CHHATRAPATI SHAHU JI MAHARAJ UNIVERSITY, KANPUR

Bachelor of Computer Application (BCA)

Course Structure

as per UP Govt Order No. 2090/Sattar-3-2024-09(01)/2023 (L4) dated 02.09.2024

Session 2025-26 onwards

School of Languages
CSJM University Campus

Chhatrapati Shahu Ji Maharaj (CSJM) University, Kanpur

(Formerly Kanpur University)

Bachelor of Computer Application (BCA)

GENERAL COURSE STRUCTURE AND CREDIT DISTRIBUTION

Semester-wise Course Structure

1st Year | Semester I

S. No.	Course Code	Course Name	L	T	P	Credits
1	BCA1001T	Computer Fundamentals and Problem-solving Techniques	3	1	0	4
2	BCA1002T	C Programming	3	1	0	4
3	BCA1003T	Principles of Management	3	0	0	3
4	BCA1004T	Professional Communication	2	0	0	2
5	BCA1005T	Basics of Mathematics	3	0	0	3
6	BCA1006P	Practical Work of C Programming and Office Automation	0	1	6	4
		Total				**20**

1st Year | Semester II

S. No.	Course Code	Course Name	L	T	P	Credits
1	BCA2001T	Object Oriented Programming using C++	3	1	0	4
2	BCA2002T	Basics of Data Structures & Algorithms	3	1	0	4
3	BCA2003T	Mathematics for Computer Application	3	0	0	3
4	BCA2004T	Financial Accounting & Management	2	0	0	2
5	BCA2005T	Computer Organization	3	0	0	3
6	BCA2006P	Practical Work of Object-Oriented Programming using C++ and Data Structures	0	1	6	4
		Total				**20**

2nd Year | Semester III

S. No.	Course Code	Course Name	L	T	P	Credits
1	BCA3001T	Python Programming	3	1	0	4
2	BCA3002T	Operating System	3	1	0	4
3	BCA3003T	Introduction to Emerging Technologies	3	0	0	3
4	BCA3004T	Internet & Web Technology	2	0	0	2
5	BCA3005T	Software Engineering	3	0	0	3
6	BCA3006P	Practical Work of Python Programming	0	1	6	4
		Total				**20**

2nd Year | Semester IV

S. No.	Course Code	Course Name	L	T	P	Credits
1	BCA4001T	Introduction to Database Management System	3	0	1	4
2	BCA4002T	Computer Networks	3	0	1	4
3	BCA4003T	Basics of Computer Graphics & Introduction to Computer Vision	3	0	0	3
4	BCA4004T	Numerical & Statistical Techniques	2	0	0	2
5	BCA4005T	Soft Computing	3	0	0	3
6	BCA4006P	Practical Work of Database Management System	0	0	3	4
		Total				**20**

3rd Year | Semester V

S. No.	Course Code	Course Name	L	T	P	Credits
1	BCA5001T	Java Programming and Dynamic Webpage Design	3	0	1	4
2	BCA5002T	Optimization Techniques	3	1	0	4
3	-	Elective-I	3	1	0	4
4	-	Elective-II	3	1	0	4
5	BCA5007P	Practical Work of Java Programming and Dynamic Webpage Design	0	1	6	4
6	BCA5008R	Project (Progressive)	0	0	10	5
		Total				**25**

3rd Year | Semester VI

S. No.	Course Code	Course Name	L	T	P	Credits
1	BCA6001T	Introduction to Data Science	3	1	0	4
2	BCA6002T	Machine Learning	3	0	1	4
3	-	Elective-III	3	1	0	4
4	-	Elective-IV	3	1	0	4
5	BCA6007P	Practical Work of Machine Learning using Python	0	1	6	4
6	BCA6008R	Project (Submissive)	0	0	10	5
		Total				**25**

Total Credits – 130

Semester V | Elective - I & II

S. No.	Course Code	Course Name	Hours/ week			Credits
			L	T	P	
1	BCA5003T	Cloud Computing	3	1	0	4
2	BCA5004T	Fundamentals of Artificial Intelligence	3	1	0	4
3	BCA5005T	Cyber Security	3	1	0	4
4	BCA5006T	Big Data Analytics	3	1	0	4
5	BCA5007T	Knowledge Management	3	1	0	4
6	BCA5008T	Software Project Management	3	1	0	4

Semester VI | Elective - III & IV

S. No.	Course Code	Course Name	Hours/ week			Credits
			L	T	P	
1	BCA6003T	E-Commerce	3	1	0	4
2	BCA6004T	Internet of Things	3	1	0	4
3	BCA6005T	Introduction to Blockchain	3	1	0	4
4	BCA6006T	Natural Language Processing	3	1	0	4
5	BCA6007T	Computer Vision	3	1	0	4
6	BCA6008T	Introduction to Quantum Computing	3	1	0	4

Detailed Syllabus

Course Code: BCA1001T
Course Name: Computer Fundamentals & Problem-solving Techniques
L-T-P-C: 3-1-0-4

Course Outcomes: On completion of this course, the students will be able to

CO1	Describe the usage of computers and why computers are essential components in business and society.
CO2	Understanding the concept of Computer memory and input/output devices of Computers and how it works and recognizes the basic terminology used in computer programming.
CO3	Demonstrate the use of Operating system commands. Understand the basic concepts of computational thinking, including sequential logic, abstractions and problem-solving techniques.
CO4	Possess the ability to design and develop programs to solve basic computational problems, develop algorithms and flowcharts. Explain the working of important application software and their use to perform any engineering activity.
CO5	Possess the ability to extend their knowledge towards learning behavior on windows operating system and Hands on training on MS Office Automation.

UNIT-I

Introduction to Computers: Introduction, Characteristics of Computers, Block diagram of computer, Generations and Classification. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Number Systems Introduction to Binary, Octal, Hexadecimal system Conversion, Binary Arithmetic Simple Addition, Subtraction, Multiplication

UNIT-II

Memory Organization: Introduction,Hierarchy, Primary Memory, Secondary memory, Cache memory, Virtual memory. Secondary Storage Devices: Introduction, Magnetic disk, Magnetic tape, Optical disks, Flash memory etc.

Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages): Introduction, Compiler, Interpreter and Assembler

UNIT-III

Operating System: Definition, Functions, Types, Classification, Introduction of command based and GUI based operating system

Windows Operating System: Introduction, Elements, Use of menus, Tools and Commands.

Computer Networks: Introduction, Types - LAN, WAN and MAN, Topologies, Data communication

UNIT-IV

Problem solving techniques: Understanding the problem, Analyzing the problem, Developing the solution

Algorithm and Flowcharts: Definition, Characteristics, Expressing Algorithms, Analysis of Algorithms, Advantages and disadvantages, Examples Flowchart: Definition, Define symbols of flowchart, Limitations of Using Flowcharts, Advantages and disadvantages, Activities involved in Program Design, Coding and implementation.

UNIT-V

Windows Operating Environment & Office Automation: Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush, MS-Word, MS-Excel, MS-Access, MS-PowerPoint Purpose, usage, command

Text and Reference Books:

1. Fundamental of Computers, *V. Rajaraman*, BPB Publications
2. Fundamental of Computers, *P. K. Sinha*
3. Computer Today, *Suresh Basandra*
4. Unix Concepts and Application, *Sumitabha Das*
5. MS-Office 2000 (For Windows), *Steve Sagman*

Course Code: BCA1002T
Course Name: C Programming

L-T-P-C: 3-1-0-4

Course Outcomes: On completion of this course, the students will be able to

CO1	Able to understand the fundamentals of C programming with its control structures.
CO2	Able to implement the concepts of arrays and functions using C programming.
CO3	Able to design and develop structure programming problems using C programming concepts.
CO4	Able to implement advance C programming concepts using pointers.
CO5	Able to understand the concept of dynamic memory allocation and file handling using C Programming.

UNIT-I

Fundamentals of C programming and Control Structures: History, Structure of a C program, C Conventions, Character Set, Identifiers, Keywords, Simple Data types, Modifiers, Variables, Constants, Operators, Operator precedence. Input and Output operation: Single character input and output. Control Structures, Conditional statement and switch statement. Looping statement, break and continue, nested for statement.

UNIT-II

Arrays: Introduction, Declaration of arrays, Initialization of arrays, processing with arrays, String manipulation, declaration of string arrays, string operations.
Functions: Introduction, advantages of functions, Function definition, function call, Actual and formal arguments, local and global variables, function prototypes, types of functions, recursive functions.

UNIT-III

Structures: Introduction to structures, Advantages of structures, accessing elements of a structure, nested structures, array of structures.
Storage classes: Introduction, Types- automatic, register, static and external.

UNIT-IV

Pointers: Introduction, Characteristics, * and & operators, Pointer type declaration and assignment, Pointer arithmetic, Call by reference, accessing array using pointers, Passing pointers to functions, Pointer to pointer.

UNIT-V

Dynamic Memory Allocation: Introduction, Library functions - malloc, calloc, realloc and free.
File Handling: Basics, File types, File operations, File pointer, File opening modes, File handling functions, File handling through command line argument, Record I/O in files.

Text and Reference Books:

1. Programming in C, *Byron S. Gottfried*, Schaum Series, BPB Publication, 3rd Ed.
2. The 'C' Programming, *Denis Ritchi*, PHI, 2nd Ed., 1988
3. Mastering C, *Venugopal*, TMH, 2nd Ed., 2006
4. Let Us C, *Yashavant Kanetkar*, BPB Publication, 18th Ed., 2021
5. Programming in ANSI C, *Balaguruswami*, TMH, 8th Ed., 2019

Course Code: BCA1003T
Course Name: Principles of Management

L-T-P-C: 3-0-0-3

Course Outcomes: On completion of this course, the students will be able to

CO1	Understand the concepts related to business.
CO2	Define Management and Demonstrate the roles, skills and Levels of management.
CO3	Describe major management theories, Business ethics and social responsibility in the context of management.
CO4	To analyze and discuss planning, Organizing, controlling, decision making, motivation, leadership, Management of change
CO5	Develop theoretical and critical thinking skills relevant to both academic and management practices.

UNIT-I

Nature of Management: Meaning, Definition, Scope, importance & Characteristics of Management, Management as Art, Science & Profession, Management Vs Administration, Management Skills, Levels of Management.

UNIT-II

Evolution of Management Thought: Contribution of F.W. Taylor, Henri Fayol, & Peter Drucker to the management thought. Business Ethics, Social Responsibility of business.

UNIT-III

Functions of Management: **Part-I** ***Planning:*** Meaning, Need & Importance, types, Process of Planning, limitations of Planning. Concept of Decision making, Types, Process of decision making. ***Organizing:*** Concept of organizing & processes: Types of Organization, Delegation of authority, Centralization and Decentralization. ***Staffing:*** Meaning & Importance.

UNIT-IV

Functions of Management: **Part-II** ***Direction:*** Nature, Principles, Motivation, Importance, theories of Motivation, ***Leadership:*** Meaning, styles, qualities & function of leader, ***Controlling:*** Need, Nature, Importance, Process of Controlling, ***Coordination:*** Concept & types of Coordination.

UNIT-V

Management of Change: Meaning, Features of change, Force for Change, Models for Change, Resistance to change, overcoming resistance to change, Stress Management.

Text and Reference Books:

1. Essential of Management, *Horold Koontz and Iteinz Weibrich*, McGraw Hill Education (India) Private Limited, May 2020
2. Principles of Management-Text & Cases, *Chandan J S*, 3rd Ed., August 2024
3. Principles & Practice of Management, *Dr. L.M. Prasad*, Sultan Chand & Sons, New Delhi, September 2024
4. Business Organization & Management, *Dr. Y. K. Bhushan*, 2016
5. Principles of Management, *Tripathi & Reddy*, Tata McGraw Hills, November 2021

Course Code: BCA1004T
Course Name: Professional Communication

L-T-P-C: 2-0-0-2

Course Outcomes: On completion of this course, the students will be able to

CO1	Develop the knowledge of basic concepts and elements of communication and professional communication
CO2	Assess the importance of effective communication in a professional career.
CO3	Enhance oral communication skills by learning Reading, Listening and Speaking skills.
CO4	Enhance effective Writing Skills by introducing business correspondence through Letters, Reports, and Resume writing.
CO5	Understand the models of professional communication and its implications in presentation skills.

UNIT-I

Basics of Professional Communication:

Meaning, Definition and Importance of Professional Communication; Difference between General and Professional communication, Process of Communication and Barriers in Communication, Levels of Communication - formal/ informal, internal/ external, intrapersonal/ extrapersonal, Interpersonal, Mass, Grapevine

UNIT-II

Oral Communication skills:

Techniques of effective oral communication skills, 7C's of Communication, Common errors in speaking, Debates, Group Discussions and Speeches, Reading skills and Listening skills

UNIT-III

Written Communication:

Principles of Effective Writing skills and Business Correspondence, Letters; Layout and formats of business letters, Sales letter (persuasive and negotiation), Inquiry letters, complaint letters, Emails, Job Application and Resume writing, Report writing; Purpose, Types of report writing, Structure of reports

UNIT-IV

Presentation skills:

Planning, Strategies and Organization of presentations, nuances of delivery, Preparing Effective Power Point Presentations, PPT, Nonverbal communication skills - Body language, Paralanguage, Posture and Gesture, Eye contact

Text and Reference Books:

1. Business Communication, *K. K. Sinha*, Galgotia Publishing Company, New Delhi.
2. Technical Communication (Principles and Practice), *Meenakshi Raman and Sangeeta Sharma*, Oxford University Press, New Delhi, New York
3. Professional Communication, *Malti Agarwal*, Krishna Prakashan
4. Essentials of Business Communication, *Rajendra Pal and J.S. Korlhalli*, Sultan Chand & Sons, New Delhi.
5. Business Communication (Principles, Methods and Techniques), *Nirmal Singh*, Deep & Deep Publications Pvt. Ltd., New Delhi.

Course Code: BCA1005T
Course Name: Basics of Mathematics

L-T-P-C: 3-0-0-3

Course Outcomes: On completion of this course, the students will be able to

CO1	Find out matrix representation of various type of problems.
CO2	Apply the concepts of limit, continuity and differentiability in different science fields.
CO3	Apply Taylors and Maclaurin's theorem to find the expansion of functions as infinite series.
CO4	Evaluate the integrals of complex functions and to find area, volume.
CO5	Apply the concept of vector algebra, scalar triple product, vector triple product.

UNIT-I

Matrices and Determinants: Matrix, Types of matrices, Addition, subtraction, scalar multiplication of a matrix, product of two matrices, Determinants of a square matrix, Co-factor of element of a square matrix, Adjoint of a square matrix, Inverse of a Square Matrix, Cayley Hamilton theorem (statement only) and problems.

UNIT-II

Limits and Continuity: Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Indeterminate Forms, L' Hospitals Rule, Continuity at a Point, Continuity Over an Interval.

UNIT-III

Differentiation: Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions, Logarithmic Differentiation, Rolle's Theorem, Mean Value Theorem, Maxima & Minima. Taylor's and Maclaurin's Theorem

UNIT-IV

Integration: Fundamental Theorem of Calculus (without proof), Indefinite Integrals, Methods of Integration Substitution, By Parts, Partial Fractions.

UNIT-V

Vector Algebra: Definition of a vector in 2 and 3 Dimensions; Double and Triple Scalar and Vector Product.

Text and Reference Books:

1. Elementary Engineering Mathematics, *B.S. Grewal*, Khanna Publishers, 15th Edition, 2015.
2. Advanced Engineering Mathematics, *H. K. Dass*, S. Chand & Company, 22nd Revised Ed. 2018.
3. Integral Calculus, *Shanti Narayan*, S. Chand & Company, 1999.
4. Differential Calculus, *Shanti Narayan*, S. Chand & Company, 1998.