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

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 - 2024 -2027 Batch

Semester	Part	Course Code	Title of Course	Course Type	Instruction Hours / Week	Contact Hours	Tutorial Hours	Duration of Examination	Examination Marks			
									CA	ESE	Total	Credits
I	I	TAM2301A/ HIN2301A/ FRE2301A	Language I- Tamil Paper I/ Hindi Paper I/ French Paper I	L	4	58	2	3	25	75	100	3
I	II	ENG2301A	English Paper I	E	4	58	2	3	25	75	100	3
I	III	CY24C01	Programming in C	CC	4	58	2	3	25	75	100	3
I	III	PP22C02	Computational and Algorithmic Thinking for Problem Solving	CC	3	45	-	-	100	-	100	3
I	III	CY24C03	IT Fundamentals for Cyber Security	CC	4	58	2	3	25	75	100	3
I	III	TH24A03	Numerical and Statistical Techniques	GE	6	88	2	3	25	75	100	5
I	III	CY24CP1	C Programming and Cyber Security Tools Lab	CC	3	45	-	3	15*	35*	50	2
	Non Tamil Students											
I	IV	NME23B1 / NME23A1	Basic Tamil I / Advanced Tamil I	AEC	2	28	2	-	100	-	100	2
Students with Tamil as Language												
I	IV	NME23ES	Introduction to Entrepreneurship	AEC	2	30	-	-	100	-	100	
I -V	VI	24BONL1 24BONL2 24BONL3	Online Course- I Online Course -II Online Course -III	**ACC**	-	-	-	-	-	-	-	-

I	V	COM15SER	Community Service 30 Hours	GC	-	-	-	-	-	-	-	-
II	I	TAM2302A/ HIN2302A/ FRE2302A	Tamil Paper II/ Hindi Paper II/ French Paper II	L	4	58	2	3	25	75	100	3
II	II	ENG2302A	English Paper II	E	4	58	2	3	25	75	100	3
II	III	IN24C04	Python Programming	CC	5	73	2	3	25	75	100	3
II	III	CY24C05	Operating systems and Security	CC	4	58	2	3	25	75	100	3
II	III	CY24CP2	Python Programming and OS Security Lab	CC	5	75	-	3	15*	35*	50*	3
II	III	TH24A12	Number Theory and Algebra	GE	6	88	2	3	25	75	100	5
II	IV	NM24UHR	Universal Human Values and Human Rights	AECC	2	30	-	-	100	-	100	2
II	IV	NME23B2/ NME23A2 #	Basic Tamil-II/ Advanced Tamil-II/	AEC	-	-	-	-	100	-	100	Gr
I-II	VI	NM23GAW	General Awareness	AEC	SS	-	-	-	100	-	100	Gr
I -V	VI	24BONL1 24BONL2 24BONL3	Online Course- 1 Online Course –2 Online Course -3	**ACC**	-	-	-	-	-	-	-	-
I-IV	VI	COM15SER	Community Services 30 Hrs	GC	-	-	-	-	-	-	-	-
III	I	TAM2303A/ HIN2303A/ FRE2303A	Tamil Paper III/ Hindi Paper III/ French Paper III	L	4	58	2	3	25	75	100	3
III	II	ENG2403A	English Paper III	E	4	58	2	3	25	75	100	3
III	III	CY23C06	Computer Network and Security	CC	4	58	2	3	25	75	100	3
III	III	CY24C07	Database Management System	CC	4	58	2	3	25	75	100	3
III	III	CS23SBGP	Gen-AI	SEC	3	44	1	-	100	-	100	3
III	III	TH24A20	Optimization Techniques	GE	4	58	2	3	25	75	100	3
III	III	CY24CP3	Database Management Lab	CC	5	75	-	3	15*	35*	50*	3

III	IV	NM23DTG	Design Thinking	AEC	2	30	-	-	100	-	100	2
I-III	VI	COM15SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	-
I – V	VI	24BONL1 24BONL2 24BONL3	Online Course I Online Course II Online Course III	ACC	-	-	-	-		-	-	-

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	ENG2404A	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	CY24C09	Data Structures and Algorithms	CC	4	58	2	3	25	75	100	3
IV	III	CY24CP4	VAPT Lab	CC	5	75	-	3	15*	35*	50	3
IV	III	CY23A01 CY23A02	Cyber Security and Cyber Law Cyber Threats and Modeling	GE	4	58	2	3	25	75	100	3
IV	III	CY23SCE1	Foundations of Cyber Security	SEC	3	45	-	-	100	-	100	3
IV	IV	NM23EII	Entrepreneurship and Innovation (IgniteX)	AECC	2	30	-	-	100	-	100	2
IV	IV	NM24EVS	Environmental Studies	AECC	SS	-	-	-	100	-	100	Gr
IV	V	COCOACT	Co-Curricular Activities	GC	-	-	-	-	100	-	100	1
I-V	VI	24BONL1 24BONL2 24BONL3	Online Course I Online Course II Online Course III	ACC	-	-	-	-	-	-	-	-

Semester	Part	Course Code	Title of Course	Course Type	Instruction hours / Week	Contact hours	Tutorial hours	Duration of Examination	Examination Marks			Credits
									CA	ESE	Total	
V	III	IN24C10	Machine Learning	CC	5	73	2	3	25	75	100	4
V	III	CY23C11	Software Engineering and Testing	CC	5	73	2	3	25	75	100	4
V	III	CY23C12	Ethical Hacking	CC	5	73	2	3	25	75	100	4
V	III	CY23E01 CY23E02	Cloud Security Web Application and Security	DSE	5	73	2	3	25	75	100	4

V	III	CY23CP5	Ethical Hacking Lab	CC	5	75	-	3	15*	35*	50	3
V	III	CY23SBP1	Mobile App Developme nt Lab	SE C	3	41	4	-	100	-	100	3
V	III	CY23AC1 / CY23AC2	Data Security/ Artificial Intelligence	AC C	SS	-	-	3	25	75	100	5**
V	IV	NM21CS1	Cyber Security I	GC	2	30	-	-	100	-	100	Gr
V	I V	CY23INST	Fieldwork/ Institutional Training	GC	-	-	-	-	100	-	100	2
V	VI	CY24COM	Comprehensive Examination	G C	-	-	-		100	-	100	Gr
I-V	V I	24BONL1 24BONL2 24BONL3	Online Course I Online Course II Online Course III	AC C	-	-	-	-	-	-	-	-

*CA conducted for 25 and converted into15, ESE conducted for75 and converted in to 35

Only internal assessment

CC: Core Courses

GE: Generic Elective

AEC: Ability Enhancement Course

ACC: Additional Credit Course

CA: Continuous Assessment

ESE: End Semester Examination

Question Paper Pattern

Evaluation Pattern 24-27 Batch onwards

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 & PG- 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 =15

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

Total :45

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 & PG - 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 =25

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

Continuous Internal Assessment

Pattern Theory

I Year UG / PG

CIA Test	:	5 marks **(conducted for 45 marks after 50 days)**
Model Exam	:	7 marks **(Conducted for 75 marks after 85 days (Each Unit 15 Marks))**
Seminar/Assignment/Quiz	:	5 marks
Class Participation	:	5 marks
Attendance	:	3 marks
Total	**:**	**25 Marks**

Practical

Lab Performance	:	7 marks
Regularity	:	5 marks
Model Exam	:	10 marks
Attendance	:	3 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.

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**

Part IV

Design Thinking

Quiz	:	50 marks
Assignment	:	25marks Project / Case study
	:	25 marks
Total	**:**	**100 Marks**

``

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
IN24C04					
CLO1	S	S	S	M	S
CLO2	S	S	M	S	M

CLO3	M	S	S	S	S
CLO4	S	M	S	S	S
CY24C05					
CLO1	S	M	S	M	S
CLO2	S	S	S	M	S
CLO3	S	S	M	S	S
CLO4	S	S	S	M	S
CY24CP2					
CLO1	S	S	M	S	M
CLO2	S	S	S	S	S
CLO3	S	S	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	M	S	M	S	M
CLO2	S	M	M	S	M
CLO3	M	S	S	S	S
CLO4	S	S	S	S	S
CY24CP3					
CLO1	M	M	S	S	M
CLO2	S	M	S	S	M

CLO3	S	S	S	S	S
CLO4	S	S	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
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
CY24C09					
CLO1	S	M	M	S	S
CLO2	S	M	S	M	M
CLO3	M	M	S	M	S
CLO4	S	S	S	M	S
CY24CP4					
CLO1	M	M	S	S	S
CLO2	M	M	S	S	S
CLO3	S	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

IN24C10

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

CY23C11

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

CY23C12

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

CY23E01

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

CY23E02

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

CY23CP5

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

CY23SBP1

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	M	S	S	M
CLO2	M	S	S	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	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	2019,8th Edition
2	P. Kaliraj, T. Devi	Higher Education for Industry 4.0 and Transformation to Education 5.0	CRC Press - Taylor & Francis Group	2021,1st Edition

Reference Books

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

COMPUTATIONAL AND ALGORITHMIC THINKING FOR PROBLEM SOLVING **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 and Edition
1	David Riley and Kenny Hunt	Computational Thinking for Modern Solver	Chapman & Hall/CRC	2014,1st Edition
2	Paolo Ferragina, Fabrizio Luccio	Computational Thinking First Algorithms	Springer	2018,1st Edition
3	Karl Beecher	Computational Thinking – A beginner's guide to problem solving	BSC publication	2017,1st 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 ,6th 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	2015,1st Edition
3	Nina Godbole, Sumit Belapure	Cyber Security: Understanding Cyber Crimes,Computer Forensics and Legal Perspectives,	Willey	2011,1st 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

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

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
IN24C04	PYTHON PROGRAMMING	Theory	73	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 concepts from IKS 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

Python Programming- IN24C04 73Hrs

Syllabus

UNIT I (14 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 (15 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 – Panini's Ashtadhyayi, Anitya - Dictionaries-Tuples and Immutable Truths-Sutras-Files.

UNIT III **(15 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)**

Files and Exception handling: Files -Text Files, File Objects, **File Built-in Methods**, File Built-in Attributes, Standard Files, **Reading and writing, Format operator, Filenames and Paths**, Pipes. Exceptions: Built-in Exceptions, Handling Exceptions, Exception with Arguments- Nyaya Logic- User-defined Exceptions.

UNIT V **(15 Hrs)**

Modules and Packages: Modules - Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions. Python packages- **Simple programs using the built-in functions of packages matplotlib, numpy, pandas. GUI Programming** - Tkinter introduction, Buttons and callbacks, Canvas widgets, Coordinate sequences, Tk Widgets, Menus and Callables.

Text Book

Sno	Author	Title of the Book	Publisher	Year and Edition
1	**Mark Lutz**	Learning python(Unit I-III)	O'Reilly Publication	2013,5th edition
2	**Allen B. Downey**	Think Python: How to Think like a Computer Scientist(Unit IV-V)	O'Reilly Publishers,	2016 , 2nd Edition,
3	**Kapil Kapoor**	Indian Knowledge System	Indian Institute of Advanced Study	2005,1st edition

Reference Books

S.No	Authors	Title	Publishers	Year and Edition
1	**E. Balagurusamy**	Problem Solving and Python Programming	McGraw-Hill	2017, 1st Edition
2	**Guido van Rossum and Fred L. Drake Jr**	An Introduction to Python – Revised and updated for Python 3.2	Python Software Foundation, Network Theory Ltd	2011,1st Edition
3	**Wesley J Chun**	Core Python Applications Programming	Prentice Hall	2012, 3 rd Edition

Pedagogy

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

Course Designer

Dr . Sabitha Banu A

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY24C05	**Operating Systems and Security**	THEORY	58	2	-	3

Preamble

To provide a discussion of the fundamentals of operating system design and to relate these to contemporary design issues and to current directions in the development of operating systems Security.

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 basic concepts of operating system and its Security	K1
CLO2	Understand the operating systems objectives and functionality along with system programs and system calls.	K2
CLO3	Applying various concepts and algorithms for scheduling, partitioning, storage management concepts and Security Concepts.	K3
CLO4	Analyze the operating system Storage, Deadlock, File System and Security	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

Operating Systems and Security – CY24C05 58 Hrs

UNIT I 11hrs

Introduction and process concepts: Definition of OS **- Definition of process - Process States - Process State Transition -** Semaphores - **Deadlock and Indefinite postponement**

UNIT II 11hrs

Storage management: Real storage: Real storage management strategies - **Contiguous Vs non-contiguous storage allocation - Single user contiguous storage allocation** - Fixed partition multiprogramming - Variable partition multiprogramming. **Virtual storage: Virtual storage management strategies:** Page replacement strategies - working sets - Demand paging.

UNIT III 12 hrs

Processor management: Introduction - Job and processor scheduling: **Preemptive Vs Non-preemptive scheduling** – priorities - Deadline scheduling - **FIFO-RR - SJF**-SRT. Distributed computing–Pipelining – Vector processing. Multiprocessing - **Fault Tolerance.**

UNIT IV **12 hrs**

Device and information management: Disk performance optimization: Operation of moving head disk storage - **Need for disk scheduling** – **FCFS - SSTF – SCAN.** Optical Disks - **file and database systems: File system – Access control by user Classes ..**Allocating and freeing space - file descriptor -Backup and Recovery.

Unit V **12 Hrs**

Operating System Security: Introduction – **Password Protection** – Access Controls – Security Kernels – **Fault – Tolerant System**– Operating System - Unix Operating System Security – **Worms and Viruses.**

Text Book

S.No.	Authors	Title	Publishers	Year and Edition
1.	Deitel H.M	An Introduction to Operating System	Addison Wesley Publishing Company, Second edition	2005, 1st edition

Reference Books

S.No.	Authors	Title	Publishers	Year and Edition
1.	Andrew S.Tanenbaum , Albert S.Woodhull.	Operating Systems- Design and Implementation	Pearson Education, 3rd Edition	2011,1st edition,
2.	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	Operating System Concepts.	John Wiley & Sons,8th edition	2010, 1st edition
3.	Archer J Harries	Operating Systems	Tata McGraw Hill, First Edition	2008, 1st edition

Pedagogy

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

Course Designer

Mrs P.YASODHA

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY24CP2	Python Programming and OS Security Lab	PRACTICAL	-	-	75	3

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 and the knowledge of operating system Process to implement the state of process and storage and processor management*. 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, functions and basic concepts of operating system	K1
CLO2	Develop programs with implementation of operators & I/O operations and operating systems functionality methods	K2
CLO3	Construct programs with features of Lists, Strings	K3
CLO4	Develop readable programs with files for Exception handling concepts.	K4

3

Mapping with Programme Learning 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

Python Programming and OS Security Lab- CY24CP2 75 Hrs

Program List

- Operators & I/O operations.
- Lists.
- Strings.
- Functions.
- Dictionaries.
- Tuples.

- Files, Modules and Packages.
- Program to ping two Network Machine using TCP code
- Simulate Process State Transition.
- Simulate Producer-Consumer Problem Using Semaphores.
- Implement and Simulate Memory Management with Fixed Partitioning Technique.
- Simulate Variable Partition Multi Programming.
- Implement Processor Management
  A) FIFO B) OPTIMAL.
- Simulate Single Level Directory File Organization Technique

Pedagogy

- Demonstration of working environment/Tools/Software/Program

Course Designer

Dr. Sabitha Banu A

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 – Implement Passwordless Authentication

Deployment of Microsoft Entra Connect – Exploring Authentication – Configuring PHS – Implementing PTA – Deploy Federation 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 privilege management 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 with Azure policies – Configure build in roles – Azure Blueprints – Design an Subscription management plan.

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 A

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY24C07	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 SYSTEMS – CY24C07 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** - cursor FOR loops - Records - Tables - **Procedures -Functions –Triggers**

Unit – V **(10 Hrs)**

An overview of NoSQL - **Characteristics 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.**Database Security Fundamentals**-Overview of Database Security-Features- What Is Database Security Management -Database Security Framework-Database Security features - **Access Control** - What Is IAM -IAM Features-IAM Authorization.

Text Book

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
3	Huawei ICT Academy	Database Security Fundamentals	SPRINGER.	2022

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 Designers

Mrs P.Yashodha

COURSE NUMBER	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY24CP3	Database Management System Lab	PRACTICAL	-	-	75	3

Preamble

The lab course provides a way to explore storing and accessing data in database through query languages and PL/SQL programming language. It enables to experience a NoSQL key.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand basic SQL query statements	K2
CLO2	Gain knowledge on primary and foreign key constraints	K2
CLO3	Apply functions and joins on data	K3
CLO4	Demonstrate PL/SQL programming on databases and differentiate Key/value store database from relational database	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	M	S	S	M
CO2	S	M	S	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

S- Strong; M-Medium.

Database Management System Lab - CY24CP3 75 Hrs

Program List

- Different data types and operators.
- ER diagram with entities , attribute ,keys and relations.
- Integrity constraints
- Built-in functions and views.
- Create, insert, update and alter table.
- Implement PL/SQL Block.

- Control Structures and Embedded SQL
- Splitting and Joining the table
- PL/SQL Functions
- PL/SQL Procedure
- A case study and formulate the problem statement on a specify project.
- Spoofing using SQL injection

Pedagogy

- Demonstration of working environment/Tools/Software/Program

Course Designers

Mrs. P Yasodha

Course Number	Course Name	Category	L	T	P	Credit
CS23SBGP	**SBS - 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 : 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 CODE	COURSE TITLE	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	Network Vulnerability Assessment ((Unit 1,2,3)	Packt Publishing Ltd	2018, 1st Edn.
2	Georgia Weidman	Penetration testing a Hands-on introduction to Hacking(Unit 4,5)	No starch press	2014, 1st Edn.

Books for Reference

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

Pedagogy

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

COURSE CODE	COURSE TITLE	CATEGOR Y	L	T	P	CREDIT
CY24C09	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	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
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

Data Structures and Algorithms - CY24C09 58 Hrs

Syllabus

UNIT I (11 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 (11 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-Quick Sort-Heap Sort-Merge Sort.

UNIT-V **(12 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 and Edition
1.	Rajesh K. Shukla	Data Structures using C & C++	Wiley India	2009, 2nd Edn.
2.	Seymour Lipschutz, G A Vijayalakshmi Pai	Data Structures	Tata McGraw-Hill	2014, 2nd Edn.

Books for Reference

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

Pedagogy

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
CY24CP4	**VAPT Lab**	THEORY	-	-	75	3

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	K1
CLO2	Understand by designing various types of network security techniques	K2
CLO3	Apply the networking concepts and Penetration testing methods	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 LAB -CY24CP4 75 HRS

- Network Discovery with Nmap
- Vulnerability Scanning with OpenVAS
- Packet Analysis with Wireshark
- OSINT and Target Profiling
- Exploitation Using Metasploit Framework
- Web Application Scanning with OWASP ZAP
- Wireless Network Security Assessment
- Social Engineering Awareness Exercise

- Threat Modeling and Risk Assessment
- Report Writing and Presentation

Pedagogy

Demonstration of working environment/Tools/Software/Program

Course

Designer

Dr. R.Divya

COURSE CODE	COURSE TITLE	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 Learning 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 Edn.

Books for Reference

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

Pedagogy

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

COURSE CODE	COURSE TITLE	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, and Wireless Networks.	K4

Mapping with Programme Learning 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 Books

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

Books for Reference

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

Pedagogy

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
IN24C10	MACHINE LEARNING	THEORY	73	2	-	4

Preamble

This course has been designed to introduce the concepts and techniques of machine learning. It also emphasize various principles, algorithms, and applications of machine learning

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the fundamentals of Machine Learning Concepts.	K1
CLO2	Understand the features of machine learning to apply on real world problems	K2
CLO3	Apply various algorithms of supervised and unsupervised learning	K3
CLO4	Analyze the concepts of linear and non-linear activation functions	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium.

MACHINE LEARNING - IN24C10 **73 Hours**

Unit I **14 Hrs**

The Machine Learning Landscape: Introduction to Machine Learning - Why Use Machine Learning?
- Examples of Applications - Types of Machine Learning systems – Main Challenges of Machine Learning – The Role of Python in Machine Learning - Anaconda in Python - Python Libraries.

Unit II **15 Hrs**

Classification: MNIST - Training a Binary Classifier - Performance Measures: Measuring Accuracy Using Cross-Validation - Confusion Matrix - Precision and Recall - The ROC Curve. Multiclass Classification - Multilabel Classification - Multi Output Classification – Classification Tree. Advanced Machine Learning: Scikit-Learn Library for Machine Learning - Cross-Validation.

Unit III **15 Hrs**

Linear Regression: Simple Linear Regression – Steps in Building a Regression Model – Building

Simple Linear Regression Model – Multiple Linear Regression: Developing Multiple Linear Regression Model Using Python –Splitting the Dataset into Train and Validation Sets -Building the Model on a Training Dataset – Logistic Regression.

Unit IV **14 Hrs**

Unsupervised Learning Techniques: Clustering – K-Means Clustering – Limits of K-Means – Clustering for Image Segmentation - Clustering for Preprocessing - Clustering for Semi-Supervised Learning – DBSCAN – Other Clustering Algorithm. Hierarchical Clustering.

Unit V **15 Hrs**

Recommender Systems: Overview – Association Rules – Applying Association Rules. Text Analytics: Overview – Sentiment Classification. Introduction to Artificial Neural Networks with Keras: From Biological to Artificial Neurons. Deep Computer Vision Using Convolutional Neural Networks: Convolutional Layers.

Text Books

S.No.	Authors	Title	Publishers	Year and Edition
01	Manaranjan Pradhan, U Dinesh Kumar	Machine Learning using Python	Wiley India, First edition	2019, 1st Edn
2	Aurelien Geron	Hands - On Machine Learning with Scikit Learn, Keras and TensorFlow Concepts Tools and Techniques to Build Intelligent Systems	OReilly Media, Second Edition	2019, 2nd Edn

Reference Books

S.No	Author	Title of the Book	Publishers \ Edition	Year and Edition
1	Tom M Mitchell	Machine Learning	Tata McGraw-Hill, New Delhi	2017, 1st Edn
2	Anuradha Srinivasa Raghavan, Vincy Joseph	Machine Learning	Wiley India, First edition	2019, 1st Edn
3	Zsolt Nagy	Artificial Intelligence and Machine Learning Fundamentals	Packt publisher	2018, 1st Edn

4	Dr. S Sridhar Dr. M Vijayalakshmi	Machine Learning	Oxford University Press	2021, 1st Edn

Pedagogy

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

COURSE CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
CY23C11	SOFTWARE ENGINEERING AND TESTING	THEORY	73	2	-	4

Preamble

- *The course is designed to impact the knowledge on building reliable software products. It also emphasizes various testing's undergone to enhance the quality of the software.*

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 software evolution, software engineering practice, life cycle models and testing concepts.	K1
CLO2	Understand on Agile models, various Phases of software Project and its life cycle models.	K2
CLO3	Apply the various building models, software testing tactics and its Methodologies.	K3
CLO4	Analyze the System, Acceptance and Performance Testing's criteria and its best practice.	K4

Mapping with Programme Outcomes

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

S- Strong; M-Medium

SOFTWARE ENGINEERING AND TESTING- CY23C11 73 Hrs.

Syllabus

Unit I **14 Hrs**

Introduction to Software Engineering: The Evolving role of Software - Software - Changing nature of Software - Legacy Software - Software myths. Software Engineering Practice: Software engineering practice - Communication practices - Planning practices - Modeling practices - Construction practice- Deployment.

Unit II **15 Hrs**

Software Development Life Cycle models: Phases of Software project-Quality, Quality Assurance, Quality control - Testing, Verification and Validation - Process Model to represent Different Phases - Life Cycle models.

Unit III **15 Hrs**

Agile Development: Agile Process –Agile Process Model-Building the Analysis Model: Requirement Analysis - Data Modeling concepts - Object Oriented Analysis -Flow Oriented Modeling-Design Engineering: Design concepts.

Unit IV **14 Hrs**

Testing Tactics: Software Testing Fundamentals -Types of Testing: White Box Testing - Static Testing-Structural Testing-Black box Testing-Integration Testing: Integration testing- Integration Testing as Type of Testing.

Unit V **15 Hrs**

System and Acceptance Testing: System Testing Overview-Functional testing versus Non-functional Testing-Functional testing - Non-functional Testing – Acceptance Testing and its criteria –Performance Testing: Factors governing Performance testing.

Text Books

S.No	Authors	Title	Publishers	Year and Edition
1.	Roger S. Pressman	Software Engineering: A Practitioner's Approach	McGraw-Hill Education	2020, 8th Edn
2.	Srinivasan Desikan , Gopalaswamy Ramesh	Software Testing Principles and Practices	Pearson Education	2019, 1st Edn

Reference Books

S.No	Authors	Title	Publishers	Year and Edition
1.	Rajib Mall	Fundamentals of Software Engineering	Prentice Hall of India Pvt Ltd	2010, 3rd Edn
2.	Sandeep Desai, Abhishek Srivastava	Software Testing: A Practical Approach	PHI Learning Pvt. Ltd	2016, 2nd Edn
3.	David Burns	Selenium 2 Testing Tools: Beginner's Guide	Tata McGraw Hill Edition	2012, 1st Edn

Pedagogy

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
CY23C12	ETHICAL HACKING	THEORY	73	2	-	4

Preamble

- *The course is designed to introduce the fundamentals of ethical hacking. It provides the fundamental information associated in the art of attacking computer infrastructure for the purposes of testing, auditing, and pre-emptively securing these infrastructures*

Course Learning Outcomes

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	M	S
CLO2	S	M	S	M	M
CLO3	S	S	M	S	S
CLO4	S	S	M	M	S

S- Strong; M-Medium

ETHICAL HACKING - CY23C12 73 Hrs.

Syllabus

Unit 1 **15 Hrs**

Introduction to Ethical Hacking-TCP/IP Concepts-IP Addressing-CIDR Notation-Planning IP Address assignments-IPv6 Addressing-Network and Computer Attacks-Malicious Software-Protecting against Malware Attacks-Intruder attacks on Networks and Computers-Addressing Physical Security.

Unit II **14 Hrs**

Foot printing and Social Engineering-Web Tools for Foot Printing-Conducting Competitive Intelligence-Introduction to Social Engineering- Art of Shoulder Surfing-Art of Dumpster Diving-

Art of piggybacking-Phishing.

Unit III **15 Hrs**

Port Scanning-Port Scanning Tools-Conducting Ping Sweeps- Understanding Scripting-Enumeration-Enumerating Windows Operating Systems-Programming for Security Professionals-Desktop and Server OS Vulnerabilities-Windows OS Vulnerabilities-Tools for Identifying Vulnerabilities—Practices for Hardening Windows Systems-Linux OS vulnerabilities.

Unit IV **14 Hrs**

Embedded Operating Systems: The Hidden Threat-Windows and other Embedded Operating System-Vulnerabilities of Embedded Oss- Hacking Web Servers-Understanding Web Applications-Understanding Web Application Vulnerabilities- Tools for Web attackers and Security.

Unit V **15 Hrs**

Hacking Wireless Networks-Understanding wireless Technology-Understanding Wireless Network Standards-Understanding Authentication-Understanding Warddriving-Understanding Wireless Hacking-Network Protection Systems-Protecting with Firewalls-Protecting with Intrusion Detection and Prevention Systems.

Text Book

S.No	Authors	Title of the Book	Publishers	Year and Edition
1	Michael T. Simpson, Nocholas D. Anti, Robert S. Wilson	Hands – On Ethical Hacking and Network Defense	Cengage Learning	2023, 4th Edn

Reference Books

S. No	Authors	Title	Publishers	Year and Edition
1	Steven DeFino, Barry Kaufman, Nick Valenteen	Official Certified Ethical Hacker Review Guide	Cengage Learning	2020, 1st Edn
2	Patrick Engebretson	The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy	Syngress Basics Series – Elsevier	2013, 2nd Edn

Pedagogy

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
CY23E01	CLOUD SECURITY	THEORY	73	2	-	4

Preamble

- *This course provides a strong knowledge in cloud security and data storage concepts, a well covering of security design patterns, gives a well background view for security issues and 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 concepts of Cloud Computing	K1
CLO2	Understand the infrastructure security level of cloud computing	K2
CLO3	Apply the storage and security management	K3
CLO4	Analyze the security and privacy of cloud environment	K4

Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO 1	S	M	S	M	S
CLO 2	S	M	S	M	M
CLO 3	S	S	M	S	S
CLO 4	S	S	M	M	S

S- Strong; M-Medium

CLOUD SECURITY- CY23E01 73 Hrs.

Unit I 14 Hrs

Cloud Computing -Introduction -Cloud Computing Defined-Evolution of Cloud Computing - The SPI Framework for Cloud Computing-The Traditional Software Model-The Cloud Services Delivery Model-Cloud Deployment Models- Key Drivers to Adopting the Cloud-The Impact of Cloud Computing on Users-Governance in the Cloud-Barriers to Cloud Computing Adoption in the Enterprise

Unit II 15 Hrs

INFRASTRUCTURE SECURITY: The Network Level: Ensuring Data Confidentiality and Integrity-Ensuring Proper Access Control-Ensuring the Availability of Internet-Facing Resources Network-

Level Mitigation. The Host Level: SaaS and PaaS Host Security-IaaS Host Security- Virtualization Software Security-Virtual Server Security. The Application Level: Application- Level Security Threats-DoS and EDoS-End User Security-SaaS Application Security-PaaS Application Security-IaaS Application Security.

Unit III **15 Hrs**

DATA SECURITY AND STORAGE: Aspects of Data Security-Data Security Mitigation- Provider Data and Its Security: Storage- Confidentiality -Integrity- Availability-Security in Cloud Computing IDENTITY AND ACCESS MANAGEMENT: Trust Boundaries and IAM- Why IAM?
- IAM Challenges-IAM Definitions- IAM Architecture and Practice-Getting ready for the cloud-IAM standards and protocols for cloud services.

Unit IV **15 Hrs**

SECURITY MANAGEMENT IN THE CLOUD: Security Management Standards- Security Management in the Cloud-Availability Management-SaaS Availability Management - PaaS Availability Management - IaaS Availability Management-Access Control-Security Vulnerability, Patch, and Configuration Management. EXAMPLES OF CLOUD SERVICE PROVIDERS- Amazon Web Services (IaaS)-Google (SaaS, PaaS)-Microsoft Azure Services Platform (PaaS).

Unit V **14 Hrs**

PRIVACY: What Is Privacy-What Is the Data Life Cycle-What Are the Key Privacy Concerns in the Cloud-Who Is Responsible for Protecting Privacy-Changes to Privacy Risk Management and Compliance in Relation to Cloud Computing.

Text Books

S.No.	Authors	Title of the Book	Publishers	Year and Edition
1	Tim Mather, Subra Kumaraswamy, Shahed Latif	Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance	O'Reilly Media, Inc.	2022, 1st Edn

Reference Books

S.No.	Authors	Title	Publishers	Year and Edition
1	Raghu Yeluri and Enrique Castro Leon	Building the Infrastructure for Cloud Security- A Solution View	Apressopen	2018, 1st Edn
2	Barrie Sosinsky	Cloud Computing Bible	Wiley-India	2010, 1st Edn

Pedagogy

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
CY23E02	WEB APPLICATION AND SECURITY	THEORY	73	2	-	4

Preamble

- *This course covers the various techniques for securing ASP.NET Web API, including basic authentication using authentication filters, forms, Windows Authentication, external authentication services, and integrating ASP.NET's Identity system*.

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 web applications, including client-server models	K1
CLO2	Understand the HTTP/HTTPS protocols, and session management mechanisms	K2
CLO3	Apply secure coding practices to develop web applications that prevent common vulnerabilities such as SQL injection, XSS, and CSRF	K3
CLO4	Analyze web applications to identify security vulnerabilities using tools and techniques such as vulnerability scanning and penetration testing	K4

Mapping with Programme Outcomes

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

S- Strong; M-Medium

WEB APPLICATION AND SECURITY- CY23E02 73 Hrs

Unit I 14 Hrs

Setting up a browser client: ASP.NET Web API security architecture – Setting up your browser client – Consuming the Web API using JavaScript and jQuery – Authentication and authorization – Implementing authentication in HTTP message handlers – Setting the principal – using the [Authorize] attribute – Custom authorization filters

Unit II 15 Hrs

Enabling SSL for ASP.NET Web API: Enforcing SSL in a Web API controller – Using client certificates in Web API – Integrating ASP.NET Identity system with Web API – Creating an empty Web API Application – Installing the ASP.NET Identity NuGet packages – Setting up ASP.NET Identity 2.1 – Defining Web API Controllers and methods.

UNIT III **14 Hrs**

Securing Web API using OAuth2: Hosting OWIN in IIS and adding Web API to the OWIN pipeline – Individual user account authentication flow – sending an unauthorized request – Get an access token – Send an authenticated request. Enabling Basic Authentication using Authentication Filter in Web API: Basic authentication with IIS – Basic authentication with custom membership - Basic authentication using an authentication filter.

Unit IV **15 Hrs**

Setting an authentication filter – Implementing a Web API authentication filter – Setting an error result – Combining authentication filters with host-level authentication. Securing a Web API using Forms and Windows Authentication: Working of forms authentication – Implementing forms authentication in Web API.

Unit V **15 Hrs**

What is integrated windows authentication? - Advantages and disadvantages of using the integrated windows authentication mechanism - Configuring windows authentication – Difference between basic authentication and windows authentication. Avoiding Cross-Site Request Forgery Attacks in Web API: - What is CSRF attack? – Anti-forgery tokens using HTML form or Razor View – Anti- forgery tokens using AJAX.

Text Book

S. No	Authors	Title of the Book	Publishers	Year and Publication
1	Rajesh Gunasundaram	ASP.NET Web API Security Essentials	Packt Publications	2023, 1st Edn

Reference Books

S. No	Authors	Title of the Book	Publishers	Year and Publication
1	Jamie Kurtz, Brain Wortman	ASP.NET Web API 2: Building a REST Service from Start to Finish	Apress Publications	2015, 2nd Edn
2	Neil Madden	API Security in Action	Managing Publications	2020, 1st Edn

Pedagogy

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

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
CY23CP5	ETHICAL HACKING LAB	PRACTICAL		-	75	3

Preamble

- *The course is intended to provide the student with the in-depth knowledge of security, importance of data gathering, foot printing and system hacking*

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	K1
CLO2	Understand by designing various types of network security techniques	K2
CLO3	Apply the networking concepts and Penetration testing methods	K3
CLO4	Implement and configure different types of vulnerability scanning methods	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	M	M	M
CLO4	S	S	S	S	S

S- Strong; M-Medium

ETHICAL HACKING LAB – CY23CP5 75 Hrs.

Programs List

1. Configure IP addressing using CIDR notation and implement firewall rules using open- source tools on Linux.
2. Utilize open-source footprinting and email spoofing tools to gather information and simulate a social engineering attack.
3. Perform port scanning and enumeration using Nmap and Enum4linux on target systems.
4. Identify and exploit web server vulnerabilities using Nikto and Metasploit.
5. Conduct wireless network penetration tests and set up intrusion detection systems using Aircrack-ng and Snort.
6. Configure IPv6 addressing and conduct malware analysis using OSSEC and Cuckoo Sandbox.
7. Use OSINT tools for competitive intelligence and simulate dumpster diving with Maltego.
8. Write Python scripts for network reconnaissance and exploit Windows desktop vulnerabilities with Exploit-DB.

9. Analyze vulnerabilities in embedded operating systems with Binwalk and conduct web server penetration tests using OWASP ZAP.
10. Analyze wireless network traffic with tcpdump and configure firewall rules with pfSense for wireless network protection.
11. Simulate intruder attacks with Kali Linux and perform physical security assessments with OpenFAIR.
12. Test physical security with piggybacking techniques and execute phishing campaigns using Gophish for employee awareness.

Pedagogy

- System, White board, Demonstration through PPT

COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDIT
CY23SBP1	MOBILE APP DEVELOPMENT LAB	PRACTICAL	-	4	41	3

Preamble

- *This course is designed to equip with the knowledge and skills needed to create and deploy mobile apps for a variety of platforms, including iOS and Android.*

Course Learning Outcomes

On the Successful Completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand basic concepts of Java	K1
CLO2	Demonstrate the Mobile app using Android	K2
CLO3	Apply the techniques to solve real-time problems	K3
CLO4	Analyze the tools and framework for development of mobile app	K4

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

MOBILE APP DEVELOPMENT LAB 45 Hrs

Programs List

- Designing a Simple Toast application.
- Develop an application that uses GUI components, Font and Colors.
- Develop an application that uses Layout Managers and event listeners.
- Develop a simple calculator application.
- Develop a simple android application using the Image View and Spinner.
- Exercises to send SMS and receive SMS.
- Create an android application to connect to a website using web view.
- Create an android application with progress circle.
- Create an android application to demonstrate countdown timer.
- Create an android application to find location using location-based services.

Pedagogy

- Demonstration of working environment / Tools / Software / Program