

**EVALUATION SCHEME AND
SYLLABUS
FOR
BACHELOR OF COMPUTER APPLICATION
(BCA)**

as per

NEP-2020

(Effective from the Session: 2023-24)



**DEPARTMENT OF COMPUTER SCIENCE AND
ENGINEERING**

FACULTY OF ENGINEERING AND TECHNOLOGY

UNIVERSITY OF LUCKNOW, LUCKNOW

CERTIFICATE

BCA

(TWO - SEMESTER PROGRAMME, TOTAL CREDITS=48)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

FACULTY OF ENGINEERING AND TECHNOLOGY
UNIVERSITY OF LUCKNOW, LUCKNOW

YEAR: FIRST, SEMESTER-I

S. No.	Paper Code	Subject	Periods			Evaluation Scheme				Sub Total	Credit
			L	T	P	Sessional Exam			Exam ESE		
						CT	TA	Total			
1.	NBCA-101	Fundamentals of Computer and its Applications	3	1	0	20	10	30	70	100	4
2.	NBCA-102	Programming in C	3	1	0	20	10	30	70	100	4
3.	NBCA-103	Basics of Information System	3	0	0	20	10	30	70	100	3
4.	NBCA-104	Mathematics	3	1	0	20	10	30	70	100	4
5.	NBCA-105	Soft Skills and Personality Development	3	1	0	20	10	30	70	100	4
Practical											
6.	NBCA-106P	Computer Application Lab	0	0	3		20	20	30	50	2
7.	NBCA-107P	Programming in C Lab	0	0	3		20	20	30	50	2
8.	NBCA-108P	Soft Skills and Personality Development Lab	0	0	2		20	20	30	50	1
9.	NBCA-GP	General Proficiency	-	-	-		-	-	-	50	
10.	ABCA-101	Induction Program*	-	-	-		-	-	-		
		Total	15	4	8					650	24

*Audit Course: Three-week duration including Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Department/Branch & Innovation.

NBCA-101
FUNDAMENTALS OF COMPUTER AND ITS APPLICATIONS

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Course Outcomes (COs):

After the completion of the course, students are expected to have the ability to:

1. Understand the components, characteristics and limitation of the computer system.
2. Understand different types of input devices, output devices and their advantages and disadvantages.
3. Understand various types of storage devices and their storage capacities.
4. Understand the concept of number system.
5. Understand the computer software need and types of software.

Unit-I **08**

Introduction to Computer: Brief history of the development of Computers. Computer System Concept, Computer System Characteristics, Capabilities and Limitations, Types of Computer. Generations of Computers, basic components of a computer system (Control Unit, ALU, Input/ Output Functions and characteristic), Memory and types of Memory.

Unit-II **06**

Processor: Introduction, types, specification, Intel, Pentium, AMD. **Motherboard:** Introduction, component, types, form factor. BIOS, CMOS, RAM, ROM, SRAM, and DRAM. **Buses:** Introduction, types, utility. Add on Cards.

Unit-III **08**

Input devices- Keyboard, Mouse, Digitalizing tablet, Scanners, Bar-Code Reader, Light Pen, and Touch Screen etc. **Output Devices-** Monitors – Characteristics and types of Monitors – Digital, Analog, Size, Resolution, Refresh Rate, Video standard, Types of Printers, Plotter, Sound Card and Speakers. **Storage Devices-** Primary Vs Secondary Data Storage and Retrieval methods. Various Storage Devices – Magnetic Tape, Magnetic Disks, Cartridge tape, data drives, hard disk drives, Floppy disk and Optical disk.

Unit-IV **08**

Computer Software – System Software, Application Software, and Operating System. **Basics of computer Programming Languages:** Concept of algorithms and flow charts, Types of computer languages, concept of Assemblers, Compilers, Interpreter, linker and loader.

Unit-V **10**

Office Automation-MS Word: Create, save, preview, print, edit, proofreading, and formatting of documents, Data presentation in tables, graphs, and charts, Creating form letters, email message, labels, and mail merge. **MS Excel:** Create, save, and edit, print, formatting, managing and hiding workbook data, Data presentation in charts and graphs, use of formulas and functions for data processing. **MS Power Point:** Create, save, and edit, Data presentation in form of tables, graphics, charts, sound, and animation. **MS Access:** Introduction, data types, database creation, basic query, and report generation.

Text Books:

1. P. K Sinha, “Computer Fundamentals”, BPB Publication.
2. V Rajaraman, Neeharika Adabala “Fundamentals of Computers”, PHI.

3. Reema Thareja, "Fundamentals of computers", Oxford Higher Education.
4. MS-Office 2000 (For Windows), Steve Sagman

Reference Books:

1. Anita Goel, "Computer Fundamentals" Pearson.
2. E Balagurusamy, "Fundamentals of computers", MC Graw Hill.
3. MS-Office 2007, Michael Price
4. Comdex Windows 7 with Office 2010, Vikas Gupta

NBCA-102
PROGRAMMING IN C

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Course Outcomes (COs)

After the completion of the course, students are expected to have the ability to:

1. Understand about writing, compiling and executing a program in C language.
2. Learn the fundamental building blocks of C Language like constants, variables, identifiers, operators, and type conversion.
3. To write programs in C-language that involves decisions and iterations.
4. Understand the implementation of functions, arrays and pointers in C programming language.

Unit-I

08

C language fundamentals: Character set, keywords, variables: declaration and initialization; scope of variables, constants, type of constants, data type, types of operators: Unary, binary, and ternary operator. Bitwise operators, type conversion and typecasting.

Unit-II

08

C Programming Construct: Components of C Language, structure of a C program, writing and executing the C programs and standard I/O in C. Concepts of operator precedence and associativity. Storage classes- automatic, register, static, and external.

Units-III

08

Conditional program execution: If, if else, nested if else, else if ladder, switch statement, use of break and default with switch; Program loops and iterations: for, while, do while, nesting of loops, use of break and continue statements.

Unit-IV

08

Functions: Introduction, types of functions, passing values to functions, recursive functions. **Arrays:** Array notation and representation, using multi-dimensional arrays, sparse matrices and their representation.

Unit-V

08

User defined data types: Structure, union, and enumerated data types. **Pointers:** Introduction and declaration, array of pointers. **C preprocessor:** Standard C preprocessors, defining and calling macros. **Dynamic Memory Allocation:** malloc(), calloc(), realloc(), and free().

Text Books:

1. Kernighan Brian W. and Ritchie Dennis M., "The C programming", Pearson Education.
2. Rajaraman, "Computer Basics and C ProgrammingV", PHI Learning Pvt. Limited - 2015.
3. Kochan Stephen G., "Programming in C", Pearson Education - 2015.

Reference Books:

1. D.S. Yadav and Rajeev Khanna, "Computer Concepts and Programming", New Age International Publication.
2. Vikas Gupta, "Computer Concepts and Programming in C", Wiley India Publication
3. Reema Thareja, "Computer Fundamentals and Programming in C", Oxford Publication

NBCA-103
BASICS OF INFORMATION SYSTEM

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COURSE OUTCOMES (COs)

After the completion of the course, students are expected to have the ability to:

1. Understand fundamental of information system.
2. Visualize structure of management information system & decision support system.
3. Learn various business application of information system.
4. Explore ERP, supply chain management and CRM based information system

Unit-I **08**

Introduction: Systems: An overview, Information and data: Definition and distinctions, features and qualities of information, types of information, process of generating information, value and cost of information, information as a corporate resource, information needs at various levels of management, and factors influencing information needs.

Unit-II **08**

Information Systems: Definition and elements, information system activities, types of information systems, information systems in business management, and recent trends in information systems.

Unit-III **08**

Basics of Internet: Terminology, World Wide Web, Intranets, Extranets, Internet, Internet application and Internet ethics, Connectivity types: level one, level two and level three connectivity, Setting up a connection: hardware requirement, selection of a modem, software requirement, modem configuration, Internet accounts by ISP: Telephone line options, Protocol options, Service options, Telephone line options – Dialup connections through the telephone system, dedicated connections through the telephone system.

Unit-IV **08**

E-mail and other Internet Services: Structure of an Email – Email Address, Email Header, Body and Attachments, Email Clients: Netscape mail Clients, Outlook Express, Web based E-mail. Email encryption-Address Book, Signature File. Email Networks and Servers, Email protocols –SMTP, POP3, IMAP4, MIME6, Telnet, FTP, IRC and Search Engine. ISDN, Protocol options – Shell, SLIP, PPP, Service options.

Unit-V **08**

Management Information System (MIS) Introduction: Definition and concept of a management information system, MIS versus data processing, MIS and decision support system, MIS and information resources management, and structure of a management information system. Advanced concepts in information system: enterprise resource planning, supply chain management, and customer relationship management.

Text Books:

1. Brian, “Management Information System”, Tata Mcgraw-hill Education Pvt. Ltd.
2. Gordon B. Davis & Margrethe H. Olson, “Management Information System”, Tata Mcgraw-hill Education Pvt. Ltd.

Reference Books:

1. Brian, “Introduction to Information System”, TMH Education Pvt. Ltd.

2. Murdick, “Information System for Modern Management”, PHI Learning Private Limited.
3. Jawadekar, “Management Information System”, TMH Education Pvt. Ltd.

**NBCA-104
MATHEMATICS**

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COURSE OUTCOMES (COs)

After the completion of the course, students are expected to have the ability to:

1. Use matrices, determinants and techniques for solving systems of linear equations in the different areas of Linear Algebra, Solve Eigen value problems and apply Cayley Hamilton Theorem.
2. Study the functions of more than one independent variable and calculate partial derivatives along with their applications.
3. Understand and implement the concept of differential equations and learn various methods to solve ordinary differential equations.
4. Identify a range of techniques to form the partial differential equations (PDF) and solutions of standard linear PDFs.
5. Compute and interpret the results of Bivariate Regression and Correlation Analysis.

Unit-I:

08

Matrices: Types of Matrices, Inverse of matrix by elementary transformations, Rank of a matrix, Consistency of linear system of equations and their solution, Characteristic equation, Eigen values and Eigen vectors, and Cayley-Hamilton Theorem.

Unit-II:

08

Differential and Integral calculus: Successive Differentiation, Partial derivatives, Euler's theorem for homogeneous functions, Total derivatives, Taylor's and Maclaurin's theorem: Expansion of function of several variables. Integral Calculus: Definite and Indefinite integration.

Unit-III:

10

Ordinary Differential Equations: Definition and examples, order and degree of differential equations, Solutions of first order first degree differential equations, Variable Separable, Equations reducible to variable separable, Linear differential equations, Bernoulli's differential equations, Linear differential equations of n^{th} order with constant coefficients, Complementary function and Particular integral.

Unit-IV:

08

Partial Differential Equations: Origin of first order partial differential equations, Partial differential equations of the first order and degree one, Lagrange's solution, Partial differential equation of first order and degree greater than one and Solution of second order linear partial differential equations with constant coefficients.

Unit-V:

06

Statistics: Moments, Moment generating functions, Skewness, Kurtosis, Correlation and Regression analysis.

Text Books:

1. N.P. Bali and Dr. Manish Goyal, "Engineering Mathematics" University Science Press, Laxmi Publications, Pvt. Ltd.
2. CB Gupta, SR Singh and Mukesh Kumar, "Engineering Mathematics", McGraw Hill Education(India)Private Limited.
3. E. Kreyzig, "Advanced Engineering Mathematics", John-Wiley & Sons.

Reference Books:

1. B.S.Grewal, "Higher Engineering Mathematics", Khanna Publishers.
2. J.N. Kanpur, "Mathematical Statistics", S. Chand & company Ltd.
3. M.D. Raisnghania, "Advanced Differential Equations", S. Chand & company Ltd.
4. Peter V. O'Neil, "Advanced Engineering Mathematics", Thomas(Cengage)Learning

NBCA-105
SOFT SKILLS AND PERSONALITY DEVELOPMENT

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COURSE OUTCOMES (COs)

After the completion of the course, students are expected to have the ability to:

1. Understand personality and personality aspects.
2. be able to communicate professionally.
3. be able to put forward own view point and create a professional and profitable Pitch.
4. be able to communicate across organizational levels and cultures effectively.
5. be able to negotiate with the odds and bring in best of the results with specific success.
6. Understand the need for feedback and constant improvement.

Unit-I

08

Strategic Thinking and Listening: Constant Learning and Self Improvement: Being Proactive, Understanding Counter Argument, Optimizing with Experiences; Benefits of Strategic Thinking; Planning with Mind Mapping; Listening: Maintaining Eye Contact, Being Attentive, Keeping an open mind, Turning words into Pictures, Ensuring understanding, Giving Feedback, Reading between the lines (Nonverbal cues); Active Listening vs. Passive Listening.

Unit-II

08

Developing Speaking and Persuasive Writing Skills: Speaking: Modes of Speaking, Using Nonverbal communication, Time Management, Preparing draft, Pacing, Pronunciation, Practicing; Persuasive Writing: Building Argument, Understanding cultural context, Using recommendation, Using concrete evidence in support, Countering perspectives, using logical opening, body and close, Using typography and highlights.

Unit-III

08

Persuasive Presentation and Self-Assessment: Persuasive Presentation: Using ten-minute interactive argument on presentation slides, Attracting and persuading external Audience, Enacting change in strategy, Providing a course of action; Self-assessment: Self-evaluation (strength of argument, clarity in message, structure and use of verbal and nonverbal cues) at the end of presentation, Getting peer evaluation, Synthesizing observations, SOAR (strength, opportunity, aspirations and results) analysis.

Unit-IV

08

Reflection Report: Leadership Communication: Highlighting specific and attainable leadership goals and plan for achieving it; Using progress report as a strategic communicator: Accomplishments as mindful leader and strategic communicator, outlining critical communication experience (receiving meaningful feedback, reaching out audience, making a persuasive pitch etc.)

Unit-V

08

Developing Personality and Soft Skills: Motivation- Factors of motivation, Self-talk, Intrinsic & Extrinsic Motivators; Assertiveness and Negotiation; Personality Traits; Empathy, sympathy and altruism, Importance of empathising with others; Understanding stress and its impact, Stress management techniques; Entrepreneurship; Critical and Creative Thinking: Characteristics of a creative person.

Text Books:

1. Functional skills in Language and Literature, by R.P. Singh, Oxford Univ. Press, 2005, New Delhi.
2. The Nature of Narrative by Robert Scholes, James Phelan and Robert Kellogg, OUP, 2006, New Delhi.
3. Soft Skills for Everyone by Jeff Butterfield, Cengage Learning: 2023, New Delhi.
4. Spoken English- A manual of Speech and Phonetics by R.K. Bansal & J.B. Harrison Orient Blackswan, 2013, New Delhi.

Reference Books:

1. A Glossary of Literary Terms by M. H. Abrams, Cengage Learning, 2015, New Delhi.
2. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt. Ltd, 2011, New Delhi.
3. Business Correspondence and Report Writing by Prof R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd. ,2001, New Delhi.
4. Word Power Made Easy by Norman Lewis, W.R. Goyal Pub. & Distributors, 2009, Delhi.
5. Developing Communication skills by Krishna Mohan, Meera Banerji Macmillan India Ltd. 1990, Delhi.

COMPUTER APPLICATION LAB

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Note: At least 3 practical needs to be conducted from each section.

Section 1: MS-Office

1. At least three applications of MS Word.
2. At least three applications of MS Excel
3. At least three applications of MS Power Point
4. At least three applications of MS Access

Section 2: Hardware

1. Disassembling of Computer system
2. Assembling of Computer system
3. Installation of operating systems (Windows, Linux, etc.)
4. Creating bootable pendrive
5. Familiarization with data recovery tools
6. Designing of posters/ flyers/ pamphlets etc using online portals like Canva.

**NBCA-107P
PROGRAMMING IN C LAB**

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1. WAP to print "Hello World".
2. WAP to calculate the area and circumference of a circle.
3. WAP that accepts the temperature in Centigrade and converts into Fahrenheit.
4. WAP that swaps values of two variables using a third variable.
5. WAP that checks whether the two numbers entered by the user are equal or not.
6. WAP to find the greatest of three numbers.
7. WAP that finds whether a given number is even or odd.
8. WAP that tells whether a given year is a leap year or not.
9. WAP that takes two operands and one operator from the user and perform the operation and prints the result by using Switch statement.
10. WAP to print the sum of all numbers up to a given number.
11. WAP to find the factorial of a given number.
12. WAP to print sum of even and odd numbers from 1 to N numbers.
13. WAP to print the Fibonacci series.
14. WAP to check whether the entered number is prime or not.
15. WAP to find the sum of digits of the entered number.
16. WAP to find the reverse of a number.
17. WAP to convert binary number into decimal number and vice versa.
18. WAP to add and multiply two matrices of order nxn.
19. WAP that finds the sum of diagonal elements of a mxn matrix.
20. WAP to implement a function that swaps two numbers using call by reference.

NBCA-108P
PROFESSIONAL COMMUNICATION LAB

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Note: At least 5 tasks needs to be conducted from each section.

Section 1: Soft Skills

1. Language Proficiency Test
2. Augmentative Skills- Outlining & Conveying
3. Reading Online Articles & Advertisement
4. Paper Presentation
5. Vocabulary Enhancement Exercises
6. Role Play- Dialogue and Conversation
7. Public Speaking Skills- 2 minutes pitch
8. Self-Assessment & Peer Feedback Script

Section 2: Personality Development

1. Personality Test
2. Office Behavioral Skills- Building Self-awareness & Adaptability in Workplace
3. Positive Thinking Exercises
4. Greeting/Introducing
5. Group/Panel Discussion
6. Presentation Skills-Drafting & Formatting Presentation Slides
7. Startup/Project Presentation
8. Interview etiquette- FAQs related to Job Interviews