Graphic Era
Deemed to be University

# Program Curriculum

# Bachelor of Computer Applications Degree Program

**Program Code: OBC**

**Directorate of Distance and Online Education**

**Batch 2023-2026**

## University's Vision, Mission, and Core Values

**Vision:** We visualize Graphic Era (Deemed to be University) as an internationally recognized, equity-driven, ethically engaged, diverse community whose members work collaboratively for positive transformation in the world, through leadership in teaching, research, and social action.

**Mission:** The mission of the university is to promote learning in true spirit and offering knowledge and skills in order to succeed as professionals. The university aims to distinguish itself as a diverse, socially responsible learning community with a high-quality scholarship and academic rigor

**Core Values:**

- Continuous learning and improvement
- Simplicity
- Integrity and trust
- Ethics

## Program Curriculum: Bachelor of Computer Applications

1. **Title of the Degree:** Bachelor of Computer Applications (BCA)
2. **Mode of Study:** Fully Online
3. **Program Curriculum will be Effective From:** The Academic Year 2023-2024
4. **Rationale for the Programme:**

Computers, computer networks, and mobile computing have catalyzed the disruption of digital evolution. In the recent past, fast-growing information and communication technology (ICT) is the backbone of strategic planning in most business houses, government organizations, and educational institutes globally. Organizations that seek to leverage the latest technologies and communication tools require expert professionals who can apply the principles of computer science and information technology to solve their problems effectively.

Graphic Era Deemed to be University's BCA is a three-year, six-semester, undergraduate programme. The program is designed to function as the runway from the university to the vast expanse of the professional career space. The curriculum of the BCA program is designed to meet the growing demand for qualified professionals in the field of ICT. It is designed to provide a potent blend of theoretical knowledge and practical skills in core ICT areas like database management, computer networks, data structures, and numerous programming languages. The curriculum also gives exposure to advanced topics such as cyber security and mobile application development. Further, it includes courses that prepare the student in financial accounting and professional skills paving the way for career success in the field of computer applications.

Career opportunities for BCA graduates are infinite. The program enables the graduates to pursue multi-faceted, lucrative, global careers as system analysts, system managers, project managers, database administrators, system designers, applications developers, and programmers in corporate houses, government organizations, and educational institutes.

## 5. Program Educational Objectives (PEOs)

The objectives of the BCA Programme are to:

**PEO-1.** To produce students employable towards building a successful career based on a sound understanding of theoretical and applied aspects as well as methodology to solve multidisciplinary real-life problems.

**PEO-2.** To produce professional graduates ready to work with a sense of responsibility, and ethics and enable them to work efficiently individually and as a team.

**PEO-3.** To impart competency in students so that they can pursue higher studies and research in areas of engineering and other professionally related fields.

**PEO-4.** To inculcate the ability to adapt to changing technology through continuous learning.

## 6. Programme Outcomes (POs)

| Serial Number | Graduate Attribute Theme | The Complete PO Statement |
|---|---|---|
| | | After the successful completion of the BCA program, the graduates will be able to: |
| **PO-1.** | Knowledge Application | Apply the knowledge of mathematics, management, and computer applications to the solution of complex real-world problems. |
| **PO-2.** | Problem Analysis | Identify, formulate, review, and analyze complex problems reaching substantiated conclusions using principles of mathematics, management sciences, and computer applications. |
| **PO-3.** | Design And Development of Solutions | Design solutions for complex real-world problems and design system components or processes that meet the specified needs with appropriate consideration for health and safety, and cultural, societal, and environmental considerations. |
| **PO-4.** | Modern Tool Usage | Create, select, and apply appropriate techniques, resources, and modern computer software and IT tools including prediction and modeling to complex software engineering activities with an understanding of the limitations. |
| **PO-5.** | Environment And Sustainability | Understand the impact of professional software engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| **PO-6.** | Ethics | Apply ethical principles and commit to professional ethics and responsibilities and norms of the development practice. |
| **PO-7.** | Individual and Teamwork | Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |

| | | |
|---|---|---|
| **PO-8.** | Communication | Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| **PO-9.** | Project Management and Finance | Demonstrate knowledge and understanding of the software engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| **PO-10.** | Life-Long Learning | Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

## 7. Programme Specific Outcomes (PSOs)

At the end of the BCA program, the graduate will be able to:

**PSO-1.** Ability to analyze, design, implement and test software systems based on requirement specifications and development methodologies of software systems.

**PSO-2.** Develop the applications to solve computational tasks and model real-world problems using appropriate programming language, data structure, and algorithms.

**PSO-3.** Ability to explore application-based technological advancements in various domains, evaluate their merits and identify research gaps to provide solutions to new ideas and innovations.

**8. Program Structure:**

| Semester 1 | | | | |
|---|---|---|---|---|
| **Sl. No.** | **Course Type*** | **Course Code** | **Course Title** | **Credits** |
| 1 | DSC | 23OBC101 | Computational Thinking and Fundamentals of IT | 3 |
| 2 | DSC | 23OBC102 | Foundations of Computer Programming | 4 |
| 3 | DSC | 23OBC103 | Mathematical Foundations of Computer Science | 3 |
| 4 | AEC | 23OBC104 | Professional English Skills | 3 |
| 5 | GE | **General Elective - 1** | | 3 |
| | | 23OBC105A | Principles and Practices of Management | |
| | | 23OBC105B | Introduction to Business Accounting | |
| 6 | DSC | 23OBC106 | C Programming Laboratory | 2 |
| 7 | SEC | 23OBC107 | Digital Productivity Tools for Moden Workplaces | 2 |
| 8 | SEC | 23OBC108 | Seminar - 1 | 1 |
| 9 | VAC | 23OBC109 | General Proficiency/NCC/Sports/Yoga/ Healthy Living and Fitness | 1 |
| | | | **Total Credits Over the Semester** | **22** |

| | | |
|---|---|---|
| *DSC: Discipline-Specific Core Course<br>AEC: Ability Enhancement Course | DSE: Discipline-Specific Elective Course<br>SEC: Skill-Enhancement Course | GE: General Elective Course<br>VAC: Value Addition Course |

| Semester 2 | | | | |
|---|---|---|---|---|
| **Sl. No.** | **Course Type** | **Course Code** | **Course Title** | **Credits** |
| 1 | DSC | 23OBC201 | Data Structures and File Organization | 4 |
| 2 | DSC | 23OBC202 | Introduction to Object-Oriented Programming | 3 |
| 3 | DSC | 23OBC203 | Introduction to Operating Systems | 3 |
| 4 | DSC | 23OBC204 | Discrete Mathematics | 3 |
| 5 | GE | **General Elective - 2** | | 2 |
| | | 23OBC205A | Indian Culture | |
| | | 23OBC205B | Fine and Performing Arts | |
| 6 | VAC | 23OBC206 | Indian Constitution | 0 |
| 7 | AEC | 23OBC207 | Environmental Science | 2 |
| 8 | DSC | 23OBC208 | Data Structures Laboratory | 2 |
| 9 | DSC | 23OBC209 | Object-Oriented Programming Laboratory | 2 |
| 10 | VAC | 23OBC210 | General Proficiency/NCC/Sports/Yoga/ Seminar/Science of Happiness | 1 |
| | | | **Total Credits Over the Semester** | **22** |

| Semester 3 | | | | |
|---|---|---|---|---|
| **Sl. No.** | **Course Type** | **Course Code** | **Course Title** | **Credits** |
| 1 | DSC | 23OBC301 | Web Application Development | 3 |
| 2 | DSC | 23OBC302 | Introductions to Database Management Systems | 3 |
| 3 | DSC | 23OBC303 | Digital Logic Design | 3 |
| 4 | DSC | 23OBC304 | Python Programming | 3 |
| 5 | DSE | **Discipline-Specific Elective - 1** | | 3 |
| | | 23OBC305A | Probability and Statistics | |
| | | 23OBC305B | R Programming | |
| | | 23OBC305C | Principles of Programming Languages | |
| 6 | AEC | 23OBC306 | Skills for Career Success - 1 | 1 |
| 7 | DSC | 23OBC307 | Database Management Systems Laboratory | 2 |
| 8 | DSC | 23OBC308 | Web Application Development Laboratory | 2 |
| 9 | SEC | 23OBC309 | Mini Project - 1 | 2 |
| | | | **Total Credits Over the Semester** | **22** |

| Semester 4 | | | | |
|---|---|---|---|---|
| **Sl. No.** | **Course Type** | **Course Code** | **Course Title** | **Credits** |
| 1 | DSC | 23OBC401 | Introduction to Design and Analysis of Algorithms | 3 |
| 2 | DSC | 23OBC402 | Introduction to Software Engineering | 3 |
| 3 | DSC | 23OBC403 | Computer Organization | 3 |
| 4 | DSC | 23OBC404 | Data Communications and Computer Networks | 3 |
| 5 | DSE | **Discipline-Specific Elective - 2** | | 3 |
| | | 23OBC405A | Big Data Analytics | |
| | | 23OBC405B | Introduction to UNIX | |
| | | 23OBC405C | Management Information Systems | |
| 6 | SEC | 23OBC406 | Skills for Career Success - 2 | 1 |
| 7 | DSC | 23OBC407 | Design and Analysis of Algorithms Laboratory | 2 |
| 8 | DSC | 23OBC408 | Data Communications and Computer Networks Laboratory | 2 |
| 9 | SEC | 23OBC409 | Mini Project - 2 | 2 |
| | | | **Total Credits Over the Semester** | **22** |

| Semester 5 | | | | |
|---|---|---|---|---|
| **Sl. No.** | **Course Type** | **Course Code** | **Course Title** | **Credits** |
| 1 | DSC | 23OBC501 | Introduction to Java | 3 |
| 2 | DSC | 23OBC502 | Introduction to Artificial Intelligence | 3 |
| 3 | DSC | 23OBC503 | Introduction to Microcontrollers | 3 |
| 4 | GE | **General Elective - 3** | | 3 |
| | | 23OBC504A | Community Engagement and Social Responsibility | |
| | | 23OBC504B | Gardening and Horticulture | |
| 5 | DSE | **Discipline-Specific Elective - 3** | | 2 |
| | | 23OBC505A | UI-UX Design Fundamentals | |
| | | 23OBC505B | Object-Oriented Analysis and Design | |
| | | 23OBC505C | Introduction to .NET Programming | |
| 6 | SEC | 23OBC506 | Skills for Career Success - 3 | 1 |
| 7 | DSC | 23OBC507 | Artificial Intelligence Laboratory | 2 |
| 8 | DSC | 23OBC508 | Java Programming Laboratory | 2 |
| 9 | SEC | 23OBC509 | Mini Project - 3 | 3 |
| | | | **Total Credits Over the Semester** | **22** |

| Semester 6 | | | | |
|---|---|---|---|---|
| **Sl. No.** | **Course Type** | **Course Code** | **Course Title** | **Credits** |
| 1 | DSC | 23OBC601 | Introduction to Machine Learning | 4 |
| 2 | DSC | 23OBC602 | Introduction to Mobile Application Development | 3 |
| 3 | | **Discipline-Specific Elective - 4** | | 3 |
| | | 23OBC603A | Cryptography | |
| | | 23OBC603B | Network Security | |
| | | 23OBC603C | Cybersecurity | |
| 4 | | **Discipline-Specific Elective - 5** | | 3 |
| | | 23OBC604A | Computer Graphics | |
| | | 23OBC604B | Mobile Communication | |
| | | 23OBC604C | University-Approved MOOC or Certification | |
| 5 | | 23OBC605 | Mobile Application Development Laboratory | 2 |
| 6 | | 23OBC606 | Machine Learning Laboratory | 2 |
| 7 | | 23OBC607 | Capstone Project | 5 |
| | | | **Total Credits Over the Semester** | **22** |
| | | | **Total Program Credits** | **132** |

## 9. Programme Articulation Matrix (Course-PO-PSO Map)

| Sem. | Course Title | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PSO-1 | PSO-2 | PSO-3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Computational Thinking and Fundamentals of IT | | | | | | | | | | | | | |
| 1 | Foundations of Computer Programming | | | | | | | | | | | | | |
| 1 | Mathematical Foundations of Computer Science | | | | | | | | | | | | | |
| 1 | Professional English Skills | | | | | | | | | | | | | |
| 1 | Principles and Practices of Management | | | | | | | | | | | | | |
| 1 | Introduction to Business Accounting | | | | | | | | | | | | | |
| 1 | C Programming Laboratory | | | | | | | | | | | | | |
| 1 | Digital Productivity Tools for Moden Workplaces | | | | | | | | | | | | | |
| 1 | Seminar - 1 | | | | | | | | | | | | | |
| 1 | General Proficiency/NCC/Sports/ Yoga/Healthy Living and Fitness | | | | | | | | | | | | | |
| 2 | Data Structures and File Organization | | | | | | | | | | | | | |
| 2 | Introduction to Object-Oriented Programming | | | | | | | | | | | | | |
| 2 | Introduction to Operating Systems | | | | | | | | | | | | | |
| 2 | Discrete Mathematics | | | | | | | | | | | | | |
| 2 | Indian Culture | | | | | | | | | | | | | |
| 2 | Fine and Performing Arts | | | | | | | | | | | | | |
| 2 | Indian Constitution | | | | | | | | | | | | | |
| 2 | Environmental Science | | | | | | | | | | | | | |
| 2 | Data Structures Laboratory | | | | | | | | | | | | | |
| 2 | Object-Oriented Programming Laboratory | | | | | | | | | | | | | |
| 2 | General Proficiency/NCC/Sports/Yoga/ Seminar/Science of Happiness | | | | | | | | | | | | | |
| 3 | Web Application Development | | | | | | | | | | | | | |
| 3 | Introductions to Database Management Systems | | | | | | | | | | | | | |
| 3 | Digital Logic Design | | | | | | | | | | | | | |
| 3 | Python Programming | | | | | | | | | | | | | |
| 3 | Probability and Statistics | | | | | | | | | | | | | |
| 3 | R Programming | | | | | | | | | | | | | |
| 3 | Principles of Programming Languages | | | | | | | | | | | | | |
| 3 | Skills for Career Success - 1 | | | | | | | | | | | | | |
| 3 | Database Management Systems Laboratory | | | | | | | | | | | | | |
| 3 | Web Application Development Laboratory | | | | | | | | | | | | | |
| 3 | Mini Project - 1 | | | | | | | | | | | | | |
| 4 | Introduction to Design and Analysis of Algorithms | | | | | | | | | | | | | |
| 4 | Introduction to Software Engineering | | | | | | | | | | | | | |
| 4 | Computer Organization | | | | | | | | | | | | | |
| 4 | Data Communications and Computer Networks | | | | | | | | | | | | | |
| 4 | Big Data Analytics | | | | | | | | | | | | | |
| 4 | Introduction to UNIX | | | | | | | | | | | | | |
| 4 | Management Information Systems | | | | | | | | | | | | | |
| 4 | Skills for Career Success - 2 | | | | | | | | | | | | | |
| 4 | Design and Analysis of Algorithms Laboratory | | | | | | | | | | | | | |
| 4 | Data Communications and Computer Networks Laboratory | | | | | | | | | | | | | |
| 4 | Mini Project - 2 | | | | | | | | | | | | | |

| Sem. | Course Title | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PSO-1 | PSO-2 | PSO-3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | Introduction to Java | | | | | | | | | | | | | |
| 5 | Introduction to Artificial Intelligence | | | | | | | | | | | | | |
| 5 | Introduction to Microcontrollers | | | | | | | | | | | | | |
| 5 | Community Engagement and Social Responsibility | | | | | | | | | | | | | |
| 5 | Gardening and Horticulture | | | | | | | | | | | | | |
| 5 | Discipline-Specific Elective - 3 | | | | | | | | | | | | | |
| 5 | UI-UX Design Fundamentals | | | | | | | | | | | | | |
| 5 | Object-Oriented Analysis and Design | | | | | | | | | | | | | |
| 5 | Introduction to .NET Programming | | | | | | | | | | | | | |
| 5 | Skills for Career Success - 3 | | | | | | | | | | | | | |
| 5 | Artificial Intelligence Laboratory | | | | | | | | | | | | | |
| 5 | Java Programming Laboratory | | | | | | | | | | | | | |
| 5 | Mini Project - 3 | | | | | | | | | | | | | |
| 6 | Introduction to Machine Learning | | | | | | | | | | | | | |
| 6 | Introduction to Mobile Application Development | | | | | | | | | | | | | |
| 6 | Cryptography | | | | | | | | | | | | | |
| 6 | Network Security | | | | | | | | | | | | | |
| 6 | Cybersecurity | | | | | | | | | | | | | |
| 6 | Computer Graphics | | | | | | | | | | | | | |
| 6 | Mobile Communication | | | | | | | | | | | | | |
| 6 | University-Approved MOOC or Certification* | | | | | | | | | | | | | |
| 6 | Mobile Application Development Laboratory | | | | | | | | | | | | | |
| 6 | Machine Learning Laboratory | | | | | | | | | | | | | |
| 6 | Capstone Project | | | | | | | | | | | | | |
| *The CO-PO-PSO mapping depends on the course/certification chosen by the student. | | | | | | | | | | | | | | |

**10. Programme Regulations:** The regulations guiding this programme are available in the Program Guide.