Maharashtra Education Society

Abasaheb Garware College

(Autonomous)

(Savitribai Phule Pune University)

Three Year B.Sc. Degree Program **in Cyber Security**

(Faculty of Science and Technology)

F. Y. B. Sc. (Cyber Security)

Choice Based Credit System Syllabus
As per NEP Structure

To be implemented from Academic Year 2024-2025

Course Structure for the Undergraduate program in Cyber Security:

Year	Semester	Course Type	Course Code	Course Title	Remark	Credit	No. of hours
1	I	Major	CYS-111-TH	Problem Solving using Computer and C Programming		2	30
			CYS-112-PR	Practical based on C programming		2	4 per batch
		Minor	DS-111-TH	Graph Theory		2	30
			DS-112-PR	Practical based on Graph Theory		2	4 per batch
			ELC-113-TH	Principle of Digital Electronics		2	30
			ELC-114-PR	Practical based on Principle of Digital Electronics		2	4 per batch
		SEC	SEC-101-CYS	Basics of Web Designing		1 + 1	15 +Practical
	II	Major	CYS-161-TH	Python Programming		2	30
			CYS-162-PR	Practical based on Python Programming		2	4 per batch
		Minor	DS-161-TH	Data Representation and visualization		2	30
			DS-162-PR	Practical based on Data Representation and visualization		2	4 per batch
			ELC-163-TH	Sequential circuits and Computer Organization		2	30
			ELC-164-PR	Practical based on Sequential circuits and Computer Organization		2	4 per batch
		SEC	SEC-151-CYS	Fundamentals of Cyber security		1 + 1	15 +Practical
2	III	Major	CYS-201-MJ	Basics of Ethical hacking		2	30
			CYS-202-MJ	Cyber Law		2	30
			CYS-204-MJP	Practical Based on Basics of Ethical hacking		2	4 per batch
		Minor	DS-201-MN	Discrete Structure for Computer Science			
			DS-202-MNP	Discrete Structure for Computer Science			
			ELC-203-MN	Introduction to Internet of things and Embedded systems			
			ELC-204-MNP	Practical Based on Introduction to Internet of things and Embedded systems			
		VSC	CYS-222-VSC	Cyber incident response		2	30
		FP	FP-231-CYS	Project on Web Designing			
		IKS	CYS-200-IKS	Computing Science in Ancient India		2	30
	IV	Major	CYS-251-MJ	Operating Systems		2	30
			CYS-252-MJ	Web and mobile technology		2	30
			CYS-254-MJP	Practical Based on Operating Systems and Web and mobile technology		2	4 per batch
		Minor	DS-251-MN	Statistical Methods for Data Science			

			DS-252-MN	Practical Based on Statistical Methods for Data Science			
			ELC-253-MN	Microcontroller Architecture and Programming			
			ELC-254-MNP	Practical based on Microcontroller Architecture and Programming			
		VSC	CYS-272-VSC	Network Security and Cryptography		2	30
		CEP	CYS-281-CEP	Project on Python			
		SEC	SEC-262-CYS	Advanced Excel		1 + 1	15 +Practical
3	V	Major	CYS-301-MJ	Digital Forensics I		2	30
			CYS-302-MJ	Information Security policy and Audit		2	30
			CYS-303-MJ	Cyber Threat Intelligence		2	30
			CYS-304-MJ	Block Chain Technology		2	30
			CYS-305-MJP	Practical Based on Digital Forensics I		2	4 per batch
			CYS-306-MJP	Practical Based on Information Security policy and Audit		2	4 per batch
		Elective	CYS-311-MJ	Web API Security		2	30
			CYS-312-MJ	Practical Based on Web API Security		2	4 per batch
		Minor	DS-301-MN	Calculus for Machine Learning		2	30
			ELC-302-MN	Embedded system Design		2	30
		VSC	CYS-321-VSC	Fintech Technology		2	30
		FP	CYS-331-FP	Project			
	VI	Major	CYS-351-MJ	Digital Forensics II		2	30
			CYS-352-MJ	Information Security		2	30
			CYS-353-MJ	Web Science		2	30
			CYS-354-MJ	Cyber Crime and investigation		2	30
			CYS-355-MJP	Practical Based on Digital Forensics II		2	4 per batch
			CYS-356-MJP	Practical Based on Information Security		2	4 per batch
		Elective	CYS-361-MJ	Malware Analysis		2	30
			CYS-362-MJP	Practical Based on Malware Analysis		2	4 per batch
		VSC	CYS-371-VSC	Mobile Forensic		2	30
		OJT	CYS-381-OJT	On Job Training		4	

CYS-111-TH: Problem Solving using Computer and 'C' Programming

Lectures: 30 (Credits-2)

Prerequisites: None

Course Objectives:

1. To introduce the foundations of computing, programming and problem-solving using computers.
2. To develop the ability to analyze a problem and devise an algorithm to solve it.
3. To develop the basic concepts and terminology of programming in general.
4. To implement algorithms in the 'C' language.
5. To test, debug and execute programs.

Learning Outcomes: On completion of this course, students will be able to:

1. Explore algorithmic approaches to problem solving.
2. Develop modular programs using control structures and arrays in 'C'.

Unit 1: Problem solving and 'C' programming **08**

1.1 Problem solving using Computers
1.2 Programming Languages as tools, types of languages
1.3 Algorithms-definition, characteristics, examples, advantages and limitations
1.4 Flowcharts - definition, notations, examples, advantages and limitations, Comparison with algorithms
1.5 Structure and example of first 'C' program
1.6 Compilation process (compilers, interpreters)
1.7 Character set, Keywords, Identifiers
1.8 Variables, Constants (character, integer, float, string, escape sequences, enumeration constant)
1.9 Data Types (Built-in and user defined data types)
1.10 Operators, Expressions, Types of operators
1.11 Arithmetic operators, Increment Decrement operators, Relational and logical operators, Bitwise operators, Assignment operators, Comma operator, sizeof operator, conditional operator, Operator precedence and Order of evaluation
1.12 Formatted input and output, format specifiers

Unit 2: Control Structures **07**

2.1 Decision making structures:- if ,if-else, else-if ladder, switch
2.2 Loop control structures - while ,do while, for
2.3 Use of break and continue
2.4 Nested control structures
2.5 Unconditional branching (goto statement)

Unit 3: Functions **07**

3.1 Function definition, Types of functions (Standard library and User defined functions)
3.2 Function parameters/arguments (Actual, Formal)
3.3 Parameter passing method (by value), return statement

3.4 Recursive functions
3.5 Scope of variables and Storage classes

Unit 4: Arrays **08**

4.1 Concept of array, advantages, disadvantages
4.2 Types of Arrays – One, Two dimensional array
4.3 Array Operations - declaration, initialization, accessing array elements
4.4 Memory representation of two-dimensional array (row major and column major)
4.5 Passing arrays to function
4.6 Array applications - Linear search, sorting an array (bubble sort)

Reference Books:

1. A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard F. Gilberg, Cengage Learning India
2. Programming in ANSI C, E. Balagurusamy, 7th Edition, McGraw Hill
3. Programming in ANSI C, Ram Kumar and Rakesh Agrawal
4. The 'C' programming language, Brian Kernighan, Dennis Ritchie, PHI

CYS-112-PR: LAB on C Programming

No. of Sessions: 12 (Credits-2)

Assignments of C Programming:

1. Assignment on use of data types, simple operators (expressions)
2. Assignment on decision making statements (if and if-else, nested structures)
3. Assignment on decision making statements (switch case)
4. Assignment on use of while loops
5. Assignment on use of for loops
6. Assignment on nested loops
7. Assignment on writing C programs in modular way (use of user defined functions)
8. Assignment on recursive functions
9. Assignment on use of arrays (1-D array) and functions
10. Assignment on use of multidimensional array (2-D arrays) and function

DS-111-TH : Graph Theory

Lectures: 30 (Credits-2)

Learning Objectives:

1. Students are introduced to basics of Graph Theory
2. Student should understand and implement important graph theory algorithms which are widely used in data science.
3. Students should to apply concepts of Graph theory to data structures.
4. Student should get acquainted with graph database.

Unit 1: An Introduction to graph **8**

1.1 Definitions, Basic terminologies and properties of graph, Graph models.
1.2 Special types of graphs, basic terminologies, properties
1.3 Some applications of special types of graph
1.4 Matrix representation and elementary results, Isomorphism of graphs.

Unit 2: Connected graph and Trees **6**

2.1 Walk, trail, path, cycle, elementary properties of connectedness
2.2 Cut edge (Bridge), Cut vertex, cut set, vertex connectivity, edge connectivity and properties
2.3 Definition of a tree, basic terminologies, properties
2.4 Binary tree – definition and elementary properties

Unit 3: Graph Algorithms **12**

3.1 BFS, DFS
3.2 Definition of spanning tree, Kruskal's algorithm to find minimal spanning tree
3.3 Prim's algorithm to find minimal spanning tree
3.4 Shortest path problem, Dijkstra's algorithm.

Unit 4: Graph Database **4**

4.1 Why graph database?
4.2 Introduction to graph database
4.3 Introduction of Neo4j

Text Book:

1. Kenneth Rosen, Discrete Mathematics and its applications, Tata McGraw Hill, Seventh Edition.
   Unit 1: Chapter 8: Sec. 8.1, 8.2, 8.3
   Unit 2: Chapter 8: Sec. 8.4
   Unit 3: Chapter 8: Sec. 8.5, 8.6
   Unit 4: Chapter 9: Sec. 9.1, 9.2, 9.3, 9.4, 9.5.

Reference Books:

1. John Clark and Derek Holton, A first look at Graph theory, Allied Publishers.
2. Narsingh Deo, Graph Theory with applications to computer science and engineering, Prentice Hall.
3. Douglas B. West, Introduction to Graph Theory, Pearson Education, second edition.

4.

DS-112-PR – Lab course on Graph Theory

Sessions 12 (Credit 2)

List of Practical

Practical 1: Problems on Unit1.
Practical 2: Problems on Unit 2 (Connected graphs)
Practical 3: Problems on Unit 2 (Trees)
Practical 4: Problems on Unit 3 (DFS, BFS)
Practical 5: Problems on Unit 3 (Prim's algorithm)
Practical 6: Problems on Unit 3 (Kruskal's algorithm).
Practical 7: Problems on Unit 3 (Dijkstra's algorithm)
Practical 8: Miscellaneous Problems-Set 1
Practical 9: Miscellaneous Problems-Set 2
Practical 10: Demo of Neo4j

ELC-113-TH: Principle of Digital Electronics

Lectures: 30 (Credits-2)

Prerequisites: None

Course Objectives:

1. To learn number systems and their representation.
2. To understand basic logic gates, Boolean algebra and K-maps.
3. To understand combinational and sequential circuits.
4. To provide a broad overview of architecture and functioning of computer systems
5. To study arithmetic circuits, combinational and sequential circuits.

Learning Outcomes: On completion of this course, students will be able to:

1. To get familiar with concepts of digital electronics.
2. Design of combinational circuits.
3. To study simple digital circuits.
4. To know the digital techniques of simplifying the circuits.

Unit 1: Data representation and Computers Arithmetic 10

1.1 Review of Decimal, Binary, Octal, Hexadecimal Number system and their inter- conversion,
1.2 BCD code, Gray code, ASCII, Concept of parity code.
1.3 Signed and Unsigned numbers, 1's and 2's complement of binary numbers, Binary arithmetic (Addition, subtraction and subtraction using 1's complement and 2's complement)

Unit 2: Boolean Algebra & Logic Gates 10

2.1 Introduction, Logic (AND OR NOT),
2.2 Boolean theorems, Boolean Laws, De Morgan's Theorem, Reduction of Logic expression using Boolean Algebra, Deriving Boolean expression from given circuit, exclusive OR and Exclusive NOR gates, Universal Logic gates, Implementation of other gates using universal gates.
2.3 Reduction technique using Karnaugh maps – 2/3/4 variable K-maps, grouping of variables in K-maps, K-maps for product of sum form, minimize Boolean expression using K-map and obtain K-map from Boolean expression

Unit 3: Combinational Circuits 10

3.1 Half adder and full adder, 4-Bit Universal adder/ Subtractor, Applications of Ex-OR gates as parity checker and generator.
3.2 Study of Multiplexer (4:1) and Demultiplexer (1:4), Encoders - Decimal/ BCD or binary, Decoder- BCD to seven segment decoder, IC 74138 and IC 7447, Digital comparator.

Reference Books

1. Digital Fundamentals: Floyd T.M., Jain R.P., Pearson Education.
2. Digital Electronics: Jain R.P., Tata McGraw Hill.
3. Digital Principles and Applications: Malvino Leach, Tata McGraw-Hill.

ELC-114-PR: Practical based on Principle of Digital Electronics

No. of Sessions: 15 (Credits-2)

List of Practical:

1. Study of Logic Gates (Verification of Truth tables). Knowing the various IC numbers and internal structure.
2. Study of Binary to Gray & Gray to Binary Converter (K- Map based design).
3. Study of Half Adder and Full Adder using Logic Gates.
4. Study of nibble adder/ subtractor.
5. Use of Ex-OR as a 4-bit Parity Checker and Generator circuits.
6. Study of Multiplexer and Demultiplexer (4:1 & 1:4).
7. Study of BCD to Seven Segment Display using IC 74138 and IC 7447.
8. Study of Decimal/ BCD or binary encoder.

SEC-111-CYS : Basics of Web Designing

Lectures: 15 + Practical (Credits-2)

Prerequisites: None

Course Objectives:

1. To learn basic HTML tags.
2. To design static Webpage.
3. To define styles for web pages using CSS.
4. To create a dynamic and interactive web page using Javascript

Learning Outcomes: On completion of this course, students will be able to:

1. Design a page using basic HTML tags.
2. Build simple static Web application.
3. Define different styles for HTML tags.
4. Understand scripting language which helps to develop interactive webpage.

Unit 1: HTML **08**

1.1 Introduction to HTML, Structure of HTML
1.2 HTML tags, attributes and HTML comment
1.3 HTML formatting tags
1.4 Headings, Paragraph
1.5 Ways to define color – Plain color, RGB, Hex value, HSL value
1.6 Inserting an Image
1.7 List
1.8 Tables
1.9 Hyperlinks and Image links
1.10 Frames and iFrame

Unit 2: HTML form designing and HTML 5 **06**

2.1 Inserting text box, text area, buttons, List box, radio, checkbox
2.2 Designing of Forms
2.3 GET and POST methods
2.4 Designing form using HTML 5 input tags

Unit3: CSS **08**

3.1 Introduction to Style Sheet
3.2 Ways to apply CSS to HTML
3.3 CSS Border, margin, positioning, color, text, link, background, list, table, padding, image, display properties, z-index, opacity
3.4 Use of Id and classes in CSS
3.5 Use of and
3.6 Introduction of CSS3: Gradients, Transitions, Animations, multiple columns
3.7 Introduction to Bootstrap
3.8 Bootstrap Tables, Images, Buttons

Unit 4: Javascript and Jquery **08**

4.1 Concept of script
4.2 Introduction to Javascript
4.3 Variables, identifiers and operators, control structures
4.4 Functions
4.5 Event Handling in Javascript
4.6 Math and date object
4.7 String object and predefined String functions
4.8 DOM concept in Javascript, DOM objects
4.9 Validations in Javascript
4.10 Jquery library
4.11 Including jquery library in page Jquery selector
4.12 DOM manipulation using Jquery

Reference Books

1. HTML Black Book by Steven Holzner, Dremtech press.
2. The Complete Reference by Thomas A. Powell, Mc Graw Hill
3. https://getbootstrap.com/

Practical Assignments:

1. HTML Tags - headings, paragraphs, line break, colors, fonts, links, Images, List, tables and Frames
2. Creating forms by using HTML and HTML5 Tags
3. Styling HTML pages using CSS
4. Assignment on bootstrap
5. Assignment on Javascript
6. Assignment on jquery

SEMESTER-II

CYS-161-TH: Python Programming

Lectures: 30 (Credits-2)

Prerequisites:

1. Minimal knowledge of software installation.

Course Objectives:

1. This course is designed to give an overall exposure to the students about the computer programming and to develop the logical thinking.
2. All the students should learn to write basic programs which will be helpful for them in their future research

Course Outcomes: Student will be able to

1. Use python programming elements to solve and debug simple logical problems. Control statements in Python
2. Experiment with the various
3. Develop Python programs using functions and strings. Develop python programs to implement various file operations and exception handling.

Unit 1: Basics of Python Programming **6**

1.1 Features of Python
1.2 How to Run Python
1.3 Identifiers
1.4 Reserved Keywords
1.5 Variables
1.6 Comments in Python
1.7 Indentation in Python
1.8 Multiline Statements
1.9 Input, Output and Import Functions (Displaying the output, Reading the input, import function)
1.10 Operators (Arithmetic, Comparison, Assignment, Bitwise, Logical, Membership, Identity), operator precedence

Unit 2 Data Types and Flow Control **4**

2.1 Numbers, Strings, List, Tuple, Set, Dictionary
2.2 Data type conversion
2.3 Decision Making (if, for, while, nested loops, control statements, types of loops)

Unit 3 Array and Matrices **10**

3.1 The NumPy Module
- 3.1.1 Creating Arrays and Matrices
- 3.1.2 arange(start, stop, step, dtype = None)
- 3.1.3 linspace(start, stop, number of elements)
- 3.1.4 zeros(shape, datatype)

3.1.5 ones(shape, datatype)
3.1.6 random.random(shape)
3.1.7 reshape(array, newshape)

Unit 4 Functions **10**

4.1 Function Definition
4.2 Function Calling
4.3 Function Arguments (Required Arguments, Keyword Arguments, Default Arguments, Variable Length Arguments)
4.4 Anonymous Functions (Lamda Functions)
4.5 Recursive Functions
4.6 Function with more than one return value

Reference Books:

1. O'Connor, T. J. Violent Python: A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers. Newnes, 2012.
2. Zelle, J.M., 2004. Python programming: an introduction to computer science. Franklin, Beedle & Associates, Inc.
3. Seitz, J., 2014. Black Hat Python: Python Programming for Hackers and Pentesters. No Starch Press.
4. Yates, J., 2016. Python: Practical Python Programming for Beginners and Experts (Beginner Guide).
5. Sanders, E., 2016. Python: The Python Quickstart Guide-The Ultimate Guide to Python Programming. CreateSpace Independent Publishing Platform.
6. Tale, S., 2016. Python: The Ultimate Beginners Guide Start Coding Today. CreateSpace Independent Publishing Platform.
7. Dawson, M., 2010. Python Programming for the Absolute Beginner 3e. Nelson Education.
8. Ashok Namdev Kamthane, Amit Ashok Kamthane, “Programming and Problem Solving with Python” , Mc-Graw Hill Education,2018.
9. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, Second edition, Updated for Python 3, Shroff / O’Reilly Publishers, 2016.
10. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. Ltd., 2016.
11. Timothy A. Budd,” Exploring Python”, Mc-Graw Hill Education (India) Private Ltd., 2015.
12. Kenneth A. Lambert, “Fundamentals of Python: First Programs”, CENGAGE Learning, 2012.
13. Charles Dierbach, “Introduction to Computer Science using Python: A Computational Problem- Solving Focus”, Wiley India Edition, 2013.

E-books and online learning material

1. www.mhhe.com/kamthane/python
2. Allen B. Downey, Think Python: How to Think Like a Computer Scientist, second edition, Updated for Python 3, Shroff / O’Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/)

CYS-162-PR: Lab on Python Programming

No. of Sessions: 12 (Credits-2)

List of Assignments:

1. Implement simple python programs using interactive and script mode.
2. Develop python programs using id () and type () functions.
3. Implement range () function in python.
4. Implement various control statements in python.
5. Develop python programs to perform various string operations like concatenation, slicing, indexing.
6. Demonstrate string functions using python.
7. Implement user defined functions using python.
8. Develop python programs to perform operations on list.
9. Implement dictionary and set in python.
10. Develop programs to work with Tuples.
11. Create programs to solve problems using various data structures in python.
12. Implement python program to perform file operations.
13. Implement python programs using modules and packages.

DS-161-TH : Data Representation and Visualization

Lectures: 30 (Credits-2)

Course Objectives:

1. To introduce methods in descriptive statistics
2. To explain the concept of descriptive statistics for real data
3. To summarize data visually and numerically

Learning Objectives:

1 To introduce methods in descriptive statistics
2 To explain the concept of descriptive statistics for real data
3 To summarize data visually and numerically

Unit 1: Introduction **8**

1.1 Raw data, attributes and variables, discrete and continuous variables. Presentation of data using frequency distribution and cumulative frequency distribution.

1.2 Graphical Presentation of frequency distribution –histogram, stem and leaf chart, less than and more than type ogive curves, bar graph, Pie chart

Unit 2: Measures of Central tendency **8**

2.1 Measures of Central tendency (for ungrouped data): Mean, Mode, Median. Examples where each one of these is most appropriate

2.2 Measures of Central tendency (for grouped data): Mean, Mode, Median. Examples where each one of these is most appropriate

2.3 Partition values: Quartiles, Box-Plot

Unit 3: Measures of dispersion **8**

3.1 Measures of Dispersion: Range, Coefficient of range, Quartile deviation, Coefficient of quartile deviation

3.2 Variance, Standard Deviation, Coefficient of Variation

Unit 4: Bivariate Data **4**

4.1 Bivariate data, Scatter diagram.

4.2 Correlation, Positive Co rrelation, Negative Correlation, Zero Correlation

Text Book:

1. Fundamentals of Applied Statistics, Gupta and Kapoor, S.Chand and Sons, New Delhi, 2014, Fourth Edition

Reference Books:

1. Statistical Methods,, G.W. Snedecor, W.G. Cochran, John Wiley & sons, 1991, Eight Edition
2. An Introductory Statistics, Kennedy and Gentle

DS-162-PR- MN Lab course on Data Representation and Visualization

Sessions 12 (Credits 2)

Manual problems solving practical

1. Problems based on Unit 1
2. Measures of Central Tendency
3. Measures of Dispersion.
4. Problems on Bivariate data

Practical using R software / Excel

5. Introduction to R software / Excel
6. Graphical Presentation of frequency distribution – bar graph, stem and leaf chart, ogive curves
7. Measures of Central Tendency
8. Measures of Dispersion.
9. Bivariate data

ELC-163-TH: Sequential Circuits and Computer Organization

Lectures: 30 (Credits-2)

Prerequisites: None

Course Objectives:

1. To provide knowledge of technological and practical aspects of electronics.
2. To familiarize with current and recent technological developments.
3. To learn the basic concepts behind the architecture and organization of computers.

Learning Outcomes: On completion of this course, students will be able to:

1. To get familiar with building blocks of sequential circuits.
2. To study the concept of counter and counter circuits.
3. To understand the working of shift register circuits.
4. To learn organization of components of CPU and their way of communication.

Unit 1: Sequential circuits **12**

1.1 Introduction, S-R flip-flop, D flip-flop, JK flip-flop, Race-around condition, T flip-flop, Application of flip-flops.

1.2 Counters: Introduction, Synchronous counter, Asynchronous counter, Terms related to counters, IC74193 (4-bit binary counter), IC 7490, Analysis of counter circuits.

1.3 Shift Register: Introduction, parallel and serial shift registers, Ring counter, Johnson counter

Unit 2: CPU, Memory and I/O Organization **12**

2.1 Block diagram of CPU, functions of CPU, general register organization, flags, Concept of RISC and CISC

2.2 Memory System hierarchy, Cache Memory, Internal Memory, External Memory, Concept of Virtual Memory.

2.3 Input/ Output: types of I/O data transfers - CPU initiated, interrupt initiated and DMA, Need of I/O interfaces, Parallel and serial communication (asynchronous and synchronous data transfer)

Unit 3: Introduction to Microprocessors and Microcontrollers **06**

3.1 Block diagram of Pentium, Functional units, Concept of pipeline and parallelism Programmers model

3.2 Introduction to Microcontroller Intel 8051 – Functional block diagram, Introduction to multi-core processors.

Reference Books:

1. R.P. Jain, "Modern Digital Electronics", McGraw-Hill Publications
2. Floyd and Jain, "Digital Fundamentals", Pearson Publication.
3. M. Morris Mano, "Digital computer Design", 3rd Edition, PHI, New Delhi.
3. A. Antonokous "Introduction to Assembly language programming for Pentium RISC Processor"
4. Mazidia and McKinlay, "The 8051 microcontroller and embedded systems" Pearson Publication

ELC-164-PR: Practical based on Sequential circuits and Computer Organization

No. of sessions: 15 (Credits-2)

List of Practical:

1. Study of RS, clocked RS and D flip flop.
2. Study of Mod 2, Mod 5, Mod 10 counter using IC 7490.
3. Study of Shift register using IC7495.
4. Study of Diode matrix ROM.
5. Study of Mod 16 counter using IC 74193.
6. Study of ring counter using Shift register IC7495.
7. Interfacing of decade counter to Seven Segment Display using IC 7447.
8. Introduction to microcontroller development board

Activity:

1. Lecture of Industry person related to syllabus.

SEC-151-CYS: Fundamentals of Cyber Security

Lectures: 30 (Credits-2)

Prerequisites

1. Fundamentals of computer software and hardware.
2. Basic concepts of operating system and networking.
3. Practical knowledge of internet and use of networks.

Course Objectives:-

1. Identify Key concept and Terminology of Cyber Security.
2. Examine the concept of privacy and its legal protections.
3. Explain the primary concepts involving encryption.
4. Perform basic computer forensics.
5. Describe the social implications of cyber security.
6. Understand the risks and benefits of social networks.

Course Outcomes: Student will be able to

1. Evaluate fundamental cyber security concepts, theories, and strategies as they apply to real world case studies.
2. Explain technical and non-technical security solutions on different types of cyber systems.
3. Assess risks, vulnerabilities, and threats to sample cyber systems.
4. Identify attributes associated with cyber security professionals.

Unit 1 Introduction to Cyber Security and various challenges in cyber security

1.1. Overview of Cyber Security,
1.2. Internet Governance – Challenges and Constraints,
1.3. Cyber Threats: - Cyber Warfare-Cyber Crime-Cyber Terrorism-Cyber Espionage,
1.4. Need for a Comprehensive Cyber Security Policy,
1.5. Need for a Nodal Authority,
1.6. Need for an International convention on Cyberspace

Unit 2 Cyber Security Vulnerabilities and attacks

2.1. Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Threat Actors, Attacks
2.2 Open Access to Organizational Data, Weak Authentication
2.3 Unprotected Broadband communications
2.4 Poor Cyber Security Awareness
2.5 Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

Unit 3 Securing Web Application, Services and Servers

3.1 Introduction, Basic security for HTTP Applications and Services,
3.2 Basic Security for SOAP Services,

3.3 Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

Unit 4 Intrusion Detection and Prevention

4.1 Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider
4.2 Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software
4.3 Network based Intrusion detection Systems, Network based Intrusion Prevention Systems
4.4 Host based Intrusion prevention Systems
4.5 Security Information Management, Network Session Analysis
4.6 System Integrity Validation.

Reference Books:

1. Cyber security – Attack and Defense Strategies: 2nd Edition Paperback Yuri Diogenes (Author), Erdal Ozkaya (Author)
2. Cyber Security Basics: Protect your organization … (Paperback) by Franke, Don

Evaluation Pattern

The internal and external evaluation will be 50-50%

All the courses, both theory as well as practical, of major and minor are of two credits each. So, total marks will be 50. Out of 25 mars will be allotted for internal evaluation and 25 marks for external evaluation.

Theory Courses:

- Internal evaluation will be of 25 marks for which 2 continuous evaluation exams will be conducted
- External evaluation will be of 25 marks

Practical Courses:

Internal evaluation will be of 25 marks out of which 10 marks will be for assignment submissions done throughout the semester and a test/viva will be conducted for 15 marks

External evaluation will be of 25 marks

For Skill Enhancement and Vocational skills, 2 credit course is divided as 1 credit for theory and 1 credit of practical. In that case also internal and external will be of 50-50%.Distribution of 25 internal and 25 external (For total 2 credits) can be decided subject- wise

Methods of assessment for internal evaluation:

Seminar, objective test, open book test, Quiz, viva, projects, assignments, group discussion, research paper review, case study, industrial visit

Passing percentage

The student must secure at least 40% marks of that course to earn the full credit.

Examination	Credits	Marks Out of	Passing marks (40%)
Internal	2	25	10
External	2	25	10

Note: There is separate passing for internal and external examinations.