



Shri Lal Bahadur Shastri Degree College, Gonda

Department of Computer Applications

BCA

Program overview

2024 onwards

Er. Abhay Dwivedi

Head of Department





Shri Lal Bahadur Shastri Degree College, Gonda

Why Choose BCA ?



The BCA is an ideal undergraduate program for students who are passionate about technology and want to build a successful career in the IT industry.

This Guide explain this Why it is a smart choice



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There are multiple domains where students can enter after BCA ..

- Gateway to the IT industry
- Strong Foundation in CS
- Balanced Learning : Theory + Practical
- In-demand skills and Future technologies
- Great Career Opportunities
- Industry Relevant Projects & Internships
- Affordable & Accessible
- Ideal for Startups & Entrepreneurs



Department of Computer Applications - BCA



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Highlighted Programs

- Programming Principles Using Python
 - Java Programming & Web Design
 - Object-Oriented Programming Using C++
 - Artificial Intelligence & Machine Learning
 - Data Structures, Algorithms, DBMS
 - Operating Systems & Networking
 - Cloud Computing
 - Data Mining & Cyber Security
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Great Career Opportunities

After BCA, students can work as :

- Software Developer / Programmer
- Website & Application Developer
- Data Analyst / System Analyst
- Network Administrator / IT Support
- Cybersecurity Analyst

Students can also pursue higher education like **MCA, MBA** in IT or Certifications like **AWS, Azure, and more.**



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Program Outcome



These are indicative skills and attributes which every graduating student of BCA must have.

P01 – Programming Knowledge

Have the ability to apply computer science fundamentals for designing and developing software applications.

P02 – Problem Analysis

Analyze complex computing problems and apply logical reasoning, including mathematical principles, for solving those problems.

P03 – Design and Development

Design efficient, scalable, and user-friendly computer-based systems or applications.

P04 – Modern Tool Usage

Use modern development environments, tools, and technologies for software development and data handling.

P05 – Communication Skills

Communicate clearly both technically and non-technically through well put-together written reports, presentations, and documentation.



P06 – Teamwork and Leadership

Collaborate effectively as a team member or leader in multidisciplinary environments.

P07 – Professional Ethics

Understand the ethical, social, and environmental consequences of computing solution and practice responsible professionalism.

P08 - Lifelong Learning

Realize the ever-evolving need for learning in the fast-changing technological landscape.

P09 - Entrepreneurship and Innovation

Using IT-based solutions, use computing knowledge for innovating ventures or to set ventures.

P010 - Project Management

Use the knowledge of management principles for the development and management of projects under computing discipline.



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Course Outcome



Semester I

BCA101 – Programming Principles Using Python

- CO1: Understand computer fundamentals and algorithmic problem-solving techniques.
- CO2: Write Python programs using appropriate syntax and control structures.
- CO3: Create modular Python code using functions, error handling, and file operations.
- CO4: Manipulate strings and lists using built-in functions.
- CO5: Implement basic object-oriented concepts and built-in data structures in Python.

BCA102 – Computer System Architecture

- CO1: Understand logic gates, Boolean algebra, and combinational circuits.
- CO2: Perform binary arithmetic and explain data representation techniques.
- CO3: Explain basic computer organization and instruction cycle.
- CO4: Describe CPU structure and addressing modes.
- CO5: Understand memory organization and I/O mechanisms.



BCA103 – Mathematical Foundation for Computers

- CO1: Apply logic, truth tables, and predicates in computational contexts.
- CO2: Understand set theory, relations, and functions.
- CO3: Perform matrix operations including inverse and determinant.
- CO4: Apply differential and integral calculus in problem solving.
- CO5: Use advanced techniques like Beta, Gamma functions, and reduction formulas.

BCA108 – Introduction to Innovation and Entrepreneurship

- CO1: Understand entrepreneurial traits and intentions.
- CO2: Identify and explore entrepreneurial opportunities and ecosystems.
- CO3: Apply decision-making frameworks in entrepreneurial contexts.
- CO4: Design lean startup models and business canvases.
- CO5: Analyze business finance and organizational structures.



Semester II

BCA201 – Object-Oriented Programming Using C++

- CO1: Understand object-oriented concepts and C++ basics.
- CO2: Use classes, objects, constructors, and destructors effectively.
- CO3: Implement inheritance and polymorphism in real-world scenarios.
- CO4: Apply function and operator overloading.
- CO5: Use file handling and exception mechanisms in C++ programs.

BCA202 – Concepts of Data Structures

- CO1: Understand and implement arrays and sparse matrix representations.
- CO2: Apply stacks, queues, and their applications.
- CO3: Use linked lists and associated operations.
- CO4: Implement tree structures and binary search trees.
- CO5: Apply sorting, searching, and hashing techniques



BCA203 – Discrete Mathematics

- CO1: Apply set theory, relations, and function concepts.
- CO2: Use logic, connectives, and inference in problem-solving.
- CO3: Understand graph types and solve shortest path problems.
- CO4: Analyze Eulerian and Hamiltonian graphs.
- CO5: Apply tree structures, spanning trees, and flow networks.

BCA208 – Business Communication

- CO1: Understand the purpose and process of effective business communication.
- CO2: Differentiate between oral and written communication types.
- CO3: Develop clear and concise business documents.
- CO4: Draft business letters, applications, and reports.
- CO5: Use digital tools and participate in communication skill workshops.



Semester III

BCA301 – Java Programming and Dynamic Web Design

- CO1: Apply object-oriented features in Java applications.
- CO2: Design interactive GUI applications using AWT and applets.
- CO3: Implement networking and JDBC-based database interaction.
- CO4: Create structured HTML pages and interactive web forms.
- CO5: Use servlets and JSP to build dynamic web applications.

BCA302 – Operating System

- CO1: Understand types, functions, and architecture of operating systems.
- CO2: Apply memory management and virtual memory concepts.
- CO3: Analyze process scheduling and synchronization mechanisms.
- CO4: Implement device and file management techniques.
- CO5: Resolve deadlocks and apply disk scheduling algorithms.



BCA303 – Numerical Methods

- CO1: Apply methods to find roots of equations.
- CO2: Use interpolation and numerical differentiation techniques.
- CO3: Perform numerical integration using trapezoidal and Simpson's rule.
- CO4: Solve linear equations using Gauss methods.
- CO5: Solve ODEs using Euler and Runge-Kutta methods.

BCA308 – Elements of Statistics

- CO1: Understand data collection and frequency distribution.
- CO2: Calculate central tendency and dispersion.
- CO3: Apply probability theories and solve simple problems.
- CO4: Use permutation, combination, and classical probability.
- CO5: Implement statistical quality control using control charts.



Semester IV

BCA401 – Introduction to DBMS

- CO1: Understand DBMS characteristics and architecture.
- CO2: Design ER and EER models and convert to relational schemas.
- CO3: Write SQL queries for data manipulation and transaction control.
- CO4: Apply normalization techniques to relational data.
- CO5: Manage transactions, concurrency, and database recovery.

BCA402 – Design and Analysis of Algorithm

- CO1: Understand algorithm growth functions and complexity.
- CO2: Apply divide-and-conquer, greedy, and dynamic techniques.
- CO3: Solve real-world problems using backtracking and branch & bound.
- CO4: Implement sorting, selection, and graph algorithms.
- CO5: Apply amortized analysis to evaluate algorithm performance.



BCA403 – Software Engineering

- CO1: Understand software development life cycle and methodologies.
- CO2: Conduct requirement analysis and documentation.
- CO3: Design systems using data flow and object-oriented models.
- CO4: Apply testing strategies and quality assurance techniques.
- CO5: Use configuration management tools and CASE tools.

BCA408 – Computer Network

- CO1: Understand networking basics and OSI/TCP-IP models.
- CO2: Apply transmission media, switching techniques, and data protocols.
- CO3: Analyze line control, error control, and point-to-point protocols.
- CO4: Implement network layer and transport layer protocols.
- CO5: Explore ISDN, routing, congestion control, and session management.



Semester V

BCA501 – Computer Graphics and Animation

- CO1: Understand basic concepts of computer graphics and output devices.
- CO2: Implement graphics algorithms for drawing lines, circles, and ellipses.
- CO3: Apply 2D transformations, clipping, and viewport techniques.
- CO4: Perform 3D transformations, projections, and curve generation.
- CO5: Understand animation principles, image compression, and virtual reality basics.

BCA502 – Web and Internet Technologies

- CO1: Understand the structure and working of the internet and web servers.
- CO2: Use HTML, CSS, and JavaScript to develop interactive web pages.
- CO3: Develop dynamic applications using jQuery and Node.js.
- CO4: Apply web security, cookies, sessions, and database integration.
- CO5: Explore e-commerce principles, responsive design, and SEO basics.



BCA511 – Artificial Intelligence

- CO1: Understand the foundations and history of AI.
- CO2: Apply search algorithms for problem-solving and game playing.
- CO3: Represent knowledge using logic and frames.
- CO4: Develop simple expert systems using rule-based logic.
- CO5: Explore AI applications in NLP, robotics, and decision making.

BCA505 – Minor Project

- CO1: Identify real-world problems and propose appropriate computing solutions.
- CO2: Apply software development and design methodologies to build prototypes.
- CO3: Collaborate in teams to complete a project under faculty guidance.
- CO4: Document project processes and outcomes effectively.
- CO5: Demonstrate the developed system with clarity and professionalism.



Semester VI

BCA601 – Information Security

- CO1: Understand information security goals and threat types.
- CO2: Apply cryptographic methods including symmetric and asymmetric techniques.
- CO3: Analyze system-level and network-level security threats.
- CO4: Use authentication and access control mechanisms.
- CO5: Understand cybersecurity practices for mobile, IoT, and enterprise systems.

BCA602 – Theory of Computation

- CO1: Understand the concepts of languages, grammars, and automata.
- CO2: Design and analyze finite automata and regular expressions.
- CO3: Understand context-free grammars and pushdown automata.
- CO4: Explore Turing machines and computability theory.
- CO5: Analyze decidability, recursion, and unsolvable problems.



BCA612 – Machine Learning

- CO1: Understand the concepts of languages, grammars, and automata.
- CO2: Design and analyze finite automata and regular expressions.
- CO3: Understand context-free grammars and pushdown automata.
- CO4: Explore Turing machines and computability theory.
- CO5: Analyze decidability, recursion, and unsolvable problems.

BCA603 – Major Project

- CO1: Design and develop a complete software system using advanced tools.
- CO2: Integrate knowledge from previous semesters to solve a real-world problem.
- CO3: Collaborate in a team environment under faculty supervision.
- CO4: Prepare and present technical documentation and project reports.
- CO5: Demonstrate professional and ethical standards in project execution and viva.



Semester VII

BCA701 – Research Methodologies

- CO1: Understand the fundamental concepts, scope, and significance of research in computer science and its interdisciplinary applications.
- CO2: Identify and formulate research problems using appropriate methods and techniques.
- CO3: Review existing literature critically and develop a comprehensive research proposal.
- CO4: Apply qualitative and quantitative research methodologies including sampling, data collection, and statistical analysis.
- CO5: Use modern tools and techniques (such as SPSS, Excel, Python, etc.) for data analysis and visualization in research contexts.

BCA712 – Introduction to Cloud Computing

- CO1: Understand basic networking and cloud principles.
- CO2: Compare cloud computing models (IaaS, PaaS, SaaS).
- CO3: Explore Google Cloud, AWS, and IBM Cloud services.
- CO4: Analyze Red Hat and Microsoft Azure platforms.
- CO5: Apply knowledge of Salesforce and Heroku cloud ecosystems



Semester VIII

BCA801 – Business Intelligence

- CO1: Understand the fundamentals and role of Business Intelligence (BI) in modern organizations.
- CO2: Analyze business problems and identify BI solutions using data-driven decision-making.
- CO3: Explore data warehousing concepts, architecture, and ETL processes.
- CO4: Use OLAP, dashboards, and reporting tools to interpret and present business data.
- CO5: Apply BI tools (such as Power BI, Tableau, or Excel) for data visualization and performance analysis.

BCA813 – Data Mining

- CO1: Understand data mining concepts, techniques, and applications.
- CO2: Apply classification methods such as decision trees and Naïve Bayes.
- CO3: Extract association rules using Apriori and FP-Growth algorithms.
- CO4: Implement clustering techniques like K-means and hierarchical clustering.
- CO5: Evaluate data mining models using accuracy, precision, and confusion matrix.



Thank You!

Happy Learning

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+91 82991 95359