

## Department of Computer Application (BCA)

### Program Outcomes (PO)

After the completion of B.Sc. Honours Degree Programme, the students will be able to:

**PO1: Professional knowledge:** Acquire comprehensive knowledge of major concepts, theoretical principles and experimental findings to various subjects in pure sciences such as Physics, Chemistry, Botany, Zoology, Mathematics, etc.

**PO2: Critical thinking and Cognitive skills:** Convey the intricate science information effectively and efficiently, analyze and solve the problems related to plants, animal sciences without relying on assumptions and guesses.

**PO3: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO4: Effective Communication:** Demonstrate familiarity with and ability to analyze both verbally and in writing issues and forms of contemporary art with a clear understanding of historical precedents.

**PO5: Instruments and Experiments:** Acquired the skills in handling scientific instruments, planning and performing in laboratory experiments and drawing logical inferences from the scientific experiments.

**PO6: Research and Analysis:** Demonstrate analytical skill and proficiency in a range of tools and techniques used in research in science and interdisciplinary.

**PO7: Employability and higher Education:** Show proficiency in professional, employability and soft skills required for higher education and placements.

**PO8: Ethics:** Imbibe ethical, moral and social values in personal and social life leading to highly cultured and civilized personality in science field.

**PO9: Science and Society:** Apply reasoning informed by the scientific knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional science practice.

**PO10: Interdisciplinary Learning:** Integrate academic curriculum with other co-curricular goals, such as career development, life-long learning, develop interdisciplinary learning and opportunity to extend their knowledge across disciplines.

**PO11: Nation Building:** Introspect and evolve into dynamic and creative individuals capable of socially productive, constructive actions that positively impact our Nation and the World at large.

## **Program Specific Outcomes (PSO)**

**After the completion of the course, the student will be able to:**

**PSO1:** Aspire for higher degrees and research work.

**PSO2:** Attain Specialization in specific domains of Computer Applications.

**PSO3:** Gain knowledge in Software Development in Information Technology Sectors.

**PSO4:** Work for Banking, Insurance, Teaching and other services in Corporate and Government sectors.

**PSO5:** Start up new business venture through Startups and as entrepreneurs in IT sector

**PSO6:** Acquire awareness towards gender, environment, sustainability, human values, and professional ethics and understand the difference between acting, responding, reacting to various social issues.

## **SEMESTER – I**

**BCA CC101 : Programming Fundamentals Using C**

**Course Outcomes:**

**At the completion of the course, the student will attain the ability to:**

- CO1:** Recognize the basics of Computer Programming Concepts using C Programming Language.
- CO2:** Explain the concept of C character set, identifiers and keywords, variable different data types, operators and programming constructs.
- CO3:** Apply the concept of advanced topics like Arrays, Functions, Pointers, Structures, Unions and Dynamic Memory Allocations and File Handling in various programmes
- CO4:** Create and execute different programmes using Procedural programming method

## **SEMESTER – I**

**BCA CC102 : Computer System Architecture**

### **Course Outcomes:**

**At the completion of the course, the student will attain the ability to:**

- CO1:** Recognise and understand different Number systems, Logic Gates, Basics of Boolean Algebra.
- CO2:** Design Combinational and Sequential Circuits, flip – flops etc.
- CO3:** Describe the design and structure of Central Processing Unit and Memory.
- CO4:** Compare the design of Modern processors, Memories and I/Os.

## **SEMESTER – II**

**BCA CC203 : Object Oriented Programming Using C++**

### **Course Outcomes:**

**At the completion of the course, the student will attain the ability to:**

- CO1** Recognize the theoretical concept of Object Oriented approach (class, objects, encapsulation, abstraction, polymorphism, Inheritance etc.)
- CO2** Explain practical implementation of Object Oriented Programming using C++ and compare between Object Oriented Programming approach and procedural programming approach.

**CO3** Apply the concept of Object Oriented Programming using C++ like class, objects, constructors & Destructors, Function Overloading, Operator Overloading, inheritance, friend class & friend functions, Virtual functions, File Handling etc.

**CO4** Create and execute different programmes using Object Oriented Programming method.

## **SEMESTER – II**

### **BCA CC204 : Discrete Structure**

#### **Course Outcomes:**

**At the completion of the course, the student will attain the ability to:**

**CO1:** Define Sets and Relations, Functions, Recurrence Relation, Permutation and Combination, Algebraic Structure and Group

**CO2:** Understand Propositional Logic, Normal Forms, Basics of Inference Theory.

**CO3:** Describe and evaluate Number Theory and outline the basic structure of Division algorithm, G.C.D and L.C.M.

**CO4:** Design solutions using Graphs and Trees for problem statements.

## **SEMESTER – III**

### **BCA CC305 : Data Structure**

#### **Course Outcomes:**

**At the completion of the course, the student will attain the ability to:**

**CO1:** Recognize the different types of data structures such as arrays, records, linked structures, stacks, queues, trees, and graphs used in Computer Science and their representation in memory, their algorithms and applications.

**CO2:** Compare and contrast the benefits of dynamic and static data structures implementations.

**CO3:** Differentiate between the benefits of alternative implementations of data structures with respect to performance.

**CO4:** Analyse the computational efficiency of the principal algorithms for sorting, searching, and hashing

### **SEMESTER – III**

#### **BCA CC306 : Operating System**

##### **Course Outcomes:**

**At the completion of the course, the student will attain the ability to:**

**CO1:** State the Role of System Software (Operating System) in Computers.

**CO2:** Describe the important Computer System resources and the Role of OS in their management policies and algorithms

**CO3:** Analyse different types of Operating Systems (DOS, Windows, UNIX).

**CO4:** Create and execute Shell Scripts in Linux.

### **SEMESTER – III**

#### **BCA CC307 : Computer Networks**

##### **Course Outcomes:**

**At the completion of the course, the student will attain the ability to:**

**CO1:** Recognise the structure of Data Communications System and its components and basics of Networking.

**CO2:** Explain the concepts of Network models (OSI and the TCP - IP Reference models), their functions of OSI Layers and different Protocols used in these Model.

**CO3:** Illustrate various Networking devices and their functions, Multiplexing, Switching Techniques, IP Addressing.

**CO4:** Compare different Transmission media, Flow control and Error Detection Techniques.

## **SEMESTER – IV**

### **BCA CC408 : Design and Analysis of Algorithms**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** State Major algorithms and data structures commonly used in different areas of Computer applications
- CO2:** Analyze the asymptotic performance of algorithms and write rigorous correctness proofs for algorithms.
- CO3:** Implement important algorithmic design paradigms and methods of analysis for different algorithms.
- CO4:** Apply efficient algorithms in common design situations.

## **SEMESTER – IV**

### **BCA CC409 : Software Engineering**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Illustrate the basics of software – its characteristics, SRS and its components.
- CO2:** Classify the fundamentals of different software process models & techniques to construct larger, and more complex software systems
- CO3:** Apply software engineering concepts to design, develop and maintain the software.
- CO4:** Implement Software Testing for good Software Quality Assurance.

## **SEMESTER – IV**

### **BCA CC410 : Database Management System**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Understand the fundamental elements of Database Management System using basic concepts of data model, entity-relationship model, database design etc.
- CO2:** Design ER-Models to represent simple database application scenarios and convert them into tables.
- CO3:** Implement Normalization for the optimization of Database Design
- CO4:** Use MS-Access package as Database Management software.

## **SEMESTER – V**

### **BCA CC511 : JAVA Programming**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Describe the fundamental concepts and features of Java Programming language.
- CO2:** Implement Object Oriented Programming Concepts (class, constructor, overloading, inheritance, overriding) in java.
- CO3:** Implement concepts of Run time polymorphism, Multithreading and Exception Handling in Java.
- CO4:** Create and Use Packages and Interfaces in a Java program and Develop Graphical User Interface applications and Web based applications in Java by importing applet, AWT and swing.

## **SEMESTER – V**

### **BCA CC512 : Theory of Computation**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Define the basic concepts and applications of Theory of Computation.
- CO2:** Mathematical foundations, algorithmic principles and computer science theory to model and design computer-based systems.

**CO3:** Apply computational mathematics in the field of Computer Applications.

**CO4:** Recognises the mathematical approaches of Abstract Machines and their related languages.

## **SEMESTER – VI**

### **BCA CC613 : Internet Technologies**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

**CO1:** State basics of Internet Technologies

**CO2:** Illustrate various Java technologies like JavaScript, JDBC, JSP, Java Beans etc widely used in web development processes.

**CO3:** Develop and execute Programs using above mentioned technologies.

**CO4:** Create dynamic, interactive web applications, database driven applications.

## **SEMESTER – VI**

### **BCA CC614 : Artificial Intelligence**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

**CO1:** Recognise the concept of AI and its applications in diverse fields.

**CO2:** Describe the key components of the Artificial Intelligence field.

**CO3:** Outline the concepts of Natural Language processing and Knowledge representation,

**CO4:** Classify Types of Learning and identify Expert Systems Architecture.

## **SEMESTER – I**

### **BCA GE101 : Computer Fundamentals**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

**CO1:** Explain basic components, structure and functions of a Computer System



**CO2:** Classify the types of Software, Hardwares and Peripherals of Computer System

**CO3:** Outline the functions of Operating systems and Programming languages

**CO4:** Use MS-office package for creating professional, documents, spreadsheets and presentations.

## **SEMESTER – II**

### **BCA GE202 : Programming Concepts**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

**CO1:** Recognize the basics of Computer Programming Concepts, using C Programming Language.

**CO2:** Explain the concept of C character set, identifiers and keywords, variable different data types, operators and programming constructs.

**CO3:** Apply the concept of advanced topics like Arrays, Functions, Pointers, Structures in various programmes

**CO4:** Create and execute different programmes using Procedural programming method

## **SEMESTER – III**

### **BCA GE303 : Database Management System**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

**CO1:** Recognize the fundamental concept of Relational Database Management System using relational data model, entity-relationship model, relational database design and relational algebra.

**CO2:** Design ER-Models to represent simple database application scenarios and convert them into relational tables.

**CO3:** Execute SQL commands as a tool for Database Management.

**CO4:** Design and Execute queries for information storage and retrieval using SQL.

## **SEMESTER – IV**

### **BCA GE404 : Python Programming**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** State the basics of Python Programming language using various data types, Programming constructs
- CO2:** Explain Python Functions, Modules and Packages and apply these concepts in programs.
- CO3:** Create and execute simple Python Programs.
- CO4:** Implement Object Oriented Programming concepts using Python

## **SEMESTER – V**

### **BCA DSE501 : Oracle**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Define relational database concepts and design.
- CO2:** Implement design principles including the E-R method and Normalization approach for logical design of databases.
- CO3:** Formulate and Execute various SQL queries for information storage and retrieval.
- CO4:** Design and Execute PL/SQL blocks using Procedures, Functions, Packages and Triggers, Views, Cursors etc.

## **SEMESTER – V**

### **BCA DSE501 : Machine Learning**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Understand the concept of Machine learning and its types in computer science
- CO2:** Analyze variety of Machine learning algorithms
- CO3:** Apply the algorithm to the real problem and optimize the model learnt.
- CO4:** Evaluate the models generated from data

## **SEMESTER – V**

### **BCA DSE502 : Data Mining**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Define fundamental concepts of Data Mining, Data Warehouse Process and architecture
- CO2:** Classify and Compare data mining and data warehousing techniques.
- CO3:** Design data warehouse with dimensional modelling.
- CO4:** Apply OLAP operations in different case studies.

## **SEMESTER – V**

### **BCA DSE502 : Introduction to Data Science**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Define fundamental concept of Data Science
- CO2:** Identify various data sources for gathering real world data
- CO3:** Prepare clean and validate structured and unstructured data for effective data analysis
- CO4:** Use Data analysis tools to uncover trends and patterns in data to support decision making process.

## **SEMESTER – VI**

## **BCA DSE603 : Python Programming**

### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** State the basics of Python Programming language using various data types, Programming constructs
- CO2:** Explain Python Functions, Modules and Packages and apply these concepts in programs.
- CO3:** Create and execute simple Python Programs.
- CO4:** Implement Object Oriented Programming concepts using Python.

## **SEMESTER – VI**

### **BCA DSE603 : Cloud Computing**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Understand the basic concepts, characteristics and benefits of cloud computing
- CO2:** Explain the key technical issues and service models of Cloud Computing
- CO3:** Enumerate characteristics of public, private and hybrid cloud deployment models
- CO4:** Understand the key security and compliance challenges of Cloud Computing

## **SEMESTER – VI**

### **BCA DSE604 : Project**

#### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

- CO1:** Formulate projects with clearly identified scope and requirements.
- CO2:** Understand the practical implementation of Software Development Life Cycle.

**CO3:** Implement programming theories, concepts and principles & use latest computing tools for Software Development.

**CO4:** Develop team building capacity and work ethics for successful project development and management.

### **SEMESTER – III**

#### **IRS SEC301 : Inter-Religious Studies**

##### **Course Outcomes:**

**After completion of the course, the student will be able to:**

**CO1:** Develop Inter-religious harmony & better understanding of other religions.

**CO2:** Interpret the different religions of the world.

**CO3:** Identify the common elements that bind different religions together.

**CO4:** Acquaint with the salient features of different religions.

### **SEMESTER – IV**

#### **BCA SEC402 : Internet Security and Cyber laws**

##### **Course Outcomes:**

**After the completion of the course, the student will attain the ability to:**

**CO1:** Identify different types of Cyber Threats and Cyber Crimes.

**CO2:** Describe Internet Security Architecture, Security Services and Security Mechanisms.

**CO3:** Outline important Cyber Laws.

**CO4:** Implementation of various Security Mechanisms for preventing Cyber attacks.

### **SEMESTER – I**

##### **Course Outcomes:**

## **ENG AEC101 : English Communication**

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

**CO1:** Communicate effectively using the techniques in the area of spoken as well as written communication.

**CO2:** Hone their LSRW skills within their communication.

**CO3:** Design and answer job interview questions

**CO4:** Demonstrate the ability to craft professional messages that are clear yet courteous.

## **SEMESTER – I**

### **HINAECC101 – हिन्दी-व्याकरण और सम्प्रेषण**

#### **परिणाम:**

1. विभिन्न प्रतियोगी परीक्षाओं के लिए तैयार करना।
2. सम्प्रेषण-क्षमता की वृद्धि करना।
3. कार्यालयी-पत्र लेखन की क्षमता विकसित करना।
4. हिन्दी के व्याकरणिक एवं सैद्धांतिक स्वरूप की जानकारी हासिल करना।

## **SEMESTER – II**

### **EVS AEC202 : Environmental Science**

#### **Course Outcomes:**

**CO1:** After completion of the course, the student will Understand multidisciplinary nature of environmental studies.

**CO2:** Understand the concept and types of natural resources and environmental pollution.

**CO3:** Evaluate the anomalies created due to haphazard population growth and its impact on environment.

**CO4:** Understand about the organizations, conventions and legislations working on mitigation of environmental issues.