Bachelor of Science (Cyber Security)

Duration	Eligibility	Annual Fee
3 Year		

Course Structure & Scheme of Examination.

S. N.	Course Code	Subject	Max Marks		Total Marks		Total Credits
		Major	Assign	Theory	Max	Mini	
1	S1-CYBA1T	**Course - I** Computer Fundamentals, Organization and Architecture	30	70	100	35	4
2	S1- CYBA2T	**Course - II** Programming Methodology AndData Structure	30	70	100	35	4
		Minor					
3	S1-CYBB2T	Operating System	30	70	100	35	4
		Elective					
4		Fundamental of Cyber Security AndIntroduction to Python Programming	30	70	100	35	6
		Vocational					
5	V1-COS-WEBT	Web Designing	30	70	100	35	2
		Lab Web Designing Practical			100	35	2
6	S1- CYBA1P	**Lab** Computer Fundamentals and Digital Lab			100	35	2
7	S1- CYBA2P	**Lab** Programming Methodology and Data Structure Lab			100	35	2
8	S1-CYSB2P	**Lab** Operating System Practical			100	35	2
9		**Lab** Python Programming Practical			100	35	2

***In Addition to Above Courses**
(i) Compulsory AECC (8 Credit) and
(ii) Field Project/ Internship/ Apprenticeship/ Community Engagement Programme (4 Credit)
as notified by Dept. Higher Education, M.P.; Shall also be a part of this Programme.

PART A: Introduction			
Program: Certificate	B.Sc. Cyber Security	Year: I Year	**Session: 2023-24 Onwards**

1	Course Code	S1-CYBA1T	Cyber Security
2.	Course Title	**Computer Fundamentals, Organization and Architecture**	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major Course I**	
4.	Pre-Requisite (if any)	To study this course, a student must have basic knowledge of Computers.	
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a successful student will be able to:** • Understand the basic structure, operation and characteristics of digital computer. • Design simple combinational digital circuits based on given parameters. • Understand the working of arithmetic and logic unit. • Know about hierarchical memory system including cache memories and virtual memory. • Know the contributions of Indians in the field of computer architecture and related technologies.	
6.	Credit Value	Theory-4 Credits Practical - 2 Credits	
7.	Total Marks	Max. Marks: 30+70	Min. Passing Marks: 35

PART B: Content of the Course

No. of Lectures (in hours per week): 2 Hrs. per week

Total No. of Lectures: 60 Hrs.

Module	**Topics**	No. of Lectures
I	**Fundamentals of computers**: Definition, Characteristics, capabilities and limitations. **Types of Computers:** Analog, Digital, Micro, Mini, Mainframe & Super Computers, Work Station, Server computers. Generations of Computers. **Smart Systems**: definition, characteristics and applications. Definition of Embedded system, GIS, GPS, Cloud Computing. Uses of computers in e-governance and various public domains and services.	8
II	Block diagram of computer and its functional units. Concept of hardware, software and firmware. Types of software. **Input devices -** keyboard, scanner, mouse, light pen, bar code reader, OMR, OCR, MICR, track ball, joystick, touch screen camera, microphone etc. **Output devices:** monitors classification of monitors based on technology -CRT & flat panel, LCD, LED monitors, speakers, printers - dot matrix printer, ink jet printer, laser printer, 3D Printers, Wi-Fi enabled printers, plotters and their types, LCD/LED projectors. Computer memory and its types, Storage devices: Magnetic tapes, Floppy Disks, Hard Disks, Compact Disc - CD-ROM, CD-RW, VCD, DVD, DVD-RW, usb drives, Blue Ray Disc, SD/MMC Memory cards	10
III	**Fundamentals of Digital Electronics:** Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Binary and other Codes, Error Detection Codes. **Logic Gates,** Boolean Algebra, Map Simplification, Combinational Circuits, Sequential Circuits, simple combinational circuit design problems. **Combinational Circuits-** Adder- Subtractor, Multiplexer, Demultiplexer, Decoders, Encoders **Sequential Circuits -** Flip-Flops, Registers, Counters.	10
IV	**Basic Computer Organization:** Instruction codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycles, Memory Reference Instruction, Input - Output & Interrupts	10

	Instruction formats, Addressing modes, Instruction codes, Machine language, Assembly language. **Register Transfer and Micro operations:** Register Transfer Language, Register Transfer, Bus & Memory Transfer, Arithmetic Micro- operations, Logic Micro-operations, Shift Micro-operations.	
V	**Processor and Control Unit:** Hardwired vs. Micro programmed Control Unit, General Register Organization, Stack Organization, Instruction Format, Data Transfer & Manipulation, Program Control, Introductory concept of RISC, CISC, advantages and disadvantages of both. **Pipelining** concept of pipelining, introduction to Pipelined data path and control - Handling Data hazards & Control hazards.	10
VI	**Memory and I/O Systems -** Peripheral Devices, I/O Interface, **Data Transfer Schemes -** Program Control, Interrupt, DMA Transfer. I/O Processor. **Memory Hierarchy,** Processor vs. Memory Speed, High-Speed Memories, Main memory & its types, Auxiliary memory, Cache Memory, Associative Memory, Interleaving, concept of Virtual Memory, Hardware support for Memory Management.	10
VII	**Indian contribution to the field -** Contributions of reputed scientists of Indian origin - like Dr. Vinod Dham Father of Intel Pentium Processor, Dr. Ajay Bhat - Co-Inventor of USB Technology, Dr. Vinod Khosla- co-founder of Sun Microsystems, Dr. Vijay P Bhatkar - architect of India's national initiative in supercomputing, and many others. **Parallel Computing projects of India** PARAM, ANUPAM, FLOSOLVER, CHIPPS etc. Other relevant contributors and contributions.	2

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

1. M.Morris Mano, "Computer System Architecture", PHI.
2. Heuring Jordan, "Computer System Design & Architecture" (A.W.L.)
3. मध्य प्रदेश हिंदी ग्रंथ अकादमी से प्रकाशित विषय से संबंधित पुस्तकें।

Reference Books:

1. William Stalling, "Computer Organization & Architecture", Pearson Education Asia.
2. V. Carl Hamacher, "Computer Organization", TMH
3. Tannenbaum, "Structured Computer Organization", PHI.
4. Er. Rajiv Chopra, "Computer Architecture", Revised 3rd Edition, S. Chand & Company Pvt. Ltd

Suggestive digital platform web links

https://www.youtube.com/watch?v=4TzMyXmzL8M

https://nptel.ac.in/courses/106/106/106106166/

https://nptel.ac.in/courses/106/106/106106134/

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **100**
Continuous Comprehensive Evaluation (CCE): **30** Marks
University Exam (UE): **70** Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	**Total Marks: 30**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A): Objective type Section (B): Short Questions Section (C): Long Answer Questions	**Total Marks: 70**

PART A: Introduction				
Program: Certificate	Class: B.Sc. Cyber Security		Year: I Year	**Session: 2023-24 Onwards**
1	Course Code	S1-CYBA1P		Cyber Security
2.	Course Title	**Computer Fundamentals and Digital Lab**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major - Course I (Practical)**		
4.	Pre-Requisite (if any)	Open for All		
5.	Course Learning Outcomes (CLO)6.	**After the completion of this course, a successful student will be able to do the following:** • Familiarity with parts of the computer and peripheral devices used with the computer. • Realization of the basic logic and universal gates. • Verify the behavior of logic gates using truth tables. • Implement Binary-to -Gray, Gray-to -Binary code conversions. • Design half and full adder circuit using basic gates. • Design and construct flip flops and verify the excitation tables.		
6.	Credit Value	Practical 2 Credits		
7.	Total Marks	Max.Marks: 30+70		Min. Passing Marks: 35

PART B: Content of the Course		
No. of Lab. Practicals (in hours per week): 2 Hrs. per week		
Total No. of Labs: 30 (02 Hours Each)		
	Suggestive list of Practicals	No. of Labs.
	I. Computer Fundamentals a) Identify various parts of the computer by physical examination. b) Identify various parts inside the CPU like motherboard, SMPS, ports, buses, IC chips, Processor, HDD, RAM etc. c) Identify various I/O devices available in the lab physically. II. Digital Electronics a) Verification and interpretation of truth table for AND, OR, NOT gates b) Verification and interpretation of truth table for NAND, NOR gates c) Verification and interpretation of truth table for Ex-OR, Ex-NOR gates d) Study of half adder using XOR and NAND gates and verification of its operation e) Study of full adder using XOR and NAND gates and verification of its operation f) Study of half subtractor and verification of its operation g) Study of full subtractor and verification of its operation h) Realization of logic functions with the help of NAND -Universal Gates i) Realization of logic functions with the help of NOR -Universal Gates j) Verify the truth table of RSflip-flops using NAND and NOR gates k) Verify the truth table of JKflip-flops using NAND and NOR gates l) Verify the truth table of T and D flip-flops using NAND and NOR gates m) Implementation of 4x1 multiplexer using logic gates n) Implementation of 1x4 demultiplexer using logic gates o) Verify Gray to Binary conversion using NAND gates only p) Verify Gray to Binary conversion using NAND gates only	30

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PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- M.Morris Mano, "Computer System Architecture", PHI.
- Heuring Jordan, "Computer System Design & Architecture" (A.W.L.)
- मध्यप्रदेश हिंदी ग्रंथ अकादमी से प्रकाशित विषय से संबंधित पुस्तकें ।

Reference Books:

- William Stalling, "Computer Organization & Architecture", Pearson Education Asia.
- V. Carl Hamacher, "Computer Organization", TMH
- Tannenbaum, "Structured Computer Organization", PHI.

Suggestive digital platform web links

https://de-iitr.vlabs.ac.in/

Suggested equivalent online courses

https://nptel.ac.in/courses/106/105/106105163/

PART D: Assessment and Evaluation

Internal Assessment	**Marks**	**External Assessment**	**Marks**
Class Interaction/Quiz	**30**	Viva Voce on Practical	**70**
Attendance		Practical Record File	
Assignments (Charts/Model/Seminars / Technology Dissemination/ Excursion/ Lab visit/ Industrial Visit)		Table Work / Exercise Assigned	
	Total Marks: 100		

PART A: Introduction				
Program: Certificate		Class: B.Sc. Cyber Security	Year: I Year	Session: 2023-24 Onwards
1	Course Code	S1-CYBA2T		Cyber Security
2.	Course Title	Programming Methodology & Data Structures		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major - Course II/ Minor/ Elective**		
4.	Pre-Requisite (if any)	To study this course, a student must have basic knowledge of Computers.		
5.	Course Learning Outcomes(CLO)	**After the completion of this course, a successful student will be able to do the following:** • Develop simple algorithms and flow charts to solve a problem with programming using top down design principles. • Writing efficient and well-structured computer algorithms/programs • Learn to formulate iterative solutions and array processing algorithms for problems. • Use recursive techniques, pointers and searching methods in programming. • Will be familiar with fundamental data structures, their implementation; become accustomed to the description of algorithms in both functional and procedural styles. • Have knowledge of complexity of basic operations like insert, delete, search on these data structures. • Possess ability to choose a data structure to suitably model any data used in computer applications. • Assess efficiency tradeoffs among different data structure implementations. • Implement and know the applications of algorithms for searching and sorting. • Know the contributions of Indians in the field of programming and data structures.		
6.	Credit Value	Theory-4 Credits Practical - 2 Credits		
7.	Total Marks	Max. Marks: 30+70		Min. Passing Marks: 35

PART B: Content of the Course		
No. of Lectures (in hours per week): 2 Hrs. per week		
Total No. of Lectures: 60 Hrs.		
Module	Topics	No. of Lectures
I	Introduction to Programming - Program Concept, Characteristics of Programming, Stages in Program Development, Algorithms, Notations, Design, Flowcharts, Types of Programming Methodologies. Basics of C++: A Brief History of C++, Application of C++, Compiling & Linking, Tokens, Keywords, Identifiers & Constants Basic Data Types, User-Defined Data Types, Symbolic Constant, Type Compatibility, Reference Variables, Operator in C++, Scope Resolution Operator, Member Dereferencing Operators, Memory Management Operators, Manipulators, Type Cast Operator. **Functions In C++:** The Main Function**,** Function Prototyping, Call by Reference Call by Address,	8
	Call by Value, Return by Reference, Inline Function, Default Arguments, Constant Arguments, Function Overloading, Function with Array.	
II	**Classes & Objects:** A Sample C++ Program with class, Defining Member Functions, Making an Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within a Class, Memory	10

	Allocation for Objects, Static Data Members, Static Member, Functions, Array of Objects, Object as Function Arguments, Friend Functions, Virtual functions, Returning Objects, Constant member functions, Pointer to Members, Local Classes. **Constructor & Destructor:** Constructor, Parameterized Constructor, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructor and Destructor.	
III	Inheritance: Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructor in Derived Classes, Nesting of Classes. Operator Overloading & Type Conversion, Polymorphism, Pointers, Pointers with Arrays C++, Streams, C++ Stream Classes, Unformatted I/O Operation, Formatted I/O Operation, Managing Output with Manipulators, Exception Handling.	8
IV	Data Structure: Basic concepts, Linear and Non-Linear data structures Algorithm Specification: Introduction, Recursive algorithms, Data Abstraction, Performance analysis. **Arrays:** Representation of single, two-dimensional arrays, triangular arrays, sparse matrices-array and linked representations. Stacks: Operations, Array and Linked Implementations, Applications-Infix to Postfix Conversion, Infix to Prefix Conversion, Postfix Expression Evaluation, Recursion Implementation. **Queues:** Definition, Operations, Array and Linked Implementations. Circular Queue-Insertion and Deletion Operations, Dequeue (Double Ended Queue), Priority Queue- Implementation.	12
V	Linked Lists: Singly Linked Lists, Operations, Concatenating, circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations, Doubly Circular Linked List, Header Linked List Trees: Representation of Trees, Binary tree, Properties of Binary Trees, Binary Tree Representations- Array and Linked Representations, Binary Tree Traversals, Threaded Binary Trees. Heap: Definition, Insertion, Deletion.	10
VI	Graphs: Graph ADT, Graph Representations, Graph Traversals, Searching. Hashing: Introduction, Hash tables, Hash functions, Overflow Handling. Sorting: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Comparison of Sorting Methods, Search Trees: Binary Search Trees, AVL Trees- Definition and Examples.	10
VII	Indian Contribution to the field: Innovations in India, origin of Julia Programming Language, Indian Engineers who designed new programming languages, open source languages, Dr. Sartaj Sahni computer scientist pioneer of data structures, Other relevant contributors and contributions.	2

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- J. R. Hanly and E. B. Koffman, "Problem Solving and Program Design in C", Pearson, 2015
- E. Balguruswamy, "C++", TMH Publication ISBN 0-07-462038-X
- Herbert Shildt, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7
- मध्य प्रदेश हिंदी ग्रंथ अकादमी से प्रकाशित विषय से संबंधित पुस्तकें।

Reference Books:

- R. Lafore, 'Object Oriented Programming C++"
- N. Dale and C. Weems, "Programming and problem solving with C++: brief edition", Jones & Bartlett Learning.
- Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning.
- Sartaj Sahani, "Data Structures, Algorithms and Applications with C++", McGraw Hill.
- Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
- D.S. Malik, "Data Structure using C++", Second edition, Cengage Learning.
- M. A. Weiss, "Data structures and Algorithm Analysis in C", 2nd edition, Pearson.
- Lipschutz, "Schaum's outline series Data structures", Tata McGraw-Hill

Suggestive digital platform web links			
https://www.youtube.com/watch?v=BCIS40yzssA			
https://www.youtube.com/watch?v=vLnPwxZdW4Y&vl=en			
https://www.youtube.com/watch?v=Umm1ZQ51tZw			
Suggested equivalent online courses			
S.No.	Online Course	Duration	Platform
1	Programming in C++ https://nptel.ac.in/courses/106/105/106105151/	8 weeks	NPTEL
2	Beginning C++ Programming - From Beginner to Beyond https://www.udemy.com/course/beginning-c-plus-plus-programming/	Self paced	Udemy

PART D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: **100**
Continuous Comprehensive Evaluation (CCE): **30** Marks
University Exam (UE): **70** Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	**Total Marks: 30**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A): Objective type Section (B): Short Questions Section (C): Long Answer Questions	**Total Marks: 70**

PART A: Introduction				
Program: Certificate		Class: B.Sc. Cyber Security	Year: I Year	Session: 2023-24 Onwards
1	Course Code	S1-CYBA2P		Cyber Security
2.	Course Title	Programming Methodology & Data Structures Lab		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major - Course II/ Minor/ Elective**		
4.	Pre-Requisite (if any)	To study this course, a student must have basic knowledge of Computers.		
5.	Course Learning Outcomes(CLO)	After the completion of this course, a successful student will be able to do the following: 1. Develop simple algorithms and flow charts to solve a problem with programming using top down design principles. 2. Writing efficient and well-structured computer algorithms/programs. 3. Learn to formulate iterative solutions and array processing algorithms for problems. 4. Use recursive techniques, pointers and searching methods in programming. 5. Possess ability to choose a data structure to suitably model any data used in computer applications. 6. Implement and know the applications of algorithms for searching and sorting etc.		
6.	Credit Value	Practical - 2 Credits		
7.	Total Marks	Max. Marks: 30+70	Min. Passing Marks: 35	

PART B: Content of the Course

No. of Lab Practicals (in hours per week): 2 hours per week

Total No. of Lab.: 30 (02 Hrs. each)

	Suggestive list of Practicals	No. of labs.
	Given the problem statement, students are required to formulate problem, develop flowchart/algorithm, write code in C++, execute and test it. Students should be given assignments on following: 1. Write a program to swap the contents of two variables. 2. Write a program for finding the roots of a Quadratic Equation. 3. Write a program to find area of a circle, rectangle, square using switch case. 4. Write a program to print table of any number. 5. Write a program to print Fibonacci series. 6. Write a program to find factorial of a given number using recursion. 7. Write a program to convert decimal (integer) number into equivalent binary number. 8. Write a program to check given string is palindrome or not. 9. Write a program to print digits of entered number in reverse order. 10. Write a program to print sum of two matrices. 11. Write a program to print multiplication of two matrices. 12. Write a program to generate even/odd series from 1 to 100. 13. Write a program whether a given number is prime or not. 14. Write a program for call by value and call by reference. 15. Write a program to create a pyramid structure 16. Write a program to check entered number is Armstrong or not. 17. Write a program to input N numbers and find their average. 18. Write a program to find the area and volume of a rectangular box using constructor. 19. Write a program to design a class time with hours, minutes and seconds as data members.	30

	20. Use a data function to perform the addition of two time objects in hours, minutes and seconds. 21. Write a program to implement single inheritance. 22. Write a program to find largest element from an array. 23. Write a program to implement push and pop operations on a stack using array. 24. Write a program to perform insert and delete operations on a queue using array. 25. Write a program for Linear search. 26. Write a program for Binary search. 27. Write a program for Bubble sort. 28. Write a program for Selection sort. 29. Write a program for Quick sort. 30. Write a program for Insertion sort. 31. Write a program to implement linked list.	

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

- J. R. Hanly and E. B. Koffman, "Problem Solving and Program Design in C", Pearson, 2015
- E. Balguruswamy, "C++", TMH Publication ISBN 0-07-462038-X
- Herbert Shildt, "C++ The Complete Reference "TMH Publication ISBN 0-07-463880-7
- मध्य प्रदेश हिंदी ग्रंथ अकादमी से प्रकाशित विषय से संबंधित पुस्तकें।

Reference Books:

- R. Lafore, 'Object Oriented Programming C++"
- N. Dale and C. Weems, "Programming and problem solving with C++: brief edition", Jones & Bartlett Learning.
- Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning.
- Sartaj Sahani, "Data Structures, Algorithms and Applications with C++", McGraw Hill.
- Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
- D.S. Malik, "Data Structure using C++", Second edition, Cengage Learning.
- M. A. Weiss, "Data structures and Algorithm Analysis in C", 2nd edition, Pearson.
- Lipschutz, "Schaum's outline series Data structures", Tata McGraw-Hill

Suggestive digital platform web links

https://www.youtube.com/watch?v=BCIS40yzssA

https://www.youtube.com/watch?v=vLnPwxZdW4Y&vl=en

https://www.youtube.com/watch?v=Umm1ZQ51tZw

Suggested equivalent online courses

S.No.	Online Course	Duration	Platform
1	Programming in C++ https://nptel.ac.in/courses/106/105/106105151/	8 weeks	NPTEL
2	Beginning C++ Programming - From Beginner to Beyond https://www.udemy.com/course/beginning-c-plus-plus-programming/	Self paced	Udemy

PART D: Assessment and Evaluation

Internal Assessment	Marks	External Assessment	Marks
Class Interaction/Quiz	30	Viva Voce on Practical	70
Attendance		Practical Record File	
Assignments (Charts/Model/Seminars / Technology Dissemination/ Excursion/ Lab visit/ Industrial Visit)		Table Work / Exercise Assigned	
	Total Marks: 100		

PART A: Introduction			
Program: Certificate	Class: B.Sc. CYBER SECURITY	Year: I Year	**Session: 2023-24 Onwards**

1	Course Code	S1-CYBB2T	
2.	Course Title	Operating System	
3.	Course Type	**Minor**	
4.	Pre-Requisite		
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a student shall be able to do the following:** • Describe the importance of computer system resources and the role of operating system in their management policies and algorithms. • Specify objectives of modern operating systems and describe how operating systems have evolved over time. • Understand various process management concepts and can compare various scheduling techniques, synchronization, and deadlocks. • Describe the concepts of memory management techniques. • Identify the best suited process management technique for any process. • Describe various file operations, file allocation methods and disk space management. • To understand and identify potential threats to operating systems and the security features to guard against them. • Learn to operate the Linux system	
6.	Credit Value	Theory-4 Credits Practical - 2 Credits	
7.	Total Marks	Max. Marks: 30+70	Min. Passing Marks: 35

PART B: Content of the Course

No. of Lectures (in hours per week): 2 Hours per week

Total No. of Lectures: 60 Hrs.

Module	**Topics**	No. of Lectures
I	Introduction to Operating System: What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems- Batch Systems, Multiprogramming Systems, Multiprocessing Systems, Time Sharing Systems, Distributed OS, Real time systems. Operating System for Personal Computers, Workstations and Hand-held Devices. Applications of various operating systems in real world. Some prevalent operating systems Windows, UNIX/Linux, Android, MacOS, Blackberry OS, Symbian, Bada etc.	6
II	Process Management: Process Concepts, Process states & Process Control Block. Process Scheduling: Scheduling Criteria, Scheduling Algorithms (Preemptive & Non-Preemptive) - FCFS, SJF, SRTN, RR, Priority, Multiple-Processor, Real-Time, Multilevel Queue and Multilevel Feedback Queue Scheduling. Deadlock - Definition, Deadlock Characterization, Necessary and Sufficient Conditions for	14

	Deadlock. Deadlock Handling Approaches: Prevention, Avoidance, Detection and Recovery.	
III	Memory Management: Introduction, Address Binding, Logical versus Physical Address Space, Swapping, Contiguous & Non-Contiguous Allocation, Fragmentation (Internal & External), Compaction, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms. File Management: Concept of File System(File Attributes, Operations, Types), Functions of File System, Types of File System, Access Methods (Sequential, Direct & other methods), Directory Structure (Single-Level, Two-Level, Tree-Structured, Acyclic-Graph, General Graph), Allocation Methods (Contiguous, Linked, Indexed)	14
IV	Disk Management: Structure, Disk Scheduling Algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK), Swap Space Management, Disk Reliability, Recovery. Security: Security Threats, Security policy mechanism, Protection, Trusted Systems, Authentication and Internal Access Authorization, Windows Security.	12
V	LINUX: Introduction, History and features of Linux, advantages, hardware requirements for installation, Linux architecture, file system of Linux - boot block, super block, inode table, data blocks. Linux standard directories, Linux kernel, Partitioning the hard drive for Linux, installing the Linux system, system - startup and shut-down process, init and run levels. Process, Swap, Partition, fdisk, checking disk free spaces. Difference between CLI OS & GUI OS, Windows v/s Linux, Importance of Linux Kernel, Files and Directories. Concept of Open Source Software	12
VI	Indian contribution to the field the BOSS operating system, open source softwares, growth of LINUX, Aryabhatt Linux, contributions of innovators Rajen Sheth, Sunder Pichai etc.	02

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications.
- A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education.
- Operating System by Peterson
- Linux by Sumitabh Das

मध्यप्रदेश हिंदी ग्रंथ अकादमी से प्रकाशित विषय से संबंधित पुस्तकें।

Reference Books:

- G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education.
- W. Stallings, Operating Systems, Internals & Design Principles, 8th Edition, Pearson Education.
- M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill.
- Operating System design and Concepts by Milan Milenkovic.

PART A: Introduction				
Program: B.Sc. Cyber Security			Year: I Year	**Session: 2024-25**
1	Course Code			
2.	Course Title	**Fundamental of Cyber Security & Introduction to Python Programming**		
3.	Course Type	**Minor I**		
4.	Pre-Requisite (if any)			
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a successful student will be able to:** • Define Describe – Issues related to Cyber Crime. • Classify - Cyber Crimes technique. • Identify – Identify Threads, Piracy, Theft, Cyber terrorism. • Demonstrate – Strategies against Cyber Frauds, Web Vandals, Hacking Cases, session hijacking, • Discuses – Strategies to tackle Cyber Crimes Indian evidence Act 1872, Into Tech Act 2000. • Investigate & Demonstrate - Electronic Record as Evidence. • Use- Proxy server, Analysis, Key loggers. • Explain – Virus and worms, Attack on Networks, Phishing Techniques. • Create simple programs using Python • Use predefined and user defined functions. • Describe the concept of OOPs with applications • Design Small Applications using various Python features.		
6.	Credit Value	Theory-4 Credits Practical - 2 Credits		
7.	Total Marks	Max. Marks: 30+70		Min. Passing Marks: 35

PART B: Content of the Course		
No. of Lectures (in hours per week): 2 Hrs. per week		
Total No. of Lectures: 60 Hrs.		
Unit	**Topics**	**No. of Lectures**
I	Introduction of Cyber Crime, Challenges of cyber crime, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Internet Time Theft, Salami attack/Salami Technique, Web jacking, Online Frauds, Software Piracy, Computer Network Intrusions, Password Sniffing, Identity Theft, cyber terrorism, Virtual Crime, Perception of cyber criminals: hackers, insurgents and extremist group etc. Web servers were hacking, session hijacking.	10
II	Cyber Crime and Criminal justice: Concept of Cyber Crime and the IT Act, 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cheating, Defamation, Harassment and E-mail Abuse, Other IT Act Offences, Monetary Penalties, jurisdiction and Cyber Crimes, Nature of Criminality, Strategies to tackle Cyber Crime and Trends. The Indian Evidence Act of 1872 v. Information Technology Act, 2000: Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages.	10
III	Tools and Methods in Cybercrime: Proxy Servers and Analysis, Password Cracking, Key loggers and Spyware, virus and worms, Trojan Horses, Backdoors, DoS and DDoS Attacks, Buffer and Overflow, Attack on Wireless Networks, Phishing: Method of Phishing, Phishing Techniques.	8
IV	**Introduction to python language**: Basic syntax, Literal Constants, Numbers, Variable and Basic data types, String, Escape Sequences, Operators and Expressions, Evaluation Order, Indentation, Input, Output, Functions, Comments. Data Structure: List, Tuples, Dictionary, Data Frame and Sets, constructing, indexing, slicing and content manipulation.	12
V	Control Flow: Conditional Statements - If, If-else, Nested If-else. Iterative Statement - For, While, Nested Loops. Control statements - Break, Continue, and Pass. Python-Functions: Syntax for defining a function, Calling a Function, Function Arguments, Anonymous Functions.	10
VI	Object oriented programming: Class and Object, Attributes, Methods, Scopes and Namespaces, Inheritance, Overloading, Overriding, Data hiding, Exception: Exception Handling, Except clause, Try finally clause, User Defined Exceptions.	10

Suggested Books:

1. Principles of Cyber crime, Jonathan Clough Cambridge University Press
2. John R. Vacca, Computer Forensics: Computer Crime Scene Investigation, 2nd Edition, Charles River Media, 2005
3. Cyber Law Simplified, Vivek Sood, Pub: TMH.
4. Cyber Security by Nina Godbo le, Sunit Belapure Pub: Wiley-India
5. Information Warfare: Corporate attack and defense in digital world, William Hutchinson, Mathew Warren, Elsevier.
6. Cyber Laws and IT Protection, Harish Chander, Pub: PHI.
7. Timothy A. Budd: Exploring python, McGraw-Hill Education.
8. R.Nageshwar Rao,"Python Programming",Wiley India
9. Think Python: Allen B. Downey, O'Reilly Media, Inc.

PART A: Introduction				
Program: B.Sc. Cyber Security			Year: I Year	**Session: 2024-25**
1	Course Code			
2.	Course Title	**Python Programming Lab**		
3.	Course Type	**Minor I (Lab)**		
4.	Pre-Requisite (if any)			
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a successful student will be able to:** • Define Describe – Python Program structure • Classify – Different types of control structures. • Demonstrate – Jumping, Branching and Looping, • Class and Objects • Use- Predefined Functions and classes • Create simple programs using Python • Use predefined and user defined functions. • Describe the concept of OOPs with applications • Design Small Applications using various Python features.		
6.	Credit Value	Practical - 2 Credits		
7.	Total Marks	Max. Marks: 100		Min. Passing Marks: 35

PART B: Content of the Course

No. of Labs (in hours per week): 2 Hrs. per week

Total No. of Hours:60

Unit	Topics	No. of Labs (2 Hrs Each)
	1. To write a Python program to find GCD of two numbers. 2. To write a Python Program to find the square root of a number by Newton's Method. 3. To write a Python program to find the exponentiation of a number. 4. To write a Python Program to find the maximum from a list of numbers. 5. To write a Python Program to perform Linear Search 6. To write a Python Program to perform binary search. 7. 7. To write a Python Program to perform selection sort. 8. To write a Python Program to perform insertion sort. 9. To write a Python Program to perform Merge sort. 10. To write a Python program to find first n prime numbers 11. To write a Python program to multiply matrices. 12. To write a Python program for command line arguments. 13. To write a Python program to find the most frequent words in a text read from a file.	**30**

PART A: Introduction			
Program: Certificate	Class: B.Sc. Cyber Security	Year: I Year	**Session: 2023-24 Onwards**

1	Course Code	**V1-COS-WEBT**	
2.	Course Title	**Web Designing**	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Vocational**	
4.	Pre-Requisite (if any)	To study this course, a student must have basic knowledge of Computers.	
5.	Course Learning Outcomes (CLO)	**After the completion of this course, a successful student will be able to:** • Code a handful of useful HTML & CSS examples • Build semantic, HTML & CSS web page • Write basic scripts • Use Names, Objects, and Methods • Add Interactivity to a Web Page • Create Dynamic Web Pages using Java Script in HTML forms.	
	Expected Job Role/Career Opportunities	**Job Role** - Web Designer / Front End Developer/ Creative Ad Designer **Job Description** - Web designers develop functional and appealing web pages, websites, web applications, online advertisements for individuals, businesses and government agencies to establish their online presence. They use knowledge of computer programming and graphic design to create websites that meet client needs. **Career Opportunities -** • Typical employers of web designers are - • Software companies • IT consultancies • Specialist web design companies • Large corporate organisations • Any organisation that uses computer systems • Self-employment/freelance work is often possible for individuals with appropriate experience. • Vacancies are advertised online, by career services and by recruitment agencies.	
6.	Credit Value	Theory-2 Credits Practical - 2 Credits	
7.	Total Marks	Max. Marks: 30+70	Min. Passing Marks: 35

PART B: Content of the Course

Total No. of Lectures+Practical(in hours per week): L-2 Hrs/P-2Hrs

Total No. of Lectures/Practical: L-30hrs/P-60hrs

Module	**Topics**	No. of Lectures
I	Introduction to Internet- World Wide Web, Internet Addressing, Browser, URL, Web server, website, homepage, Domain Name. Basic concepts. Softwares for Web Designing - Notepad/Notepad++, Dreamweaver, Blue Griffon, Net beans, Sea	6

	Monkey, Word press, Sublime. Introduction to HTML: HTML Tags and Attributes, HTML Basic Tags, Formatting Tags, HTML Color Coding, Div and Span Tags for Grouping. Lists: Unordered Lists, Ordered Lists, **Definition list.** Images: Image and Image Mapping Hyperlink: URL - Uniform Resource Locator, URL Encoding. Table: <table>, <th>, <tr>, <td>, <caption>, <thead>, <tbody>, <tfoot>, <colgroup>, <col>. Attributes Using Iframe as the Target Form: <input>, <textarea>, <button>, <select>, <label> Headers: Title, Base, Link, Styles, Script HTML Meta Tag, XHTML, HTML Deprecated Tags & Attributes	
II	CSS: Introduction, Features and benefits of CSS, CSS Syntax, External Style Sheet using <link>, Multiple Style Sheets, Value Lengths and Percentages. Selectors: ID Selectors, Class Selectors, Grouping Selectors, Universal Selector, Descendant/Child Selectors, Attribute Selectors, CSS - Pseudo Classes. Color Background Cursor: background-image, background-repeat, background- position, CSS Cursor Text Fonts: color, background-color, text-decoration, text-align, vertical-align, text-indent, text-transform, white-space, letter-spacing, word-spacing, line-height, font-family, font-size, font-style, font-variant, font-weight.	5
III	Lists Tables: list-style-type, list-style-position, list-style-image, list-style, CSS Tables (border, width & height, text-align, vertical-align, padding, color) Box Model: Borders & Outline, Margin & Padding, Height and width, CSS Dimensions. Display Positioning: CSS Visibility, CSS Display, CSS Scrollbars, CSS Positioning (Static Positioning, Fixed Positioning, Relative Positioning, Absolute Positioning), CSS Layers with Z-Index. Floats: The float Property, The clear Property, The clearfix Hack.	**5**
IV	The JavaScript: Nature of JavaScript, Script Writing Basics, Enhancing HTML Documents with JavaScript, The Building Blocks. Introduction to JavaScript, JavaScript Engines, Values, Variables and Operators, Variable Mutation, Basic Operators, Operator Precedence, JavaScript Types, Types Definition, Types in JavaScript, Objects, Type Conversion and Coercion, Static vs Dynamic Type Checking. JavaScript Conditionals: Introduction to Conditionals, Conditionals in JavaScript, Ternary Operators and Conditionals. Conditional Ladder & Switch statement. JavaScript Arrays: Introduction to Arrays, Declaring and Mutating Arrays, Array Methods and Properties, Replication with Array Methods, Multi-dimensional Arrays.	**7**
V	JavaScript Loops: Introduction to Loops, Loops in JavaScript, While and Do/While Loops, For Loops, Break and Continue in Loops, Iterating Arrays, Iterating Objects. JavaScript Functions: Introduction to Functions, Functions in JavaScript, Nested Functions in JavaScript, Arrow Functions in JavaScript, Function as an Argument, Function as the Returned Object, JavaScript Scope: Scope Introduction, Scope in JavaScript, Lexical Scope, Module Scope. Method of Adding Interactivity to a Web Page, Creating Dynamic Web Pages; Concept of Java Scripting the Forms. Java Scripting the Forms, Basic Script Construction, Talking to the Form Objects, Organizing the Objects and Scripts, Field-Level Validation, Check Required Fields like Validating Zip Code, Automated Formatting, Format Phone, Format Money, Automatic Calculation, Calculate Expiration Date, Calculate Amount etc.	7
	Suggested List of Practicals	
	1. Design a home page which displays information about your college department using headings, HTML entities and paragraphs.	

	2. Implement different type of list tags in the college department homepage. 3. Create a webpage for any clinic using marquee and HTML formatting tags. 4. Create 3 Hyperlinks in home page connecting it to 3 different pages. 5. Create 3 hyperlinks in a page, which jumps to 3 different headings on same page. 6. Insert image(s) and iframe in a webpage. 7. Design a page with image of block diagram of computer, mapping each component as area with specific co-ordinates which when clicked may give their detail. 8. Create a web page having two frames, Frame 1 containing links and another with contents of the link. When link is clicked appropriate contents should be displayed on Frame 2. 9. Design a timetable and display it in tabular format. 10. Demonstrate difference between "get" and "post" method of form tag in a form with name and password text fields. 11. Design an admission form for any course in your college with text, password fields, drop-down list, check-boxes, radio buttons, submit and reset button etc. 12. Create a website for online book store with Home, Login, Catalogue, Registration page with links to all these pages in a menu on top of every page. Embed heading, paragraph, images, video, iframe, form controls, table, list in this website. 13. Write a CSS style specification rule that would make all unordered lists (tags) have square bullets and a purple background. 14. Create a HTML form with the use of cascading style sheets. 15. Design a web page of your Home town with a attractive background color, text color, an image, font face by using Inline CSS formatting. 16. Create a catalog for an online shopping company that sells music records using style sheets. 17. Create a sample code to illustrate the Inline style sheet for your web page. 18. Create a sample code to illustrate the External style sheet for your web page 19. Design a web page by using different CSS border styles. 20. Demonstrate the use of CSS Box Model. 21. Change the color of all elements with the class "colortext" to "Blue". 22. Set different margins for all four sides of a paragraph. 23. Write a JavaScript program to display the current day and time. 24. Write a JavaScript program to remove a character at the specified position of a given string and return the new string. 25. Write a JavaScript program to get the current date. 26. Write a JavaScript program to find the area of a triangle. 27. Write a JavaScript program to determine whether a given year is a leap year. 28. Write a JavaScript program to calculate multiplication and division of two numbers. 29. Write a JavaScript program to convert temperatures to and from Celsius, Fahrenheit. 30. Write a JavaScript program to check whether a given positive number is a multiple of 3. 31. Write a JavaScript program to change the case of a string.(i.e upper case to lower case and vice-versa). 32. Write a JavaScript program to compute the sum of elements of given array of integers. 33. Develop and demonstrate a HTML file that includes JavaScript script for taking a number n as input	

	using prompt and display first n Fibonacci numbers in a paragraph. 34. Develop and demonstrate a HTML file that includes JavaScript script for taking full name in a text field and display first, middle, last name in 3 different labels. Middle and last name may be optional, thus message like "NA" should be displayed in corresponding labels. If input contains 2 words, then they should be considered as first and last name. 35. Develop and demonstrate a HTML file that includes JavaScript script for switching an image source for a image on click of "change" and "original" button. 36. Design HTML form for keeping student record, apply JavaScript validation in it for restriction of mandatory fields, numeric field, email-address field, specific value in a field etc. 37. Write a JavaScript code that displays text "Bigger Text" with increasing font size in the interval of 10ms in red color, when the font size reaches 50pt it displays "Smaller Text" in green color. Then the font size should decrease to 5pt and then stop.	

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

1. Suggested Readings:

1. Jon Duckett, HTML And CSS: Design And Build Websites, Wiley
2. Jon Duckett, JavaScript And Jquery: Interactive Front-End Web Development, Wiley Jennifer Niederst Robbins, Learning Web Design: A Beginner's Guide To HTML, CSS, JavaScript, And Web Graphics, O'reilly
3. Steven M. Schafer, Html, XHTML, And CSS Bible, Wiley
4. Felke-Morris, Basics Of Web Design: Html5 & Css3, 5th Edition, Pearson Education, 2019. Felke-Morris, Web Development & Design Foundations With Html5, 10th Edition, Addison- Wesley, 2020.
5. Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets For Web Design, Wiley India.
6. Thomas A Powell, The Complete Reference To Html
7. Lee Anne Philips, Using Html, PHI
8. C. Xavier, World Wide Web Design With Html,
9. Xavier C, Web Technology And Design, New Age International
10. Laura Lemay, Mastering Html, CSS & JavaScript Web Publishing
11. Dt Editorial Services, Html 5 Black Book - Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and Jquery, DreamTech Press Publication

2. Suggestive digital platforms web links:

https://www.w3schools.com/

https://spoken-tutorial.org/

https://www.doc-developpement-durable.org/file/Projets-informatiques/cours-&-manuels-

informatiques/htm-html-xml-

ccs/Sams%20Teach%20Yourself%20HTML,%20CSS,%20and%20JavaScript%20All%20in%

200ne.pdf (PDF: 608 pages)

http://www.nematrian.com/Pages/HTMLCSSJSCombined.pdf (PDF: 514 pages)
https://www.daoudisamir.com/references/vs ebooks/html5 css3.pdf (PDF: 681 pages)

Suggested equivalent online courses:

https://nptel.ac.in/courses/106/105/106105084/ (NPTEL Course: Internet Technology - Part of the Course)

https://onlinecourses.swayam2.ac.in/aic20_sp11/preview (HTML and CSS)

https://www.coursera.org/learn/html-css-javascript-for-web-developers#syllabus (HTML, CSS,

and JavaScript for Web Developers)

https://www.classcentral.com/course/html-css-javascript-for-web-developers-4270 (HTML,

CSS, and JavaScript for Web Developers) https://www.classcentral.com/course/duke-programming-web-4256 https://www.coursera.org/learn/duke-programming-web (Programming Foundations with

JavaScript, HTML and CSS)