Pratibha College of Commerce & Computer Studies
DEPARTMENT OF B.Sc. (Cyber and Digital Science)

B. Sc. (CDS) (2019 Pattern)

Programme Outcomes

After successfully completing **B. Sc. (Cyber and Digital Science)** Programme students will be able to:

PO1	To prepare students for professional work in business and industry as well as government and law enforcement.
PO2	To develop a logical understanding of the subject.
PO3	To strengthen the basics of the subject useful in selecting various career options.
PO4	To make students aware of cyber-crime and learn ways to handle them.
PO5	To produce entrepreneurs who can work in the area of Cyber and Digital Forensics.
PO6	To make students competent to apply their knowledge and skills to succeed in their career/ professional development and/or postgraduate education to pursue flexible career paths amidst future technological changes.

Programme Specific Outcomes

PSO 1	Students will apply basic principles and practices of computing grounded in Cyber Security and Digital Science.
PSO 2	Students will demonstrate a sense of societal and ethical responsibility in their professional endeavors, and will remain informed and involved as full participants in our profession and our society.
PSO 3	Our graduates will demonstrate strong communication skills and the ability to function effectively in multi-disciplinary teams.
PSO 4	Our graduates will demonstrate strong bonding in team and display distinct leadership traits.

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B. Sc. (CDS) (2019 Pattern)

Course Outcomes

F. Y. B. Sc. (Cyber and Digital Science)

SEMESTER- I

CDS-111: Introduction to Computers and Problem Solving
After successfully completing this course, students will be able to:

CO1:	Learn the fundamental concepts of computer science.
CO2:	Develop the logic of problem solving.
CO3:	Ability to analyze a problem and devise an algorithm to solve it.
CO4:	Able to formulate algorithms, pseudo-codes, and flowcharts for arithmetic and logical problems

CDS-112: Python Programming
After successfully completing this course, students will be able to:

CO1:	Able to use python programming elements to solve and debug simple logical problems.
CO2:	Experiment with the various control statements in Python.(Ability to code with the various control statements in Python)
CO3:	Develop Python programs using functions and strings.
CO4:	Develop python programs to implement various file operations and exception handling.

CDS-113: Basic Mathematical Techniques

After successfully completing this course, students will be able to:

CO1:	Express mathematical properties via the formal language of propositional logic.
CO2:	Acquire ability to describe computer programs in a formal mathematical manner.
CO3:	Apply basic counting techniques to solve combinatorial problems;
CO4:	Apply variety of methods for explaining, summarizing and presenting data and interpreting results clearly.
CO5:	Apply concepts of graphs and trees to tackle real situations such as connectivity and constraint satisfaction, e.g., scheduling.

CDS-114: Basic Statistical Techniques for Computer Science

After successfully completing this course, students will be able to:

CO1:	To compute and interpret various summary statistics
CO2:	To compute the correlation coefficient and regression coefficients and interpret them.
CO3:	To interpret the nature of different types of the probability distributions.
CO4:	To use probability distributions for understanding the nature of a given data.
CO5:	To statistically test various hypotheses and make decisions.

CDS-115: Lab Course on Introduction to Computers and Problem-Solving Course

After successfully completing this course, students will be able to:

CO1:	Able to understand and apply the steps for installing Windows and Linux Operating Systems.
CO2:	Basic Understanding of DOS and Networking Commands.
CO3:	Able to connect network devices with proper settings.

CDS-116 Lab Course on Python Programming

After successfully completing this course, students will be able to:

CO1:	Develop and implement programs by making use of built-in data structures.
CO2:	Design and implement programs to solve real-world problems.
CO3:	Able to handle File and its related operations.

CDS-117 Lab Course on Basic Mathematical Techniques

After successfully completing this course, students will be able to:

CO1:	Able to develop foundational mathematical concepts.
CO2:	Able to understand different algorithms.
CO3:	Able to understand Graph Theory.
CO4:	To formulate problems precisely and solve the problems.
CO5:	To test various hypotheses of significance.

CDS-118: Lab Course on Basic Statistical Techniques for Computer Science

After successfully completing this course, students will be able to:

CO1:	Ability to understand the basic concepts of probability.
CO2:	Able to understand the concept of linear and Non-linear Regression.
CO3:	To introduce to the students some of the probability distributions, their shapes, properties, and applications in real life.

SEMESTER- II

CDS-121: Fundamentals of Cyber Security

After successfully completing this course, students will be able to:

CO1:	Evaluate fundamental cyber security concepts, theories, and strategies as they apply to real world case studies.
CO2:	Explain technical and non-technical security solutions on different types of cyber systems.
CO3:	Assess risks, vulnerabilities, and threats to sample cyber systems.
CO4:	Identify attributes associated with cyber security professionals.

CDS-122: Fundamentals of Digital Communication Systems

After successfully completing this course, students will be able to:

CO1:	To solve problems on Number systems and their representation
CO2:	To familiarize with logic gates and applications in combinational and sequential circuits
CO3:	To identify the importance of different blocks in electronic communication systems
CO4:	To comprehend the functional units and components of digital computer

CDS-123: Computer Networks

After successfully completing this course, students will be able to:

CO1:	Understand the concept of OSI Reference Model and TCP/IP.
CO2:	To know the components of the Network.
CO3:	Understand top down approach of data communication from one user to another user.
CO4:	To detect the IP address and route.

CDS-124: Programming in C

After successfully completing this course, students will be able to:

CO1:	Devise computational strategies for developing applications.
CO2:	Develop applications (Simple to Complex) using C programming language.

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SEMESTER- III

CDS-231: Basics of Ethical Hacking

On completion of the course, student will be able to:

CO1:	Perform assessment of network, web and system for weaknesses and penetrate if needed
CO2:	Draft detailed report which includes vulnerabilities, threats, risks and it's impact
CO3:	Implement industry standard security protocols to minimize cyber attacks
CO4:	Clearly understand and concur the consequences of cyber attacks

CDS-232: Database Management Systems

On completion of the course, student will be able to:

CO1:	Compare and contrast database models.
CO2:	Write standard SQL queries.
CO3:	Understand the concepts and techniques of transaction processing, concurrency control and recovery.
CO4:	Understand the emerging trends and applications of database.

CDS-233: Data Structure using Python

On completion of the course, student will be able to:

CO1:	Use well-organized data structures in solving various problems.
CO2:	Differentiated the usage of various structures in the problem solution.
CO3:	Implement the algorithms to solved problems using appropriate data structures.

CDS-234: Lab on CDS-231

On completion of the course, student will be able to:

CO1:	Perform internal and external vulnerability analysis on web application and network.
CO2:	Comprehend the hackers mindset while conducting reconnaissance and system hacking.
CO3:	Implement industry standard security protocols to prevent cyber-attacks.
CO4:	Carry-out the same tactics, techniques and procedures as actual hackers.

CDS-235: Lab on CDS-232

On completion of the course, student will be able to:

CO1:	Design and implement the database schema for a general problem domain.
CO2:	Normalize the database.
CO3:	Populate and query a database using SQLDDL / DML commands.
CO4:	Programming PL/SQL including stored procedures, stored functions, cursors, packages.

CDS-236: Lab on CDS-233

On completion of the course, student will be able to:

CO1:	Correctly implement the right data structure for a given problem.
CO2:	Apply or create a suitable algorithm to solve a particular problem

SEMESTER- IV

CDS-241: Principles of Operating Systems

On completion of the course, student will be able to:

CO1:	Learn scheduling algorithms and synchronization.
CO2:	Handle Deadlock handling methods and Demand Paging.

CDS-242: Web and Mobile Application

On completion of the course, student will be able to:

CO1:	Design the user interface.
CO2:	Develop secure web applications.
CO3:	Use cryptographic functions in mobile application development using Kotlin.

CDS-243: Network Security and Cryptography

On completion of the course, student will be able to:

CO1:	Understand cryptographic algorithms.
CO2:	Design secure applications.
CO3:	Develop attitude to apply appropriate encryption technique for the problem

CDS-244: Lab Course on CDS-241

On completion of the course, student will be able to:

CO1:	Install Linux distribution.
CO2:	Install security tools on operating systems
CO3:	Implement algorithm from operating systems concepts.

CDS-245: Lab on CDS-242

On completion of the course, student will be able to:

CO1:	Code well designed web applications with validations using JavaScript.
CO2:	Develop secure mobile applications using cryptographic functions.

CDS-246: Lab Course on CDS-243

On completion of the course, student will be able to:

CO1:	Implement cryptographic algorithms.
CO2:	Design secure applications.
CO3:	Develop attitude to apply appropriate encryption technique for the problem.

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SEMESTER- V

CDS-351: Digital Forensics-1

On completion of the course, student will be able to:

CO1:	Describe Forensic science and Digital Forensic concepts
CO2:	Determine various digital forensic Operandi and motive behind cyber attacks
CO3:	Interpret the cyber pieces of evidence, Digital forensic process model and their legal perspective.
CO4:	Demonstrate various forensic tools to investigate the cybercrime and to identify the digital pieces of evidence
CO5:	Analyze the digital evidence used to commit cyber offences.

CDS-352: Cyber Threat Intelligence

On completion of the course, student will be able to:

CO1:	Detecting and Responding to Advanced Cyber Attacks
CO2:	To defend against the cyber-attacks.
CO3:	To understand to use appropriate technique for the cyber-attacks.

CDS-353: Information Security Policy and Audit

On completion of the course, student will be able to:

CO1:	Students will be able to describe fundamental concepts of information security and systems auditing.
CO2:	Analyze the latest trend of computer security threats
CO3:	Identify security weaknesses in information systems and find appropriate solution for security mechanism
CO4:	Explain the security controls in the aspects of physical, logical and Operational security control
CO5:	Critically evaluate the security of information systems and audit

CDS-354: Lab on CDS-351

On completion of the course, student will be able to:

CO1:	Perform basic digital forensics.
CO2:	Demonstrate use of digital forensics tools.
CO3:	Guide a digital forensics exercise.
CO4:	Recognize the state of the practice and the gaps in technology, policy, and legal issues

CDS-355: Lab on CDS-352

On completion of the course, student will be able to:

CO1:	Detecting and Responding to Advanced Cyber Attacks
CO2:	To defend against the cyber-attacks.
CO3:	To understand to use appropriate technique for the cyber-attacks.

CDS-356: Lab on CDS-353

On completion of the course, student will be able to:

CO1:	Solve Case studies related to Information Security and Audit
CO2:	Analyze Security controls
CO3:	Apply cryptographic technologies
CO4:	Perform basic level Information Security Audit

CDS-357 A: Mobile Forensics

On completion of the course, student will be able to:

CO1:	Understand the cellular network and mobile device hardware
CO2:	Learn mobile forensics process in detail
CO3:	Understand mobile devices and its forensics
CO4:	Understand and use mobile forensics tools

CDS-357 B: Cloud Security

On completion of the course, student will be able to:

CO1:	Learn the fundamentals of cloud computing and its models
CO2:	Learn data, storage and network security mechanism in cloud environment

CDS-358A: Lab on CDS-357A (Mobile Forensic)

On completion of the course, student will be able to:

CO1:	Find the 5G technologies affects in mobile forensics
CO2:	Understand to explain the technical terms to a non-technical person
CO3:	Use the mobile forensics tools and try various usages of them in real life

CDS-358B: Lab course on Cloud Security (CS-357B)

On completion of the course, student will be able to:

CO1:	Setup own Amazon EC2 instances on cloud
CO2:	Setup infrastructure and data security
CO3:	Apply Identity and Access Management (IAM) policies on cloud instances

Semester IV

CDS-361: Digital Forensics-2

On completion of the course, student will be able to:

CO1:	Explain how to apply digital forensics methods to investigating email and social media communications
CO2:	Trace, recover, and analyze e-mail messages by using forensics tools
CO3:	Describe procedures for acquiring data from mobile devices
CO4:	Retrieve information from mobile devices
CO5:	To examine and recover graphics files
CO6:	Explore procedures for virtual machine forensics, live acquisitions, and network forensics.

CDS 362: Cyber Law (Information Security Policies and Strategies)

On completion of the course, student will be able to:

CO1:	Have a good understanding of Cyber Security and the Tools
CO2:	Develop the Understanding of, how to make secure system planning,
CO3:	Make Learner to develop standard and policies

CDS-363: Web Science

On completion of the course, student will be able to:

CO1:	Develop a simple web application
CO2:	Access and develop web services
CO3:	Provide security to the web application through authorization and authentication.

CDS-364: Lab on CDS-361

On completion of the course, student will be able to:

CO1:	Perform basic digital forensics.
CO2:	Demonstrate use of digital forensics tools.
CO3:	Guide a digital forensics exercise.

CDS-365: Lab on CDS-362

On completion of the course, student will be able to:

CO1:	Solve Case studies related to Information Security Policies and Strategies
CO2:	Study if Indian IT Acts.
CO3:	Study of Security standard.
CO4:	Perform basic level Information Security policies.

CDS-366: Lab on CDS-363

On completion of the course, student will be able to:

CO1:	Develop the simple Web applications
CO2:	Perform SQL injection attack analysis on web application and database.
CO3:	Implement basic web services.

CDS-367A: Malware Analysis

On completion of the course, student will be able to:

CO1:	Classify the malwares and analyze them.
CO2:	Use the tools for analysis of any type of malware.
CO3:	Write own tools/programs for analyzing the malware.

CDS-367B: Fin tech- Cybersecurity

On completion of the course, student will be able to:

CO1:	Understand the financial threats and its security
CO2:	Monitor the threats and try to find the FinTech Solutions for Small Businesses

CDS-368A: Lab on CDS-367A

On completion of the course, student will be able to:

CO1:	Classify the malwares and analyze them.
CO2:	Use the tools for analysis of any type of malware.
CO3:	Write own tools/programs for analyzing the malware.

CDS-368B: Lab on CDS-367B (Fintech security)

On completion of the course, student will be able to:

CO1:	Understand the block chain for payment service.
CO2:	Understand cyber security and risk management.