University of Rajasthan
Jaipur

SYLLABUS

Bachelor of Computer Application

B.C.A. Part-I Examination 2021

B.C.A. Part-II Examination 2022

B.C.A. Part-III Examination 2023

Bachelor of Computer Applications (BCA)

Eligibility for Admission to BCA course session 2014-2015 "A candidate must have passed 10+2 examination (Arts/Science/Commerce) or equivalent with securing 48% or more (minimum pass mark for SC/ST/OBC/SBC candidates) in aggregate without any approximations".

In regard to reservation of Seats for admission to BCA Part I, the reservation policy of Govt. of Rajasthan/University of Rajasthan will be followed.

Admission Procedure: Admission to BCA Part I course will be made on the basis of merit list (10+2 level).

Attendance: A candidate shall be required to put in a minimum of 75% attendance at the lectures and 75% attendance at the practicals separately in each paper, as per university norms.

Scheme of Examination for Bachelor of Computer Applications(BCA):

The Bachelor of Computer Applications will be a **Three Part Course in Faculty of Science** extending over **three academic sessions**. Medium of instructions and examination will be **English only**. There shall be an examination at the end of each part. Each theory paper examination will be of **three hour** duration and shall carry **100 marks**. Theory paper shall contain three parts. All questions are compulsory.

Part – I (very short answer) consists 10 questions of **two marks** each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of **four marks** each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of **twelve marks** each with one question from each unit with internal choice.

Each practical examination (Maximum marks 100) will be of **four hour** duration on one day and carry **60 marks for exercises**(3 exercises) assigned in the examination, 25 marks for **viva-voce** and 15 marks for **practical records and regularity** of the candidate. Other rules and procedures of examinations will be common to those for B.Sc. course.

"A candidate will be promoted to Part III if he/she passed with 40% in **three theory and two practical papers** of Part II examination and with at least 50% in aggregate of these papers. However, if the candidate has not passed Part I Examination then also he/she be promoted to part III if the number of due papers (part I & Part II together) does not exceed **four theory papers and two practical papers**."

Passing of Examination and Promotion to next Part: A candidate must secure at least 36% marks in each paper and 50% marks in aggregate for passing a part examination. A

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candidate will be promoted to part II if he/she has secured at least 40% in **three theory** and **two practical** papers of part I examination and with at least 50% in aggregate of these papers. A candidate will be promoted to Part III if he/she has passed 40% in **three theory** and **two practical** papers of Part II examination and with at least 50% in aggregate of these papers, and has passed Part I examination.

Division and Honors: On successful passing out of all three part examinations (in first attempt), those securing 75% and above in aggregate of all the three parts will be awarded **First division with Honors**, and those securing between 60% or more but less than 75% will be awarded **First division** and rest will be awarded **Second division**.

BCA Part - I

Code	Subject	Hours / Week	Max. Marks
Theory			
BCA-101	Elementary Physics	4	100
BCA-102	Basic Mathematics	4	100
BCA-103	General English	4	100
BCA-104	Principles of Programming Language (Through 'C')	4	100
BCA-105	Computer Organization	4	100
BCA-106	Office Management Tools	4	100
Practical			
BCA-107	Technical Writing and Communication Skills	3	100
BCA-108	C- Laboratory	3	100
BCA-109	Office Automation Laboratory	3	100
BCA-110	Typing Skills Laboratory (English and Hindi Language)	3	100

BCA Part - II

Code	Subject	Hours / Week	Max. Marks
Theory			
BCA-201	Business Accounting	4	100
BCA-202	Discrete Mathematics	4	100
BCA-203	Operating System	4	100
BCA-204	Database Management System	4	100
BCA-205	Web Designing and Multimedia	4	100
	Elective (Any One)		
BCA-206A	Object Oriented Programming Concepts (Through C++)	4	100
BCA-206B	Programming through VB6.0	4	100
Practical			

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BCA-207	Database Laboratory	3	100
BCA-208	Object Oriented Laboratory	3	100
BCA-209	Web Designing Laboratory	3	100
BCA-210	Multimedia Laboratory	3	100

BCA Part - III

Code	Subject	Hours / Week	Max. Marks
Theory			
BCA-301	Data Structure (Using C/C++)	4	100
BCA-302	System Design Concepts	4	100
BCA-303	Networking Technologies	4	100
BCA-304	Core Java Programming	4	100
BCA-305	E-Commerce	4	100
	Elective (Any One)		
BCA-306(A)	ASP.Net	4	100
BCA-306(B)	PHP	4	100
BCA-306(C)	Linux and Shell Programming	4	100
Practical			
BCA-307	Networking Laboratory	3	100
BCA-308	Core Java Laboratory	3	100
BCA-309	Elective Laboratory	3	100
BCA-310	Project	3	100

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BCA101: Elementary Physics

Question Paper pattern for Main University Examination *Max Marks: 100*

Part - I (very short answer) consists 10 questions of **two marks** each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part - II (short answer) consists 5 questions of **four marks** each with one question from each unit. Maximum limit for each question is up to 80 words.
Part - III (Long answer) consists 5 questions of **twelve marks** each with one question from each unit with internal choice.

UNIT-I

Electric charge, conductors and insulators, Coulomb's Law, quantization and conservation of electric charge. the electric field, electric lines of force and Gauss' Law of electrostatics, electric potential energy, electric potential, energy and electrical power.
Capacitors, capacitance, capacitors in series and parallel, capacitors with dielectric. Electric current, resistance, resistivity and conductivity, Ohm's law, electromotive force, series and parallel combination of resistances, current in a single loop, Kirchoff's current law, Kirchoff's Voltage law.

UNIT-II

Magnetic field due to a bar magnet, Biot Savrt's law, magnetic field due to a current carrying coil, Force between two parallel currents, Magnetic field inside solenoid and toroid, magnetic flux, Faraday's law of electromagnetic induction, magnetic properties of matter, (diamagnetic, paramagnetic, ferromagnetic and ferromagnetic materials), inductance, energy stored in an inductor, LR circuits.

UNIT-III

Introduction to Logic and implementation with Logic Gates, Logic functions-NOT,AND,OR NOR, EX-NOR. Truth tables. Boolean Algebra. de Morgan's theorems, Standard forms for logical expressions. Sum of Products, Product of Sums specification of logical functions in terms of Minterms and Maxterms. Karnaugh Maps, simplification of logical functions, introduction of "don't care" states, Synthesis using only NAND or only NOR gates.

UNIT – IV

Combinational Circuits Multiplexer-IC 74150 and IC 44151, De multiplexer-IC 74154, Decoder-IC 74139, BCD to Seven segment De-coder IC 7446/7447 IC 7448/7449 Decimal to BCD Priority Encoder IC 7417, parity Checker IC 74180, Magnitude Comparator IC 7485.

UNIT - V

Sequential Circuits : RS Flip Flop, Clocked RS Flip Flop, D Flip Flop, Edge Triggered D Flip Flop, master-Salve Technology and its advantage. Shift Register as Flip Flop system, IC 7496, UP/DOWN counters 74 series asynchronous counters 74 series synchronous

Reference books

1. Bernard Grob, Basic Electronics, Tata Mc Graw Hill.
2. Fowler, Electricity, Tata Mc Graw Hill.
3. Shivakumar, Engineering Physics, Tata Mc Graw Hill
4. Iyer, Circuit Theory, Tata Mc Graw Hill
5. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Vikas Publishing House Pvt.
6. R.P. Jain, Modern Digital Electronics, Tata Mc Graw Hill Publications Company Ltd. New Delhi

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BCA102: Basic Mathematics

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part - I (very short answer consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words

Part - II (short answer) consists 5 questions' of four marks each with one question from each unit. Maximum limit for each question is up to 80 words

Part –III (Long answer) consists of 5 questions of Twelve Marks each with one question from each unit and with internal choice.

Unit- I

Functions : Functions, domain & range of a function, types of functions-constant, identity, polynomial, exponential, logarithmic, trigonometric, inverse- trigonometric, rational, periodic, modulus, signum and greatest integer functions with their graphs. Composite functions, Invertible Functions. Function domain and range, one to one and onto functions, composite functions, inverse of functions. Binary operations.

Unit-II

Matrices and Determinant : Definition and Types of Matrices, Addition , Subtraction and Multiplication of Matrices, Non-commutatively of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix(restrict to square matrices of order 2), Scalar Multiplication. Transpose of a Matrix.

Determinant of a square matrix (up to 3x3 matrices), properties of determinants, minors , cofactors. expansion of determinants, application of determinants in finding the area of a triangle. Invertible matrices. Adjoint and inverse of a matrix, Solution of system of linear equations by inverse matrix method and Cramer's Rule, Eigen Values, Eigen Vectors.

UNIT III

Numerical Methods: Floating Point Numbers and its representation. Normalized Floating point number and their arithmetic operations and consequences. Errors in Numbers. **Finite Difference methods:** The operators E, Δ and∇ their algebraic properties and relations. Difference Table, Fundamental theorem of difference table. One missing term case. Factorial notion of a polynomial. Concept of Zero Difference. Effect of Error in tabular values. **Quadratic Equation**: Solution ol Quadratic Equations, Nature ol Roots Solution of a quadratic equation by factorization method and Shridharacharya's formula. Relation between the roots of a quadratic equation, formation ol quadratic equation from given roots.

UNIT- IV

Statistics : Frequency Distribution, Graphical representation of frequency distribution. Mean, Median, Mode and other measures of Central Tendency, Dispersion, Standard Deviations, Variance. Correlation and regression, Measure of Karl Pearson's coefficient of correlation, regression analysis, properties of regression lines.

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UNIT-V

Probability: Factorial notation n!, Combinations and Permutations, Classical approach of Probability- trial & events, exhaustive events, equally likely events, mutually exclusive events, favourable events, independent events. Classical or mathematical definition of probability. Law of addition of probabilities. Multiplication law of probability and conditional probability. Simple problems based on addition and multiplication law of probabilities.

Reference Books:

(i) C.L. Liu: Elements of Discrete Mathematics, Tata Mc-Graw Hill Publishing Company Ltd.. 2000
(ii) Seymour Lipschutz; Discrete Mathematics;TMH.
(iii) Richard Johnsoribaugh: Discrete Mathematics, Pearson Education, Asia, 2U0I
(iv) John Truss: Discrete Mathematics for Computer Scientists, Pearson Education, Asia, 2001.
(v) R.D. Sharma : Basic Mathematics,
(vi) B.L. Agrawal : Basic Statistics, Khanna Pub.
(vii) Stephen Bernstem: Elements of Statistics, TMFI.
(viii) SC Gupta & V.K.Kapoor : Fundamentals of Mathematical, Sultan Chand & Sons., New Delhi.
(ix) S.P.Gupta : Statistical Methods, Sultan Chand & Sons., New Delhi.
(x) V.Rajaraman: Computer Orented Numerical Methods,3rd Edn., PHI
(xi) ARVashishtha and Vipin Vashishitha,: Numerical Analysis, Kedar Nath ram Nath Pub., Meerut.

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BCA103: Communicative English

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part - I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words

Part - II (short answer) consists 5 questions' of four marks each with one question from each unit. Maximum limit for each question is up to 80 words

Part –III (Long answer) consists of 5 questions of Twelve Marks each with one question from each unit and with internal choice.

UNIT-I

Concepts and Fundamentals: Narration, Active and Passive Modals. Subject Verb. Concord, Meaning of Communication, Importance &scope of Communication, Communication Scope. Essentials of Good Communication. Verbal and Non-verbal communication. Formal and Informal Communication. Barriers to communication.

UNIT-II

Written Communication : Objectives of written Communication, Merits and dements of written communication, Planning business messages.

Writing Letters : Business letters. Office memorandum, Letters: Official & Informal, Sales letters. Letter Styles/Layout.

UNIT-III

Report Writing : Types of report (Business report & Academic report) ,Format & Drafting of the report, Essentials of good report writing.

Language Skills : Importance of Vocabulary: Choice of words. Common problems with verbs, adjectives, adverbs, pronouns, conjunctions, punctuation, prefix, suffix etc.

UNIT-IV

Oral Communication : Principles of effective oral communication, Media of oral communication, Advantages of oral communication, Disadvantages of oral communication. Styles of oral communication.

Interviews : Importance of Interviews: Art of interviewing. Types of interview, Essential Features, Structure , Guidelines for Interviewer, Guide lines for interviewee.

Arts of Listening : Good listening for improved communications, Art of listening, Meaning, nature and importance of listening. Principles of good listening, Barriers in listening. Comprehension.

UNIT V

Job Application : Types of application, Form & Content of an application, Drafting the application. Preparation of resume.

Project Presentations : Advantages & Disadvantages. Charts, Distribution of time (presentation, questions & answers, summing up). Visual presentation. Guidelines for using visual aids. Electronic media (power-point presentation)

Reference Books

(i) C.S.Rayudu: Communication, Himalaya Pub. House

(ii) Reuben Ray: Communication Today-Understanding, Creative Skill, Himalaya Pub. House

(iii) Malera Treece: Successful Communication

(iv) Boyce & Hull: Business Communication Today, McGraw Hill,

(v) Prof.K.Mohan: Communication skills and Report Writing, Tata McGraw Hill

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BCA104: Principles of Programming (Through 'C')

Question Paper pattern for Main University Examination *Max Marks: 100*

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Part – II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.
Part – III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT- I

Basic concepts of Programming languages, Programming Domains, Language Evaluation criteria and language categories, Evolution of major programming languages. Describing syntax and semantics formal methods of describing syntax, Pseudo code, Design of Algorithm & Flowchart

UNIT- II

Fundamentals of C: History and importance of C, sample programming, basic structure and execution of C programs, constants, variables, and data types and various type of declarations, different type operators and expressions, evaluation of expressions, operator precedence and associability. Managing input and output operations, decision making and branching decision making.

UNIT- III

Iteration: while, do...while, for loop, nested loops, break & continue, goto statements.
Arrays and Strings: One-dimensional arrays and their declaration and initialization, two-dimensional arrays and their initializations, character arrays (One and Two dimensional), reading and writing strings, string - handling functions.

UNIT-IV

Functions: Need and elements for user defined functions, definition of functions, return values and their types, function calls and declaration, recursion, parameter passing, passing arrays and strings to functions, the scope, visibility and life time of variables.
Understanding Pointers: Accessing the address of a variable, declaration and initialization of pointer variables, accessing a variable through its pointer, pointers and arrays, pointers and function arguments, functions returning pointers.

UNIT -V

Structures and Unions: Defining structure, declaring structure variable and accessing structure members, initialization of structure, operation on individual members, and array of structures, union, size of structure
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BCA105: Computer Organization

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part - I (very short answer) consists 10 questions of two marks each with two questions from each unit. Maximum limit for each question is up to 40 words.

Part - II (short answer) consists 5 questions of four marks each with one question from each unit. Maximum limit for each question is up to 80 words.

Part - III (Long answer) consists 5 questions of twelve marks each with one question from each unit with internal choice.

UNIT-1

Computer System History and Architecture development von Neumann machine, Mother Board, System clock, Bus (Data, Address Control), Bus architecture (ISA, MCA, EISA, PCI, AGP), Expansion slots and cards (Network adapter cards, SCSI card, Sound card, TV tuner card, PC card), Ports (Serial Parallel, AGP, USB hire Wire), cables (RS 2.12, BIN), Input devices Output devices , Storage devices, random versus sequential access, formatting, tracks and sectors, speed, storage capacity, Floppy Disk, I lard Disk tracks, cylinders, scclots, Hard Drive Interfaces Optical Disks . Magnetic tape. Modern (fax/Datay Voice.)

UNIT-II

Basic building blocks I/O, Memory, ALU and its components, Control Unit and its functions. Instruction -word. Instruction and Execution cycle, branch, skip, jump and shift instruction, Operation of control registers; Controlling of arithmetic operations, Classification of Computers (Workstation, Mainframe, Super Computer, Client Server Computer. Notebook. Tablet, PalmTop Computer).

UNIT III

Basics of Computer Architecture ,System Bus and instruction cycles, memory subsystem organization and interfacing, system buses and instruction cycles, I/O subsystem organization and interfacing. Register transfer language. CPU design: Specifying a CPU design, and implementation of a simple CPU(fetching instructions from memory, decoding and executing instructions, establishing required data path, Design of ALU, Design of Control Unit and design verification). Design and implementation a simple micro processor. Feature of Pentium microprocessor.

UNIT IV

Addressing Techniques: Direct, Indirect Immediate, Relative, Indexed addressing and paging. Registers. Indexed ,General purpose, Special purpose, overflow, carry, shift scratch. Memory Butter register, accumulators, stack pointers, floating point, status information and buffer registers. Memory: Main memory, RAM, static and dynamic, ROM, EPROM, EEPROM, EAROM, Cache and Virtual memory.

UNIT- V

Buses, Interfacing buses, Bus formats - address, data and control, Interfacing keyboard, display, auxiliary storage devices and pointers. I/O cards in personal computers. Introduction to Microprocessor and Microcontrollers: Introduction to 8085,8086 microprocessor, DMA Controller, examples of few instructions to understand addressing techniques.Difference between microprocessor and Microcontrollers. RISC Vs. CICS.

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Recommended Books

(i) A.S. Tanenbaum : Structured Computer Organization, PHI

(ii) William Stallings: Computer Organization and Architecture , Sixth Edition, Pearson Education

(iii) John D. Carpinelli: Computer Systems Organization & Architecture; 3rd Edition; Person Education Asia, 2008

(iv) M. Morris Mano; Computer System Architectures; III Edition, Prentice Hall of India,2008

(v) B. Malvino: Digital Computer Electronics III Edition; TMHL

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scratch. Memory Buffer register; accumulators; stack pointers; floating point; status information and buffer registers. Memory: Main memory, RAM, static and dynamic, ROM, EPROM, EEPROM, EAROM, Cache and Virtual memory.

UNIT- V

Buses, Interfacing buses, Bus formats – address, data and control, Interfacing keyboard, display, auxiliary storage devices and printers. I/O cards in personal computers.
Introduction to Microprocessors and Microcontrollers: introduction to 8085 microprocessor, examples of few instructions to understand addressing techniques. Difference between microprocessor and microcontrollers, RISC v/s CISC.

Recommended Books

1. Andrew S. Tanenbaum , Structured Computer Organization,Printice Hall
2. William Stallings, Computer Organization and Architecture , Sixth Edition, Pearson
3. John D. Carpinelli: Computer Systems Organization & Architecture; 3rd Edition; Person Education Asia,2008
4. M, Morris Mano: Computer System Architectures; III Edition, Prentice Hall of India,2008
5. Malvino B ; Digital Computer Electronics III Edition; TMHL

BCA106: Office Management Tools

Question Paper pattern for Main University Examination ***Max Marks: 100***

Part – I (very short answer) consists 10 questions of **two marks** each with two questions from each unit. Maximum limit for each question is up to 40 words.
Part – II (short answer) consists 5 questions of **four marks** each with one question from each unit. Maximum limit for each question is up to 80 words.
Part III (Long answer) consists 5 questions of **twelve marks** each with one question from each unit with internal choice.

UNIT- I

Introduction to Operating System: Introduction to Operating system, FAT and NT file systems, file and directory structures and naming rules of files, booting process, system files, Dos Commands (internal & external)
Windows 7/8, Windows concept features, Desktop, Taskbar, Start menu, My Computer, Recycle bin, Windows Accessories(Calculator, Notepad, Paint, Word Pad, Character Map Windows Explorer Entertainment, System Tools, Communication). Sharing information between programs, Smart devices tools and applications

UNIT II

MS Word: Word processing, MS Word features, creating, saving and opening documents in Word, interface, toolbars, ruler, zoom, keyboard shortcuts, editing, proofreading features & formatting, enhancement, advance features of MS Word and a package name

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thesaurus, mail merge, handling graphics, tables, converting a Word document into various formats like-text, rich text format, Word perfect, etc.

UNIT- III

MS Excel: Worksheet basics, creating worksheet, entering data into worksheet, data, text, dates, alphanumeric values saving & quitting worksheet, opening and moving around in an existing worksheet, Toolbars and menus, Keyboard shorteuts, working with single and multiple workbook, working with formula & cell referencing, Auto sum, coping formulas, absolute and relative addressing, formatting of worksheet, previewing & printing worksheet, Graphs and Charts, Database, macros, multiple worksheets-concepts.

UNIT- IV

Power Point: Creating and viewing a presentation, managing Slide Shows, navigating through a presentation, using hyperlinks, advanced navigation with action setting and action buttons, organizing formats with Master Slides, applying and modifying designs, adding graphics, multimedia and special effects.

UNIT- V

Microsoft Access: Planning a database (tables, queries, forms, reports), creating and editing database, customizing tables, linking tables, designing and using forms, modifying database structure. Sorting and Indexing database, querying a database and generating reports.

Reference Books:

1. Microsoft; 2007/2010 Microsoft Office System, PHI.
2. Microsoft; Microsoft Office 2007/2010: Plain & Simple; PHI.
3. Microsoft; Microsoft Office XP: Plain & Simple; PHI.
4. Sanjay Saxena: A First Course in Computers 2003 Edition: Vikas Pub.

BCA 107 : Technical Writing and Communication Skills

Practical Lab Exercises based on Theory Paper BCA 103.

BCA 108 : C Laboratory

Practical Lab Exercises based on Theory Paper BCA 104

BCA 109 : Office Automation Laboratory

Practical Lab Exercises based on Theory Paper BCA 106

BCA 110 : Typing Skills Laboratory (English and Hindi Typewriting)

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