side exploitation – **Social engineering** – Bypassing Antivirus Applications - **Web application Testing** – Wireless Attacks.

TEXT BOOKS

S.No.	**Authors**	**Title**	**Publishers**	**Year and Edition**
1	Sagar Rahalkar	NetworkVulnerability Assessment	Packt Publishing Ltd	August 2018 (UNIT 1,2,3), 1st Edition
2	Georgia Weidman	"Penetration testing a Hands-on introduction to Hacking",	No starch press	2014(UNIT 4,5),1st Edition

REFERENCE BOOK

S.No.	Authors	Title	Publishers	Year and Edition
1	Steve Manzuik, Ken Pfeil, Andrew Gold	Network Vulnerability Assessment from Vulnerability	Syngress Media,U.S,	November 2020,1st edition

Pedagogy

Chalk and talk, PPT, Discussion, Assignment, Demo, Quiz, Case Study

Course Designer

Dr. R. Divya

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23CP4	VAPT and DBMS Lab	PRACTICAL	-	-	75	2

Preamble

The subject is intended to provide the student with the in-depth knowledge of security and testing concepts

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Design the Fundamental concepts of Security methods and concepts of data base management.	K1
CLO2	Understand by designing various types of network security techniques and DDL, DML SQL statements and PL/SQL programming	K2
CLO3	Apply the networking concepts and Penetration testing methods and, PL/SQL program to store and retrieve datafrom databases	K3
CLO4	Implement and configure different types of vulnerability scanning methods	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

VAPT and DBMS Lab -CY23CP4 75 HRS

- Network Discovery with Nmap
- Vulnerability Scanning with OpenVAS
- DOS Attack
- OSINT and Target Profiling
- Burpsuite
- Social Engineering Awareness Exercise

- Different data types and operators.
- ER diagram with entities, attribute, keys and relations.
- Perform Data Definition Language statements (Create, Alter, Drop, Truncate, Rename)
- Perform Data Manipulation Language statements (Select, Insert, Update, Delete)
- Draw tables with Normalization
- Implement PL/SQL Block

Pedagogy

Demonstration of working environment/Tools/Software/Program

Course Designer

Dr.R.Divya

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23C09	DATABASE MANAGEMENT SYSTEM	Theory	58	2	-	3

Preamble

This course provides an insight on the basics of database, database design, relational model and querying a database. It also gives an overview of NoSQL databases and storing andaccessing data in a key/value database MongoDB.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the basic concepts of database management and NoSQL Databases	K1
CLO2	Understand DDL, DML SQL statements and PL/SQL programming	K2
CLO3	Apply various queries, PL/SQL program to store and retrieve data from databases	K3
CLO4	Analyze the working of SQL, PL/SQL program, NoSQL database to solve real-world problems	K4

Mapping with Programme Learning outcomes

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

S-**Strong; M-Medium**

DATABASE MANAGEMENT SYSTEM – CY23C09 58 Hrs

Syllabus

Unit – I (12 Hrs)

Database Concepts: Introduction -Relationships - **DBMS** -Relational data model - Integrity rules - **Theoretical relational languages**. Database Design: Data modeling -**Dependency** -Database design - Normal forms - **Dependency diagrams – De normalization**.

Unit – II (12 Hrs)

Structured Query Language (SQL): Introduction – DDL - Naming rules and conventions – Data types **Constraints** - Creating table- Displaying table information - **Altering an existing table**– **Dropping, renaming, and truncating table** - Table type. Working with tables: DML - adding a newrow/record – updating and deleting existing rows/records - Retrieving data from table.

Unit-III **(12Hrs)**

Functions and Grouping: Built-in functions - Grouping data. Joins and Views: **Join -Join types.** Views: Views - **Creating a view - Removing a view - Altering a view**. PL/SQL: Fundamentals - Block structure - comments - Data types – Other data types - Variable declaration – Assignment operation.

Unit – IV **(12 Hrs)**

Control Structures and Embedded SQL: Control structures - Nested blocks - SQL in PL/SQL - Data manipulation - **Transaction control statements**. PL/SQL Cursors: **Cursors -Implicit & explicit cursors and attributes** - Records - Tables - **Procedures -Functions –Triggers**

Unit – V **(10 Hrs)**

An overview of NoSQL **– NoSQL storage types** - Advantages and Drawbacks - Mongo DB Introduction – **Creating database and Dropping database** - **Creating collection and Dropping collection** – Insert, query and update document.

Text Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1.	Nilesh Shah	Database Systems UsingOracle	PHI	2016, 2nd Edition,
2.	Gaur av Vaish	Getting Started with NoSQL	Packt	2013,1 st Edition

Reference Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Rajesh Narang	Database Management Systems	Prentice Hall of India,	2011, 2nd Edition,
3	Kristina Chodoro w	MongoDB: DefinitiveGuide	Oreilly	2015,2nd Edition,

Pedagogy

- Chalk and talk PPT, Discussion, Assignment, Demo, Quiz, Flipped mode.

Course Designer

Dr.S.Angel

Course CODE	Course Name	Category	L	T	P	Credit
CY23SCE1	**Coursera: Foundations of Cyber Security**	Practical	-	-	45	3

Coursera: Foundations of Cyber Security

Course Contents **45 Hrs**

Foundations of Cyber Security (8 Hrs)

Introduction to Cyber Security Essentials (12 Hrs)

Introduction to Cyber Security Foundations (3 Hrs)

Network Security (8 Hrs)

Operating Systems & Security (14 Hrs)

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23A01	Cyber Security and Cyber Law	THEORY	58	2	-	3

Preamble

The course is designed to impact the knowledge on the concepts of Cyber Law and Security techniques

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 Security, Cyber Space and Cyber Law	K1
CLO2	Understand the cyber law acts, cyber-crimes and e-security methods	K2
CLO3	Understand the cyber law acts, cyber-crimes and e-security methods	K3
CLO4	Analyze the techniques of Cyber Acts, Cyber Laws, and Security problems	K4

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Cyber Security and Cyber Law - CY23A01 [58 Hrs]

Syllabus

UNIT I (11 Hrs)

Introduction to Cybercrime – Cybercrime definition and origins of Cybercrime of the world – Cybercrime and Information Security – **Classifications of Cybercrime** – Cybercrime and the Indian IT Act, 2000 – **A Global perspective on Cybercrimes**.

UNIT II (12 Hrs)

Cyber Offences and Cybercrime – Introduction – Strategic attacks - Types of Attacks – Proliferation of Mobile and Wireless Devices – Trends in Mobility and Wireless devices – Security Challenges faced by Mobile devices – Registry Setting for Mobile devices – Authentication Service Security – **Attacks on Mobile Phones – Security implications for Organizations – Organizational Measures for handling Mobile Phones: Device Related security issues – Security policies and Measure in Mobile Computing era and Laptops**.

UNIT III **(11 Hrs)**

Methods and tools used in Cyber Line – Introduction – **Password Cracking – Malwares – DoS and DDos Attacks** – SQL injection and Buffer overflow – Phishing and Identity Theft – Enumeration – Attacks on Wireless Networks.

UNIT IV **(12 Hrs)**

Cyberspace and Cyber Law – Introduction to e-commerce **– Contract aspects in Cyber Law – Security aspects of Cyber Law** – Intellectual property aspect in Cyber Law and evidence aspect in Cyber Law – Criminal Aspects in Cyber Law – Global trends in Cyber Law - Legal framework for electronic Data Interchange Law relating to electronic ranking – Need for Indian Cyber Law.

UNIT V **(12 Hrs)**

Information technology Act – Introduction of Cybercrime and Cyber Security – Information Technology Act 2000 – Penalties, Adjudication and Appeals under the Information Technology Act, 2000 – Offences under Information Technology Act, 2000 - Information Technology Act, 2008 and its Amendments - **Importance of Information Security Standards – Information Security Challenges.**

Text Books

S.No	Authors	Title	Publishers	Year and Edition
1.	Nilakshi Jain, Ramesh Menon	Cyber Security and Cyber Laws	Wiley India Pvt Ltd	2021, 1st Edition

Reference Books

S.No	Authors	Title	Publishers	Year and Edition
1.	D. P. Mittal	Law of Information Technology (Cyber Law	TAXMANN'S.	2018, 1st Edition
2.	Faiyaz Ahamad	Cyber Law and Information Security	Dreamtech Press	2013, 2nd Edition

Pedagogy

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

Course Designer
Mrs. M Selvanayaki

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23A02	Cyber Threats and Modeling	THEORY	58	2	-	3

Preamble

The learner understands the basic concepts of cyber security threats and modeling and also can learn about email threats, web threats and cyber threat management.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall about the Ethical Hacking Concepts, Hacking Tools, OS Concepts, Networks Tools.	K1
CLO2	Understand Intrusion Detection, Social Engineering, Buffer Overflows and different types of Attacks and their protection mechanisms.	K2
CLO3	Apply the various tools to identifying the vulnerabilities.	K3
CLO4	Analyze the Intruders attacks on Networks, OS Vulnerabilities, Wireless Networks.	K4

Mapping with Programme Outcomes

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

S- Strong; M-Medium

Cyber Threats and Modeling - CY23A02 [58 Hrs]

Syllabus

UNIT I (11 Hrs)

Getting started: Dive In and Threat Model - Learning to Threat Model – Checklists for Diving In and Threat Modeling - Strategies for Threat Modeling - Structured Approaches to Threat Modeling - **Models of Software**.

UNIT II (12 Hrs)

Finding Threats: STRIDE - Understanding STRIDE - Spoofing Threats - Tampering Threats - Repudiation Threats - Information Disclosure Threats - **Denial-of-Service Threats** - Elevation of Privilege Threats - STRIDE Variants - Attack Trees: Working with Attack trees - Representing a Tree - Real Attack Trees - Perspective on Attack Trees - Attack Libraries: **Properties of Attack Libraries** - CAPEC - OWASP Top Ten.

UNIT III (12 Hrs)

Privacy Tools: Solove's Taxonomy of Privacy - Privacy Considerations for Internet Protocols - Privacy Impact

Assessments - Processing and Modeling Threats: Starting the Threat Modeling Project - **Tracking with Tables and Lists – Scenario - Specific Elements of Threats Modeling.**

UNIT IV **(12 Hrs)**

Threat Modeling Tools: Open Source Tools - Commercial Tools - Web and Cloud Threats: Web threats - Cloud Tenant Threats - Cloud Provider Threats - Mobile Threats. Human Factors and Usability_ Models of Software Scenarios - Tools and Techniques for Addressing Human Factors - **User Interface Tools and Techniques**.

UNIT V **(11 Hrs)**

Threats to Cryptosystems – Cryptographic primitives – Classic Threat actors – Attacks against actors – Attacks against Cryptosystems – Building with Crypto – **Things to remember about crypto – Secret systems** – Kerckhoffs and his principles.

Text Book

S.No	Authors	Title	Publishers	Year and Edition
1.	Adam Shostack	Threat Modeling – Designing for Security	Wiley India Pvt Ltd	2014, 1st Edition

Reference Books

S.No	Authors	Title	Publishers	Year and Edition
1.	Swiderski, Frank and Syndex	Threat Modeling	Microsoft Press	2016, 1st Edition
2.	Jocelyn O. Padallan	Cyber Security	Arcler Press Publisher	2019, 2nd Edition

Pedagogy

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

Course Designer

Mrs. M Selvanayaki