ST. XAVIER'S COLLEGE JAIPUR

Nevta - Mahapura Road, Jaipur - 302029, Rajasthan, India

Affiliated to the University of Rajasthan

Approved under Section 2(f) &12(B) of the UGC Act, 1956

COURSE OUTCOMES

B.C.A.

(Bachelor of Computer Applications)

Department of Computer Science

(Session 2021-2024)

Course Outcomes (COs)

B.C.A. Part-I

101 (Theory): Elementary Physics	
CO 1.	Understand the basic terminology/definitions of electrical and electronics
CO 2.	Apply the knowledge of theorems/laws to analyse the simple circuits
CO 3.	Use the principles of electromagnetic induction in electrical applications
CO 4.	Ability to understand logic and gates and minimise the Boolean functions using Karnaugh maps and “don’t care” condition
CO 5.	Ability to understand, analyse and design various combinational and sequential circuits

102 (Theory): Basic Mathematics	
CO 1.	Identify matrix operations
CO 2.	Understand the meaning of limit, continuity, and differentiation
CO 3.	Evaluate a definite integral using the Fundamental Theorem of Calculus
CO 4.	Identify a general method for constructing solutions to inhomogeneous linear constant-coefficient Second-order equations
CO 5.	Demonstrate Scalar multiplication, magnitude, vector multiplication and Simple application of vectors, the slope of a straight line, centre, radius, and the equation of a circle

103 (Theory): General English	
CO 1.	To understand and apply knowledge of human communication and language
CO 2.	Ability to find, use, and evaluate primary academic writing associated with the discipline of communication
CO 3.	Communication that facilitates their ability to work collaboratively, like managing conflict, understanding small group processes, active listening, appropriate self-disclosure, etc.
CO 4.	Understanding the types of interviews and making oneself competent
CO 5.	Create a resume, a cover letter, and a profile on professional social media sites
CO 6.	Create various types of business reports

Course Outcomes (COs)

B.C.A. Part-I

104 (Theory): Principles of Programming Language through C	
CO 1.	Understand the basics of programming language
CO 2.	Understand the basics of algorithms and flowcharts
CO 3.	Write, compile and debug programmes in C language
CO 4.	Understand, explain, and use different data types and operators to write programmes
CO 5.	Formulate, evaluate, and analyse the problems by applying programming concepts using decision control statements and loop control statements
CO 6.	Formulate the problem by apply the programming concepts using array, structure, pointer and functions
CO 7.	Create meaningful visual media
CO 8.	Discuss different processes and considerations involved in writing in business

105 (Theory): Computer Organisation	
CO 1.	Identify functional units and illustrate register transfer operations
CO 2.	Explain the internal organisation of the computer and its instructions
CO 3.	Make use of fixed and floating-point algorithms and analyse micro programme instructions
CO 4.	Summarise the memory organisation and pipelining concepts

Course Outcomes (COs)

B.C.A. Part-I

106 (Theory): Office Management Tools	
CO 1.	Understand the basic features of Microsoft Office, Windows basics, and file management
CO 2.	Develops familiarity with Word, Excel, Access, PowerPoint, email, and Internet basics
CO 3.	Recognise when to use each of the Microsoft Office programmes to create professional and academic documents
CO 4.	Use Microsoft Office programmes to create personal, academic, and business documents following current professional and/or industry standards

107 (Practical): Technical Writing and Communications Skills	
CO 1.	Students will be able to know the importance and use of the English Language
CO 2.	They will be able to introduce themselves professionally with confidence
CO 3.	They will be acquainted with prescribed grammatical topics and will learn English
CO 4.	They will be able to communicate effectively and confidently in the written form

Course Outcomes (COs)

B.C.A. Part-I

108 (Practical): C Programming Lab	
CO 1.	Identify different programming approaches in procedural programming
CO 2.	Analyse and critically evaluate various programming approaches
CO 3.	Implementation of different applications or projects
CO 4.	Select and implement different programming approach concepts in project or application development
CO 5.	Demonstrate awareness of the programming paradigm in terms of understanding the concept of application development

109 (Practical): Office Management Tools	
CO 1.	Introduction to operating system, types, explaining various commands of DOS
CO 2.	Introduction to MS- Word, analysis of the various menus of MS- Word, knowledge of converting word documents into various formats, explaining Mail Merge
CO 3.	Introduction to MS- Excel, working on formulas, introduction to cell Reference and the different types., working on charts, graphs, macros
CO 4.	Creating and viewing PowerPoint presentations, working on multimedia and special effects
CO 5.	Working on MS- Access, creating and editing database, forms, queries, reports, tables
CO 6.	Sorting and indexing database

Course Outcomes (COs)

B.C.A. Part-I

110 (Practical): Typing Skills Lab (Hindi and English Typing)	
CO 1.	Making the Student Familiar with Hindi Characters
CO 2.	Understanding the functions of keys on keyboards
CO 3.	Understand the importance of touch keyboarding
CO 4.	Learn correct keyboarding techniques
CO 5.	Correctly format business and academic documents

Course Outcomes (COs)

B.C.A. Part-II

201 (Theory): Business Accountancy	
CO 1.	Understand basic concepts and terminologies of accounting
CO 2.	Understand the process of recording and classifying business transactions and events
CO 3.	Recognize commonly used financial statements, their components and how information from business transactions flows into these statements
CO 4.	Understand the financial statements, viz., Profit and Loss Account, Balance Sheet, and cash flow statement of a sole proprietor
CO 5.	Demonstrate knowledge of the preparation of financial statements and or financial schedules in accordance with generally accepted accounting principles

202 (Theory): Discrete Mathematics	
CO 1.	Ability to apply mathematical logic to solve problems
CO 2.	Understand sets, relations, functions and discrete structures
CO 3.	Ability to use logical notations to define and reason about fundamental mathematical concepts such as sets of relations and functions
CO 4.	Ability to formulate problems and solve recurrence relations
CO 5.	Ability to model and solve real-world problems using graphs and trees

Course Outcomes (COs)

B.C.A. Part-II

203 (Theory): Operating System	
CO 1.	Describe the basics of the operating systems and mechanisms of OS to handle processes, threads, and their communication
CO 2.	Analyse memory management and its allocation policies
CO 3.	Illustrate different conditions for deadlock and their possible solutions
CO 4.	Discuss the storage management policies with respect to different storage management technologies
CO 5.	Evaluate the concept of the operating system with respect to UNIX, Linux, Time, and mobile OS

204 (Theory): Database Management System	
CO 1.	To define databases the different types of databases, and why they are valuable assets for decision making
CO 2.	Develop normalisation and ER modelling that are used concurrently to produce a good database design
CO 3.	Recognise the relationships among entities and the attributes of those entities, and in designing an entity relationship diagram to capture those relationships
CO 4.	Develop a set of queries to handle a specified set of typical user inquiries for information extraction from the database

Course Outcomes (COs)

B.C.A. Part-II

205 (Theory): Web Application Development	
CO 1.	Understand, analyse, and apply the role of languages like HTML, CSS, and JavaScript in web development
CO 2.	Analyse and explore a web page and identify its elements and attributes
CO 3.	Design static web pages using HTML and CSS
CO 4.	Create dynamic web pages using JavaScript

206(A) (Theory): Object Oriented Programming (C++)	
CO 1.	Read and understand object-oriented software code of medium-to-high complexity
CO 2.	Use standard and different types of object-oriented libraries when required for implementation
CO 3.	Understand the basic principles of creating object-oriented applications or programmes
CO 4.	Understand the fundamental concepts of computer science: structure of the computational process, algorithms, and complexity of computation

Course Outcomes (COs)

B.C.A. Part-II

206(B) (Theory): VB.NET

CO 1.	Understand .NET Framework programming
CO 2.	Describe the basic structure of a Visual Basic.NET project and use the main features of the integrated development environment (IDE)
CO 3.	Acquire deep knowledge of data types, operators and control statements in VB.NET
CO 4.	Implement the concept of arrays, procedures and structures using various VB.NET controls
CO 5.	Ability to create applications using Microsoft Windows Forms
CO 6.	Ability to handle exceptions and effectively work with .NET environment
CO 7.	Database connectivity using ADO.NET

207 (Practical): Database Management System Lab

CO 1.	Understand the underlying concepts of database technologies, design and implement a database schema for a given problem domain, and normalisation techniques
CO 2.	Populate and query a database using SQL DML/DDL commands, enforce integrity constraints on a database
CO 3.	Concept of transaction and concurrency, understand database concepts and structures
CO 4.	Understand the objectives of data and information management and understand the data modelling and database development process
CO 5.	Construct and normalise conceptual data models. Implement a relational database into a database management system

Course Outcomes (COs)

B.C.A. Part-II

208 (Practical): Web Design and Multimedia	
CO 1.	Able to recognise the key elements of www
CO 2.	Able to recognise the components available for the security and privacy of the systems and network
CO 3.	Able to create HTML web pages and execute them, different HTML tags
CO 4.	Able to implement different styling ways and related attributes on webpages, filters, frames and layers on webpages
CO 5.	Able to create web pages with JavaScript
CO 6.	Able to use jQuery in web pages. Able to create pages with AJAX and publish websites

209 (Practical): Multimedia	
CO 1.	Understand the basic concepts and terminology of the Web and its services
CO 2.	Analyse a web page and identify its elements and attributes
CO 3.	Create web pages using HTML, DHTML, and Cascading Style Sheets
CO 4.	Build dynamic web pages using JavaScript (Client-side programming)
CO 5.	Develop proficiency in using basic and advanced tools and features of Photoshop to manipulate images and graphics
CO 6.	Develop skills in CorelDraw for designing custom web graphics for business and personal websites

Course Outcomes (COs)

B.C.A. Part-II

210(A) (Practical): Object Oriented Programming (C++)

CO 1.	This lab work provides the object-oriented programming approach in connection with the C++ language
CO 2.	Understand the difference between the top-down and bottom-up approach
CO 3.	Apply the concepts of object-oriented programming in practical application
CO 4.	Apply virtual and pure virtual functions & complex programming situations
CO 5.	Writing programmes using the concept of polymorphism
CO 6.	Applying the programming assignments based on encapsulation and dynamic binding
CO 7.	Use of exception handling should be used in real-time programming using C++
CO 8.	Illustrate the process of data file manipulations using C++

Course Outcomes (COs)

B.C.A. Part-II

210(B) (Practical): VB.NET

CO 1.	Working on .NET Framework
CO 2.	Writing the structure of a Visual Basic.NET project and using the main features of the integrated development environment (IDE)
CO 3.	Use of data types, operators, and control statements in VB.NET
CO 4.	Practically implement the concept of arrays, procedures and structures using various VB.NET controls
CO 5.	Creating applications using Microsoft Windows Forms
CO 6.	Handling exceptions through self-written codes
CO 7.	Database connectivity using ADO.NET

Course Outcomes (COs)

B.C.A. Part-III

301 (Theory): Data Structure and Algorithm	
CO 1.	Students will be able to use linear and non-linear data structures like stacks, queues, linked lists etc.
CO 2.	Define basic static and dynamic data structures and relevant standard algorithms for them: stack, queue, dynamically linked lists, trees, graphs, heap, priority queue, hash tables, sorting algorithms, and min-max algorithm
CO 3.	Students will be able to choose appropriate data structures as applied to specified problem definitions
CO 4.	Students will be able to handle operations like searching, insertion, deletion, and traversing mechanism

302 (Theory): System Design Concepts	
CO 1.	Assess analysis and design tools and techniques
CO 2.	Examine fundamental software testing techniques and strategies
CO 3.	Understand principles of system implementation and maintenance
CO 4.	Apply various estimation models to determine the cost of software projects and illustrate risks in the software projects
CO 5.	Evaluate the role of information systems in today's competitive business environment

Course Outcomes (COs)

B.C.A. Part-III

303 (Theory): Networking Technologies	
CO 1.	Understand the concept of Signals, OSI & TCP/IP reference models and discuss the functionalities of each layer in these models
CO 2.	Discuss and analyse flow control and error control mechanisms and apply them using standard data link layer protocols
CO 3.	Design subnets and calculate the IP addresses to fulfil the network requirements of an organisation
CO 4.	Analyse and apply various routing algorithms to find the shortest paths for packet delivery
CO 5.	Explain the details of Transport Layer Protocols (UDP, TCP) and suggest appropriate protocols for reliable/ unreliable communication
CO 6.	Analyse the features and operations of various application layer protocols such as HTTP, DNS and SMTP

304 (Theory): JAVA	
CO 1.	Understand the basic principles of OOP and JAVA Programming
CO 2.	Analyse various techniques and methods used in JAVA
CO 3.	Implement the various concepts of JAVA to solve problems
CO 4.	Develop Web and Desktop Applications using JAVA

Course Outcomes (COs)

B.C.A. Part-III

305 (Theory): e-Commerce	
CO 1.	Demonstrate an understanding of the foundations and importance of e-commerce
CO 2.	Analyse the impact of e-commerce on business models and strategy
CO 3.	Describe the infrastructure for e-commerce
CO 4.	Describe the key features of the Internet, Intranets and Extranets and explain how they relate to each other
CO 5.	Discuss e-Commerce Security
CO 6.	Assess electronic payment systems

306(A) (Theory): PHP	
CO 1.	To implement PHP script using Decisions and Loops
CO 2.	To develop PHP applications using Strings, Arrays and Functions
CO 3.	To design object-oriented programming (OOP) principles for PHP and use HTML form elements that work with any server-side language
CO 4.	To display and insert data using PHP and MySQL

Course Outcomes (COs)

B.C.A. Part-III

306(B) (Theory): LINUX	
CO 1.	Understand basics of Linux Operating System and File System, set of commands and utilities in Linux systems
CO 2.	Write shell programming, investigate & manage processes, control structure, loops, cases and functions in shell programming and apply them to create shell scripts
CO 3.	Compare different editors (vi, etc.) and use them to create a shell script for a given problem
CO 4.	Familiarity with pipes and redirection, LINUX environment, traps, signals, filter parameters, filter options, and regular expressions
CO 5.	Explain the role of system administration and network services in Linux

307: Network Technologies Lab (Practical)	
CO 1.	Understand the fundamental underlying principles of computer networking
CO 2.	Understand the details and functionality of layered network architecture
CO 3.	Apply mathematical foundations to solve computational problems in computer networking
CO 4.	Analyse the performance of various communication protocols
CO 5.	Compare routing algorithms and their functions
CO 6.	Practice packet /file transmission between nodes

Course Outcomes (COs)

B.C.A. Part-III

308 (Practical): JAVA Lab	
CO 1.	Understand the basic concepts of scripting and the contributions of scripting language
CO 2.	Explore PYTHON data structures like Lists, Tuples, Sets and dictionaries
CO 3.	Create practical and contemporary applications using functions and regular expressions
CO 4.	Ability to learn how to read and write files in JAVA

309(B) (Practical): PHP	
CO 1.	Introduction to PHP
CO 2.	Programmes on server-side scripting and client-side- scripting, datatypes, syntax
CO 3.	Programmes on decision-making statements, iterations arrays and their types
CO 4.	Programmes on the concept of string functions performed on strings
CO 5.	Programmes on functions, their types, arguments
CO 6.	Programmes on form handling, exception, try to catch, file handling operations
CO 7.	Programmes on database handling

Course Outcomes (COs)

B.C.A. Part-III

309(C) (Practical): LINUX	
CO 1.	Able to recognise the booting and interface of the Linux operating system
CO 2.	Able to execute and test commands related to file and data handling, arithmetic operations, redirection and piping
CO 3.	Execute user and administration-specific operations. Execute shutdown and user management-specific commands
CO 4.	Able to install Linux and handle dual operating systems in one computer, file permissions and directories
CO 5.	Able to open and work in different modes of vi Editor, able to use the commands of vi editor
CO 6.	Able to create and execute shell scripts

310: Project	
CO 1.	Introduction of the subject
CO 2.	Seeing the working model and identifying errors, if any
CO 3.	Learn critical thinking skills and inquiring skills through application-oriented project development in CS & IT in a teamwork environment
CO 4.	Learn literature survey skills. Refine communication skills and public speaking skills through written and oral presentations
CO 5.	Learn problem-solving skills. Learn proposal development skills to initiate an application-oriented project in the areas of CS & IT

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COURSE OUTCOMES

B.C.A.

(Bachelor of Computer Applications)

Department of Computer Science

(Session 2022-2025)

Course Outcomes (COs)

B.C.A. Part-I

101 (Theory): Computer Fundamentals and Office Management Tools	
CO 1.	Understand the basics of computers
CO 2.	Understand the concept of input and output devices of computers and how they work and recognise the basic terminology used in computer programming
CO 3.	Identify and represent numbers in different number systems
CO 4.	Analyse and understand in-depth training in the use of office automation packages, internet etc.
CO 5.	Enhance the ability of essential for common man for day-to-day office management, and e-governance
CO 6.	Evaluate how to use software packages in day-to-day activities

102 (Theory): Computer Organisation	
CO 1.	Identify functional units and illustrate register transfer operations
CO 2.	Explain the internal organisation of the computer and its instructions
CO 3.	Make use of fixed and floating-point algorithms and analyse microprogram instructions
CO 4.	Summarise the memory organisation and pipelining concepts
CO 5.	Illustrate data transfer between a central computer and I/O devices

Course Outcomes (COs)

B.C.A. Part-I

103 (Theory): Operating System	
CO 1.	Describe the basics of the operating systems, and mechanisms of OS to handle processes, threads, and their communication
CO 2.	Analyse the memory management and its allocation policies
CO 3.	Illustrate different conditions for deadlock and their possible solutions
CO 4.	Discuss the storage management policies concerning different storage management technologies
CO 5.	Evaluate the concept of the operating system with respect to Unix, Linux, time, and mobile OS

104 (Theory): Principles of Programming Language through C	
CO 1.	Understand the basics of programming language
CO 2.	Understand the basics of algorithms and flowcharts
CO 3.	Write, compile and debug programmes in C language
CO 4.	Understand, explain, and use different data types and operators to write programmes
CO 5.	Formulate, evaluate, and analyse the problems by applying programming concepts using decision control statements and loop control statements
CO 6.	Formulate the problem by applying the programming concepts using array, structure, pointers and functions

Course Outcomes (COs)

B.C.A. Part-I

105 (Theory): Web Application Development	
CO 1.	Describe the basics of the Internet and concepts like Internet service providers, internet connections, and Internet protocols
CO 2.	Discuss basics of e-mail, mailing lists, newsgroups, internet relay chat, and instant messaging
CO 3.	Describe internet services: Telnet, FTP, and the Web
CO 4.	Analyse a web page and identify its elements and attributes
CO 5.	Create web pages using HTML and Cascading Style Sheets
CO 6.	Build dynamic web pages using JavaScript (Client-side programming)

106 (Theory): Basic Mathematics	
CO 1.	Identify matrix operations
CO 2.	Understand the meaning of limit, continuity, and differentiation
CO 3.	Evaluate a definite integral using the fundamental theorem of calculus
CO 4.	Identify a general method for constructing solutions to inhomogeneous linear constant-coefficient Second-order equations
CO 5.	Demonstrate scalar multiplication, magnitude, vector multiplication and simple application of vectors, the slope of a straight line, centre, radius, and the equation of a circle

Course Outcomes (COs)

B.C.A. Part-I

107 (Practical): Office Management Tools Lab	
CO 1.	Understand the basic features of Microsoft Office, Windows basics, and file management
CO 2.	Develops familiarity with Word, Excel, Access, PowerPoint, email, and Internet basics
CO 3.	Recognise when to use each of the Microsoft Office programmes to create professional and academic documents
CO 4.	Use Microsoft Office programmes to create personal, academic, and business documents following current professional and/or industry standards

108 (Practical): C Programming Lab	
CO 1.	Identify different programming approaches in procedural programming
CO 2.	Analyse and critically evaluate various programming approaches which will help in the implementation of different applications or projects
CO 3.	Select and implement different programming approach concepts in project or application development
CO 4.	Demonstrate awareness of the programming paradigm in terms of understanding the concept of application development

Course Outcomes (COs)

B.C.A. Part-I

109 (Practical): Web Application Development Lab	
CO 1.	Understand, analyse, and apply the role of languages like HTML, CSS, and JavaScript in web development
CO 2.	Analyse and explore a web page and identify its elements and attributes
CO 3.	Design static web pages using HTML and CSS
CO 4.	Create dynamic web pages using JavaScript

110 (Practical): Communication Skills Lab	
CO 1.	Effectively communicate through verbal/oral communication and improve listening skills
CO 2.	Write precise briefs or reports and technical documents
CO 3.	Actively participate in group discussions/meetings/interviews and prepare & deliver presentations
CO 4.	Become an effective individual through goal/target setting, self-motivation and practising creative thinking
CO 5.	Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of teamwork, Interpersonal relationships, conflict management and leadership quality

Course Outcomes (COs)

B.C.A. Part-II

201 (Theory): Object Oriented Programming (C++)	
CO 1.	Investigate different concepts of programming approaches in terms of the application or project development
CO 2.	Create methods and programmes within the field of procedural programming as well as develop logical and analytical approaches to programming problems independently
CO 3.	Apply his/her knowledge in new areas within the field of basic and advanced programming
CO 4.	Develop independently relevant applications using self-logic in the field of programming languages These methods include performing experiments/programmes and interpreting their results

202 (Theory): Database Management System	
CO 1.	To investigate what databases are, different types of databases, and why they are valuable assets for decision-making
CO 2.	Develop normalisation and ER modelling that are used concurrently to produce a good database design
CO 3.	Recognise the relationships among entities and the attributes of those entities, and in designing an entity relationship diagram to capture those relationships
CO 4.	Develop a set of queries to handle a specified set of typical user inquiries for information extraction from the database

Course Outcomes (COs)

B.C.A. Part-II

203 (Theory): Software Engineering

CO 1.	To define basic concepts of software development such as requirement analysis, designing, testing, and debugging etc.
CO 2.	To explain different types of models that can be used to design software
CO 3.	To design solutions to a given problem and analyse the best one based on parameters like cost, time, and knowledge
CO 4.	To apply the various testing techniques and testing tools
CO 5.	To explain the importance of reliability in software development

204 (Theory): Data Structure and Algorithm

CO 1.	Students will be able to use linear and non-linear data structures like stacks, queues, linked lists etc.
CO 2.	Define basic static and dynamic data structures and relevant standard algorithms for them: stack, queue, dynamically linked lists, trees, graphs, heap, priority queue, hash tables, sorting algorithms, and min-max algorithm
CO 3.	Students will be able to choose appropriate data structures as applied to specified problem definitions
CO 4.	Students will be able to handle operations like searching, insertion, deletion, and traversing mechanism

Course Outcomes (COs)

B.C.A. Part-II

205 (Theory): Cloud Computing	
CO 1.	Investigate different concepts of cloud computing in terms of an individual and organisation
CO 2.	Create theories, methods and interpretations of theories within the field of cloud computing as well as solve theoretical and practical problems independently
CO 3.	Apply his/her knowledge in new areas within the field of cloud computing
CO 4.	Develop web applications using the concept of cloud computing

207 (Practical): Object Oriented Programming (C++) Lab	
CO 1.	Read and understand Object oriented-based software code of medium-to-high complexity
CO 2.	Use standard and different types of Object-oriented libraries when required for implementation
CO 3.	Understand the basic principles of creating Object-oriented applications or programmes
CO 4.	Understand the fundamental concepts of computer science: structure of the computational process, algorithms, and complexity of computation

Course Outcomes (COs)

B.C.A. Part-II

208 (Practical): Database Management System Lab	
CO 1.	Understand, the underlying concepts of database technologies, design and implement a database schema for a given problem domain, and normalisation techniques
CO 2.	Populate and query a database using SQL DML/DDL commands, enforce integrity constraints on a database
CO 3.	Concept of transaction and concurrency, understanding database concepts and structures
CO 4.	Understand the objectives of data and information management, understand data modelling and database development process
CO 5.	Construct and normalise conceptual data models Implement a relational database into a database management system

209 (Practical): Data Structure and Algorithm Lab	
CO 1.	Investigate different concepts of data structure in terms of application or project development
CO 2.	Create methods and programmes within the field of procedural programming as well as develop logical and analytical approaches to programming problems independently
CO 3.	Apply his/her knowledge in new areas within the field of basic and advanced programming
CO 4.	Develop independently relevant applications using self-logic in the field of programming languages. These methods include performing experiments/programmes and interpreting their results

Course Outcomes (COs)

B.C.A. Part-II

A01 (Elective): .NET

CO 1.	Understand the basic structure of C# and Net Programming
CO 2.	Understand the basic Libraries and their functions
CO 3.	Understand the basic concepts underlying the ASP net and C# net
CO 4.	Understand the basic concepts of the NET framework and compact framework

A02 (Elective): PHP

CO 1.	To implement PHP script using Decisions and Loops
CO 2.	To develop PHP applications using Strings, Arrays and Functions
CO 3.	To display and insert data using PHP and MySQL
CO 4.	To design object-oriented programming (OOP) principles for PHP and use HTML form elements that work with any server-side language

Course Outcomes (COs)

B.C.A. Part-II

A03 (Elective): Data Science

CO 1.	Understand basic concepts and associated terminology of data science
CO 2.	Apply appropriate descriptive and inferential methods to summarise data and identify associations and relationships as part of data analytics
CO 3.	Identify and appropriately acknowledge sources of data
CO 4.	Apply basic data cleaning techniques to prepare data for analysis and presentation as part of the data science process
CO 5.	Recognise, describe, and calculate the measures of location of data, centre of data, and spread of data
CO 6.	Use appropriate data science tools and technology to collect, process, transform, summarise, and visualise data

B01 Elective (Practical): .NET Lab

CO 1.	Demonstrate an understanding of C# syntax through program design
CO 2.	Develop a working knowledge of C# programming constructs and the NET Framework
CO 3.	Write an object-oriented program using custom classes
CO 4.	Build and debug well-formed Web Forms with ASP NET Controls
CO 5.	Create custom controls with user controls
CO 6.	Use ADO NET in a web application to read, insert, and update data in a database

Course Outcomes (COs)

B.C.A. Part-II

BO2 (Elective): PHP

CO 1.	Analyse PHP scripts and determine their behaviour
CO 2.	Construct PHP scripts to create dynamic web content
CO 3.	Create PHP scripts capable of inserting and modifying data in a MySQL database
CO 4.	Design web pages with the ability to retrieve and present data from a MySQL database

BO3 (Elective): DATA SCIENCE

CO 1.	Basic knowledge of Regression, Correlation, Probability
CO 2.	Use of PYTHON scripts and Libraries
CO 3.	Working with JUPITER editor
CO 4.	Working with SQL, R

Course Outcomes (COs)

B.C.A. Part-III

301 (Theory): JAVA	
CO 5.	Understand the basic principles of OOP and JAVA Programming
CO 6.	Analyse various techniques and methods used in JAVA
CO 7.	Implement the various concepts of JAVA to solve problems
CO 8.	Develop Web and Desktop Applications using JAVA

302 (Theory): PYTHON	
CO 5.	To learn how to use lists, tuples, and dictionaries in PYHON programmes and identify PYTHON object types
CO 6.	To learn how to use indexing and slicing to access data in PYTHON programmes
CO 7.	Use if-else statements and switch-case statements to write programmes in PYHTHON to tackle any decision-making scenario
CO 8.	To learn how to read and write files in PYTHON
CO 9.	Develop cost-effective, robust applications using the latest PYTHON trends and technologies
CO 10.	Build the system's entire web development process using various tools

Course Outcomes (COs)

B.C.A. Part-III

303 (Theory): Data Communication & Networking	
CO 1.	Understand the concept of Signals, OSI & TCP/IP reference models and discuss the functionalities of each layer in these models
CO 2.	Discuss and analyse flow control and error control mechanisms and apply them using standard data link layer protocols
CO 3.	Design subnets and calculate the IP addresses to fulfil the network requirements of an organisation
CO 4.	Analyse and apply various routing algorithms to find the shortest paths for packet delivery
CO 5.	Explain the details of Transport Layer Protocols (UDP, TCP) and suggest appropriate protocols for reliable/unreliable communication
CO 6.	Analyse the features and operations of various application layer protocols such as HTTP, DNS and SMTP

304 (Theory): Artificial Intelligence	
CO 1.	Identify basic concepts and scope of Artificial Intelligence
CO 2.	Compare different AI search techniques and apply them to real-world problems
CO 3.	Apply basic principles of AI in solutions that require problem-solving, inference, perception, knowledge representation, and reasoning
CO 4.	Develop intelligent algorithms for constraint satisfaction problems and design intelligent systems for Game Playing
CO 5.	Classify different learning paradigms and their application in Neural Networks
CO 6.	Explain concepts of Natural Language processing and discuss Expert systems

Course Outcomes (COs)

B.C.A. Part-III

305 (Theory): Digital Marketing	
CO 1.	Understand the concept of digital marketing and its real-world iterations
CO 2.	Articulate innovative insights into digital marketing, enabling a competitive edge
CO 3.	Understand how to create and run digital media-based campaigns
CO 4.	Identify and utilise various tools such as social media, etc.
CO 5.	Recognise ethical and moral issues, identify needed actions, and demonstrate the moral courage to implement them

307 (Practical): JAVA Lab	
CO 1.	Identify the core concepts of Information Technology, both theoretical and applied
CO 2.	Investigate new technologies, tools, practices, and standards and relate them to their knowledge domain
CO 3.	Acquaint with design and development tools and engage in systematic evaluation using current methodologies
CO 4.	Demonstrate the ability to integrate IT knowledge and develop industry-oriented projects

Course Outcomes (COs)

B.C.A. Part-III

308 (Practical): PYTHON Lab	
CO 1.	Understand the basic concepts of scripting and the contributions of scripting language
CO 2.	Explore PYTHON data structures like Lists, Tuples, Sets and dictionaries
CO 3.	Create practical and contemporary applications using Functions and Regular Expressions
CO 4.	Ability to learn how to read and write files in PYTHON

309 (Practical): Digital Marketing Lab	
CO 1.	Learn digital marketing tools like search engine optimisation and associated analytics
CO 2.	Apply digital marketing tools to a) improve websites' rankings and optimise them in the process b) Improve the brand's visibility c) improve the reach of brands, which physically is relatively difficult and less effective
CO 3.	Analyse the relative importance of digital marketing strategies to optimise digital marketing campaigns
CO 4.	Evaluate the performance of different social media in conjunction with the overall digital marketing plan
CO 5.	Design search engine optimisation and search engine marketing campaigns

310: Project	
CO 1.	Introduction of the subject
CO 2.	Seeing the working model and identifying errors, if any
CO 3.	Learn critical thinking skills and inquiring skills through application-oriented project development in CS & IT in a teamwork environment
CO 4.	Learn literature survey skills. Refine communication skills and public speaking skills through written and oral presentations
CO 5.	Learn problem-solving skills and skills to develop proposals to initiate an application-oriented project in the areas of CS & IT

Course Outcomes (COs)

B.C.A. Part-III (Theory/Practical)

CO1 (Elective): Data Warehousing and Data Mining

CO 1.	Understand the principles of Data warehousing and Data Mining
CO 2.	Familiar with the Data warehouse architecture and its Implementation
CO 3.	Know the Architecture of a Data Mining system
CO 4.	Understand the various Data preprocessing Methods
CO 5.	Perform classification and prediction of data

CO2 (Elective): Network Security and Cryptography

CO 1.	Understand basic security terminologies
CO 2.	Classify the encryption techniques
CO 3.	Illustrate various public key cryptographic techniques
CO 4.	Evaluate the authentication and hash algorithms
CO 5.	Discuss authentication applications
CO 6.	Understand basic concepts of system and web security

Course Outcomes (COs)

B.C.A. Part-III (Theory/Practical)

CO3 (Elective): Machine Learning

CO 1.	Understand different types of machine learning techniques and their applications in the real world
CO 2.	Apply various mathematical models for supervised machine learning models
CO 3.	Apply and evaluate the unsupervised machine learning models through various clustering algorithms
CO 4.	Apply probabilistic graphical models to represent complex systems and make predictions based on uncertain data
CO 5.	Apply reinforcement learning algorithms to solve real-time complex problems with an understanding of the trade-offs involved
CO 6.	Evaluate various machine learning algorithms through statistical learning techniques