



छत्रपति शाहू जी महाराज विश्वविद्यालय, कानपुर

CHHATRAPATI SHAHUJI MAHARAJ UNIVERSITY, KANPUR

(पूर्ववर्ती कानपुर विश्वविद्यालय कानपुर)

Formerly Kanpur University, Kanpur – 208024

A Documentary Support

*For*

*Matric No. – 1.1.1*

**Programme Outcomes & Course Outcomes**

*Under the*

Criteria - I


(Curriculum Design and Development)

Key Indicator - 1.1

*In*

Matric No. – 1.1.1

**Bachelor of Computer Application**

  
Co-ordinator  
Internal Quality Assurance Cell  
CSJM University, Kanpur

  
(Registrar)  
C.S.J.M. University  
Kanpur  
REGISTRAR  
C.S.J.M. UNIVERSITY  
KANPUR

## **Program Outcomes for BCA**

**PO 1:** Apply mathematics and computing fundamental and domain concepts to find out the solution of defined problems and requirements. (Computational Knowledge)

**PO 2:** Use fundamental principle of Mathematics and Computing to identify, formulate research literature for solving complex problems, reaching appropriate solutions. (Problem Analysis)

**PO 3:** Understand to design, analyze and develop solutions and evaluate system components or processes to meet specific need for local, regional and global public health, societal, cultural, and environmental systems. (Design/Development of Solutions)

**PO 4:** Use expertise research-based knowledge and methods including skills for analysis and development of information to reach valid conclusions. (Conduct Investigations of Complex Computing Problems)

**PO 5:** Use expertise research-based knowledge and methods including skills for analysis and development of information to reach valid conclusions. (Conduct Investigations of Complex Computing Problems)

**PO 6:** Exhibiting ethics for regulations, responsibilities and norms in professional computing practices. (Professional Ethics)

**PO 7:** Enlighten knowledge to enhance understanding and building research, strategies in independent learning for continual development as computer applications professional. (Life-long Learning)

**PO 8:** Establishing strategies in developing and implementing ideas in multi- disciplinary environments using computing and management skills as a member or leader in a team. (Project Management and Finance)

**PO 9:** Contribute to progressive community and society in comprehending computing activities by writing effective reports, designing documentation, making effective presentation, and understand instructions. (Communication Efficacy)

**PO 10:** Gain confidence for self and continuous learning to improve knowledge and competence as a member or leader of a team. (Individual and Teamwork)

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

- 1) Students will be able to understand, analyze and develop computer programs in the areas related to algorithm, web design and networking for efficient design of computer based system.
- 2) Apply standard software engineering practices and strategies in software project development using open source programming environment to deliver a quality of product for business success.
- 3) Student will be able to know various issues, latest trends in technology development and thereby innovate new ideas and solutions to existing problems.

## **Course Outcomes:**

### **BCA 101: Computer Fundamental & Office Automation**

- CO 1: Recognize the importance of computer in education and career,
- CO 2: Understand the basic knowledge of computer,
- CO 3: Perform common functional operations in windows. Identify software and hardware
- CO 4: Understand Testing, errors and debugging,
- CO 4: Understand the usage of Computer,
- CO 5: Understand windows directory
- CO 6: Understand the components of office automation.
- CO 7: Perform operations using MS Word, Excel, PowerPoint, Surf details through Internet,
- CO 8: Understand and discuss about the use of Office Package and internet in daily life

### **BCA 102: Programming Principle & Algorithm**

- CO 1: Read, understand and trace the execution of programs written in C language.
- CO 2: Write the C code for a given algorithm.
- CO 3: Implement Programs with pointers and arrays, perform pointer arithmetic and use the pre-processor.
- CO 4: Write programs that perform operations using derived data types.

### **BCA 103: Principle of Management**

- CO1: Understand the concepts related to Business.
- CO2: Define management and explain the characteristics of Managers in organizations
- CO3: Demonstrate the roles, skills and Levels of management.
- CO4: List and describe major management theories as represented through the history of modern management thought.

- CO5: Discuss ethics and social responsibility in the context of management.
- CO6: To analyze and discuss planning, organizing, controlling, decision making, communication, motivation, leadership, Management of Change.
- CO7: Develop theoretical and critical thinking skills relevant to both academic and management practice.
- CO8: To promote group interaction through class discussion.

### **BCA 104: Business Communication**

- CO 1: To participate in an online learning environment successfully.
- CO 2: To distinguish among various levels of organizational communication and communication barriers while developing an understanding of Communication as a process in an organization.
- CO 3: To draft effective business correspondence with brevity and clarity.
- CO 4: To stimulate their Critical thinking by designing and developing clean and lucid writing skills.
- CO 5: To demonstrate their verbal and non-verbal communication ability through presentations.

### **BCA 105: Mathematics 1**

- CO 1: Find out Eigen values and Eigen vectors.
- CO 2: Apply the concepts of limit, continuity and differentiability.
- CO 3: Apply Taylors and Maclaurin's theorem to find the expansion of functions as infinite series.
- CO 4: Evaluate the integrals of complex functions and to find area, volume.
- CO 5: Apply the concept of vector algebra, scalar triple product, vector triple product.

### **BCA 201: C Programming**

- CO 1: Understanding a functional hierarchical code organization.
- CO 2: Ability to define and manage data structures based on problem subject domain.
- CO 3: Ability to work with textual information, characters and strings.
- CO 4: Ability to work with arrays of complex objects.

- CO 5: Understanding a concept of object thinking within the framework of functional model.
- CO 6: Understanding a concept of functional hierarchical code organization.
- CO 7: Understanding a defensive programming concept. Ability to handle possible errors during program execution.

### **BCA 202: Digital Electronics & Computer Organization**

- CO 1: An ability to understand theory of Digital Design and Computer Organization to provide an insight of how basic computer components are specified.
- CO 2. An ability to understand the functions of various hardware components and their building blocks.
- CO 3. An ability to understand and appreciate Boolean algebraic expressions to digital design.
- CO 4. An in depth understanding of realization of different combinational/sequential circuits.
- CO 5. An in depth understanding of different stages of an instruction execution.
- CO 6: An in-depth understanding o how different hardware components are related and  
work in communication
- CO 7: An ability to understand computer buses and input/output peripherals.

### **BCA 203: Organization Behaviour**

- CO1: Demonstrate the applicability of the concept of organizational behaviour to understand the behaviour of people in the organization.
- CO2: Demonstrate the applicability of analyzing the complexities associated with management of individual behaviour in the organization.
- CO3: Analyze the complexities associated with management of the group behaviour in the organization.
- CO4: Demonstrate how the organizational behaviour can integrate in understanding the motivation behind behaviour of people in the organization.

### **BCA 204: Financial Accounting & Management**

- CO 1. Prepare consolidated financial statements using international accounting standards.
- CO 2. Manage the financial operations including revenues, expenses, assets, liabilities and capital.
- CO 3. To understand and be able to calculate the various ratios through financial statements and its  
impact on the short and long term position of the firm.
- CO 4. Determine the long term sources of finance to fulfil the long term finance needs of organization.
- CO 5. Demonstrate the applicability of the concept of Financial Management to understand  
Capitalization and Capital Structure.

- CO 6. Determine the break-even point and analyze the profit on large volume of output by differentiating between fixed and variable costs.
- CO 7. Improve the business management by recording all the costs incurred in conducting the business.
- CO 8. Evaluate and determine the organization's motives for holding cash, Cash budget, Managing Inventory and Receivables.
- CO 9: Apply accounting and financial information for decision making and achievement of business goals.

### **BCA 205: Mathematics – II**

- CO 1: Ability to learn the basic concepts about relations, functions and to draw different diagrams like Lattice, Hasse diagrams.
- CO2: Identify the application of partial differentiation and apply for evaluating maxima, minima.
- CO 3: Evaluate 3D Geometry.
- CO 4: Illustrate the working methods of multiple integral and apply for finding area, Volume.

### **BCA 301: Object Oriented Programming Using C++**

- CO 1: Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
- CO 2: Able to make use of objects and classes for developing programs.
- CO 3: Able to use various object oriented concepts to solve different problems.

### **BCA302: Data Structures Using C & C++**

- CO1: Design correct programs to solve problems.
- CO 2: Choose efficient data structures and apply them to solve problems.
- CO 3: Analyze the efficiency of programs based on time complexity.
- CO 4: Prove the correctness of a program using loop in-variants, pre-conditions and post-conditions in programs.
- CO 5: Implement abstract data types using arrays and linked list.
- CO 6: Apply the different linear data structures like stack and queue to various computing problems.
- CO 7: Implement different types of trees and apply them to problem solutions.
- CO 8: Analyze the various sorting and searching algorithms.

### **BCA 303: Computer Architecture and Assembly Language**

- CO 1: Identify and explain the building blocks of computer, instruction execution cycle
- CO 2: Knowledge about different CPU organizations
- CO 3: Recognize addressing modes, data/ instruction formats
- CO 4: Knowledge about different micro operations that are needed for an instruction execution
- CO 4: Explain various I/O transfer modes, interrupt, and memory interface.
- CO 5: Knowledge of different arithmetic operations like addition, subtraction, multiplication, division based on algorithms.
- CO 6: Case study of Intel 8085 microprocessor, overview, architecture, programming involving loop, subroutine, I/O etc.

### **BCA 304: Business Economics**

- CO 1: Gain basic knowledge of the operation of the business economics.
- CO 2: Apply the different concepts of demand, cost and production.
- CO 3: Employ marginal analysis for decision making
- CO 4: Understand and gain analytical skills for understanding market structures.
- CO5: Apply an ethical understanding and perspective to business situations.

### **BCA 305: Elements of Statistics**

- CO 1: Organize, manage and present data.
- CO 2: Analyze statistical data graphically using frequency distributions and cumulative frequency distributions.
- CO 3: Analyze statistical data using measures of central tendency, dispersion and location.
- CO 4: Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events.
- CO 5: Translate real-world problems into probability models.

### **BCA 401: Computer Graphics and Multimedia Application**

- CO 1: Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
- CO 2: Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
- CO 3: Use of geometric transformations on graphics objects and their application in composite form.

- CO 4: Extract scene with different clipping methods and its transformation to graphics display device.
- CO 5: Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.
- CO 6: Render projected objects to naturalize the scene in 2D view and use of illumination models for this.

### **BCA 402 Operating System**

- CO 1: Understand the fundamental concepts of operating systems and their structure, processes, and threads.
- CO 2: Able to solve questions based on algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time and Response Time.
- CO 3: Understand and analyze the memory management techniques.
- CO 4: Apply page replacement algorithms to resolve the issues in virtual memory.
- CO 5: Acquire knowledge of files and I/O management system.

### **BCA 403: Software Engineering**

- CO 1: Students will be able to decompose the given project in various phases of a lifecycle.
- CO 2: Students will be able to choose appropriate process model depending on the user requirements.
- CO 3: Students will be able perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
- CO 4: Students will be able to know various processes used in all the phases of the product.
- CO 5: Students can apply the knowledge, techniques, and skills in the development of a software product.

### **BCA 404: Optimization Techniques**

- CO 1: Be able to understand the application of OR and frame a LP Problem with solution –graphical and simplex method
- CO 2: Be able to build and solve Transportation and Assignment problems using appropriate method.
- CO 3: Be able to design and solve simple models of PERT-CPM to improve decision making and develop critical thinking and objective analysis of decision problems.
- CO 4: Be able to solve simple problems of replacement and implement practical cases of decision making under different business environments.



### **BCA 405: Mathematics III**

- CO 1: Find out nth roots of complex numbers.
- CO 2: Apply the concepts of convergence of sequence and series, find out series sum.
- CO 3: Apply the concept of vector calculus, Find out Directional Derivatives, Divergence and Curl.
- CO 4: Find out Fourier series of periodic functions.
- CO 4: To solve various differential equations and to apply these analytical methods in different engineering applications.

### **BCA 501: Introduction to DBMS**

- CO 1: Will be able to comprehend and evaluate the role of database management systems in information technology applications within organizations.
- CO 2: Effectively explains the basic concepts of databases and data models.
- CO 3: Develops an Entity-Relationship model based on user requirements.
- CO 4: Designs SQL queries to create database tables and make structural modifications.
- CO 4: Constructs queries with relational algebra.
- CO 5: Explains the concurrency control and recovery algorithms.

### **BCA 502: Java Programming and Dynamic Webpage Design**

- CO 1: Write, compile, run, and test simple object-oriented Java programs demonstrating use of good object-oriented design principles including encapsulation and information hiding; primitive and reference data types.
- CO 2: Understand and apply in programs the concept of inheritance, package and multithreading. Identify and fix common exception issues in code.
- CO 3: Demonstrate the use of a variety of basic AWT components; file-based I/O; and one-dimensional arrays.
- CO 4: Understand the concept of events and how to handle the event-driven programming and also networking. Develop JDBC application of elementary level.
- CO 5: Write a static webpage using HTML. Use various tags, tables and image formats.
- CO 6: Set up the web server. Understand HTTP and client-server architecture. Understand the potential of Servlets. Apply the methods of Servlets to retrieve and sending information, tracking session and database connectivity.
- CO 7: Create web pages of dynamic and static nature using JSP and HTML. Create JSP forms and gather information using forms. Use JSTL and custom tag libraries.

### **BCA 503: Computer Network**

- CO 1: Build an understanding of the fundamental concepts of data communication and computer networking.
- CO 2: Understand how errors detected and corrected that occur in transmission
- CO 3: How collisions to be handled when many stations share a single channel
- CO 4: Know about routing mechanisms and different routing protocols
- CO 5: Understand transport layer functions
- CO 6: Know about different application layer protocols

### **BCA 504: Numerical Methods**

- CO 1: Apply Numerical methods to find out solution of algebraic and transcendental equations.
- CO 2: Apply various Interpolation techniques to interpolate the complicated functions for given data into much simpler one like polynomials.
- CO 3: Numerically differentiate and integrate a tabular function whenever analytical methods are not applicable.
- CO 4: Solve system of linear equations in large size with the help of different iterative methods.
- CO 5: Solve the ordinary differential equations using different numerical methods.

### **BCA 601: Computer Network security**

- CO 1: Identify the security issues in the network and resolve it.
- CO 2: Analyse the vulnerabilities in any computing system and hence be able to design a security solution.
- CO 3: Evaluate security mechanisms using rigorous approaches by symmetric and asymmetric ciphers and Hash functions.
- CO 4: Demonstrate various network security applications, IPSec, Firewall, IDS, Web Security, Email Security and Malicious software etc.

### **BCA 602: Information System: Analysis Design & Implementation**

- CO 1: Perform standard analysis and design of structural systems following codes and modern practices.
- CO 2: Determine deformations and stresses in structural systems under the action forces: gravity, wind, fire, earth pressure and flood.
- CO 3: Apply basic technical concepts to identify, analyze and solve technical problems involving structural, geotechnical, and material behaviour under forces and fire.
- CO 4: Select appropriate engineering materials and practices.
- CO 5: Employ productivity software to solve technical problems.
- CO 6: Utilize modern surveying methods for land measurement and/or construction layout.

- CO 7: Utilize graphic techniques to produce engineering documents.
- CO 8: Conduct standardized field and laboratory testing on civil engineering materials.
- CO 9: Estimate material quantities for technical projects.
- CO 10: Plan and prepare design and construction documents, such as specifications, contracts, change orders, engineering drawings, and construction schedules.
- CO 11: Perform economic analyses and cost estimates related to design, construction, operations and maintenance of systems in the civil technical specialties.
- CO 12: Work effectively on teams.
- CO 13: Communicate effectively.
- CO 14: Engage in lifelong learning.
- CO 15: Understand professional, ethical and social responsibilities.
- CO 16: Respect diversity and possess knowledge of contemporary professional, societal and global issues;
- CO 17: Will be committed to quality, timeliness, and continuous improvement.

### **BCA 603: E-Commerce**

- CO 1: Analyse the impact of E-commerce on business models and strategy.
- CO 2: Describe the major types of E-commerce.
- CO 3: Explain the process that should be followed in building an E-commerce presence.
- CO 4: Describe how procurement and supply chains relate to B2B E-commerce.
- CO 5: Demonstrate the various approaches in Electronic Payment System
- CO 6: Evaluate legal issues to privacy such as Internet Indecency, Encryption policies and other Legal issues.

### **BCA 604: Knowledge Management**

- CO 1: Clearly characterize types of knowledge and structure of knowledge management solutions.
- CO 2: Describe key components of KM solutions: infrastructure, mechanisms and technologies, systems and processes.
- CO 3: Analyze and evaluate: organizational impacts of KM, factors influencing KM.
- CO 4: Demonstrate understanding of importance of intellectual capital in gaining a competitive advantage of organization.
- CO 5: Apply appropriate tool for information and knowledge visualization, representation and structuring.