

**BACHELOR OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION (w.e.f. 2013-14)**

FIRST YEAR

Paper No.	Title of Paper	External Marks	Internal Marks	Maximum Marks	Pass Marks	Exam Duration
BCA-101	Computer Fundamentals and Programming with 'C'	80	20	100	35	3hrs
BCA-102	PC Software	80	20	100	35	3hrs
BCA-103	Computer-Oriented Numerical and Statistical Methods	80	20	100	35	3hrs
BCA-104	Logical Organization of Computers	80	20	100	35	3hrs
BCA-105	Mathematical Foundations – I	80	20	100	35	3hrs
BCA-106	Communicative English	80	20	100	35	3hrs
BCA-107	Lab – I Programming in 'C' based on BCA-101 & BCA-103			100	35	3hrs
BCA-108	Lab – II Based on BCA-102			100	35	3hrs

BACHELOR OF COMPUTER APPLICATIONS
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SECOND YEAR						
Paper No.	Title of Paper	External Marks	Internal Marks	Maximum Marks	Pass Marks	Exam Duration
BCA-201	Operating System	80	20	100	35	3hrs
BCA-202	Data Structures	80	20	100	35	3hrs
BCA-203	Computer Architecture	80	20	100	35	3hrs
BCA-204	Data Base Management System	80	20	100	35	3hrs
BCA-205	Software Engineering	80	20	100	35	3hrs
BCA-206	Mathematical Foundations – II	80	20	100	35	3hrs
BCA-207	Lab – I Based on BCA-202 using 'C'			100	35	3hrs
BCA-208	Lab – II Based on BCA-204			100	35	3hrs

**BACHELOR OF COMPUTER APPLICATIONS
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THIRD YEAR						
Paper No.	Title of Paper	External Marks	Internal Marks	Maximum Marks	Pass Marks	Exam Duration
BCA-301	Object Oriented Programming using C++	80	20	100	35	3hrs
BCA-302	Web Designing	80	20	100	35	3hrs
BCA-303	Computer Networks	80	20	100	35	3hrs
BCA-304	Management Information System	80	20	100	35	3hrs
BCA-305	Computer Graphics	80	20	100	35	3hrs
BCA-306	E-Commerce	80	20	100	35	3hrs
BCA-307	Lab – I Based on BCA-301			100	35	3hrs
BCA-308	Lab – II Based on BCA-302			100	35	3hrs

BCA – 101 Computer Fundamentals and Programming with 'C'

Maximum Marks: 100
Minimum Pass Marks: 35
Time: 3 hours

External: 80
Internal: 20

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Computer Fundamentals: Definition, Functional units of computer, characteristics & classification of computers, Applications of computers in various fields.

Computer hardware & software: I/O devices, Storage devices, types of software, language translator.

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

Techniques of Problem Solving: Flowcharting, algorithms, decision table, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

UNIT-II

Overview of C: History of C, Structure of a C Program, C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant.

Input/output: Unformatted & formatted I/O function in C,

Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, conditional operators and special operators. Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.

UNIT - III

Decision making: IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement, for, while, and do-while loop, break, continue statement.

Functions: Definition, prototype, passing parameters, recursion.

Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime.

UNIT - IV

Arrays: Definition, types, initialization, processing an array, passing arrays to functions, Strings & arrays.

Structure and Union: Introduction, Features of structures and union, Declaration and initialization of structures and union.

Pointers: Introduction, Pointer arithmetic, Pointer comparison, Pointers and arrays, Pointers and functions, Pointers and strings, Pointer to pointer, dynamic allocation using pointers.

TEXT BOOKS

1. Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB
2. Dromey, R.G., How to Solve it By Computer, PHI

3. Gottfried, Byron S., Programming with C, Tata McGraw Hill
4. Balagurusamy, E., Programming in ANSI C, 4E, Tata McGraw-Hill

REFERENCE BOOKS

1. Balagurusamy E, Computing Fundamentals and C Programming, Tata McGraw Hill.
2. Norton, Peter, Introduction to Computer, McGraw-Hill
3. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
4. Rajaraman, V., Fundamentals of Computers, PHI
5. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.
6. Yashwant Kanetker, Let us C, BPB.
7. Rajaraman, V., Computer Programming in C, PHI.

BCA-102 PC Software

Maximum Marks: 100
Minimum Pass Marks: 35
Time: 3 hours

External: 80
Internal: 20

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT – I

Windows: Basics of Windows. Windows History, Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, Windows explorer, computer, managing files and folders, Configuring System devices. Control panel , using windows accessories.

UNIT – II

Documentation Using Word-Processing package: Introduction to Word-Processing, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Advance Features of Word-Processing: Mail Merge, Macros, Tables, Printing, Styles, linking and embedding object.

UNIT – III

Electronic Spread Sheet - Introduction & area of use, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Database Management : Sorting, Querying, Filtering, Table, Validation, Goal Seek, Scenario.

UNIT – IV

Presentation using PowerPoint: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

TEXT BOOKS

1. Microsoft Office – Complete Reference – BPB Publication
2. Learn Microsoft Office – Russell A. Stultz – BPB Publication

REFERENCES BOOKS

1. Courter, G Marquis (1999). Microsoft Office 2000: Professional Edition. BPB.
2. Koers, D (2001). Microsoft Office XP Fast and Easy. PHI.
3. Nelson, S L and Kelly, J (2002). Office XP: The Complete Reference. Tata McGraw-Hill.

BCA-103 Computer-Oriented Numerical and Statistical Methods

Maximum Marks: 100
Minimum Pass Marks: 35
Time: 3 hours

External: 80
Internal: 20

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Computer Arithmetic: Floating-point representation of numbers, arithmetic operations with normalized floating-point numbers and their consequences, significant figures.

Error in number representation-inherent error, truncation, absolute, relative, percentage and round-off error.

Iterative Methods: Bisection, False position, Newton-Raphson method. Discussion of convergence.

Solution of simultaneous linear equations and ordinary differential equations: Gauss-Elimination methods, pivoting, Ill-conditioned equations, refinement of solution. Gauss-Seidal iterative method, Euler method, Taylor-series method, Runge-Kutta methods, Predictor-Corrector methods.

UNIT-II

Polynomial interpolation: Newton, Lagranges, Difference tables, Approximation of functions by Taylor Series.

Chebyshev polynomial: First kind, Second kind and their relations, Orthogonal properties.

Numerical Differentiation and integration: Differentiation formulae based on polynomial fit, pitfalls in differentiation, Trapezoidal & Simpson Rules.

UNIT-III

Basic Statistics: Measure of Central Tendency, Preparing frequency, distribution table, Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode.

Measure of Dispersion: Range, Variance and Standard Deviations; Frequency Distributions and Cumulative Frequency Distributions: Moments and Moments Generating Functions.

Distribution Patterns: Types of Theoretical Probability; Normal, Binomial and Poisson distribution.

UNIT-IV

Correlation and Regression: Types of Correlation, Properties of Coefficient of Correlation, Methods of studying Correlation; Aim of Regression Analysis, Kinds of Regression Analysis.

Tests of significance: Z-test, Student T-test, Chi-square test.

Curve fitting: Method of least squares and Polynomial fit.

REFERENCE BOOKS

1. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India.
2. S. S. Sastry, Introductory Methods of Numerical Analysis.
3. M. K. Jain, S.R.K. Iyengar & R. K. Jain, Numerical Methods for Scientific and Engineering Computation.

4. H. C. Saxena, Finite Differences and Numerical Analysis.
5. Modes A., Numerical Analysis for Computer Science.
6. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
7. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, Sultan Chand and Sons, 1995.
8. Graybill, Introduction to Statistics, McGraw.
9. Anderson, Statistical Modelling, McGraw.

BCA-104 Logical Organization of Computers

Maximum Marks: 100
Minimum Pass Marks: 35
Time: 3 hours

External: 80
Internal: 20

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT - I

Information Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode

Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions – Venn Diagram, Karnaugh Maps.

UNIT - II

Digital Logic: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates – XOR, XNOR etc. Implementations of digital circuits using gates, Combinational Logic – Characteristics, Design Procedures, analysis procedures.

Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters.

UNIT - III

Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master-Slave flip-flops. State table, state diagram and state equations. Flip-flop excitation tables

Designing registers – Serial Input Serial Output (SISO), Serial Input Parallel Output (SIPO), Parallel Input Serial Output (PISO), Parallel Input Parallel Output (PIPO) and shift registers.

Designing counters – Asynchronous and Synchronous Binary Counters, Modulo-N Counters and Up-Down Counters

UNIT - IV

Memory & I/O Devices: Memory Parameters, Semiconductor RAM, ROM, Magnetic and Optical Storage devices, Flash memory, I/O Devices and their controllers.

Instruction Design & I/O Organization: Machine instruction, Instruction set selection, Instruction cycle, Instruction Format and Addressing Modes. I/O Interface, Interrupt structure, Program-controlled, Interrupt-controlled & DMA transfer, IOP.

TEXT BOOKS

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS

1. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
2. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

BCA – 105 Mathematical Foundations – I

Maximum Marks: 100
Minimum Pass Marks: 35
Time: 3 hours

External: 80
Internal: 20

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT- I

Set, subsets and operations on sets, Venn diagram of sets. Power set of a set. Equivalence relation on a set and partition of a set, Permutation and combinations, Partially ordered sets, Lattices (definition and examples). Boolean algebra (definition and examples) Epsilon and delta definition of the continuity of a function of a single variable, Basic properties of limits, Continuous functions and classifications of discontinuities, Derivative of a function, Derivatives of Logarithmic, exponential, trigonometric, inverse trigonometrical and hyperbolic functions. Higher order derivatives.

UNIT- II

Formation of differential equations order and degree of the differential equation, Geometrical approach to the existence of the solution of the differential equation $dy/dx=f(x,y)$. Ordinary differential equations of first degree and the first order, exact differential equations
Linear differential equations of higher order with constant coefficients, Homogeneous linear differential equations and linear differential equations reducible to homogenous differential equations, Applications of differential equations to geometry,

UNIT- III

Propositions and logical operators, Truth tables and propositions generated by a set. Equivalence and implications, Laws of logic, Mathematical system, Proposition over a universe, Mathematical induction, Quantifiers
Binary operations on a non empty set, Groups, Subgroups, Normal Subgroups, Cosets, Factor groups, Rings, Sub rings, Ideals, Factor rings, Prime ideals, Minimal ideal, Fields, direct product of groups, Isomorphism of groups and rings (definitions and examples only)

UNIT- IV

Addition and multiplication of matrices, Laws of matrix algebra, Singular and non singular matrices, Inverse of a matrix, Rank of a matrix, Rank of the product of two matrices, Systems of linear equations i.e. $AX=0$ and $AX=B$
Characteristic equations of a square matrix, Cayley-Hamilton Theorem, Eigen values and eigen vectors, Eigen values and eigen vectors of symmetric skew symmetric, Hermitian and skew –Hermitian matrices, Diagonalization of a square matrix.

REFERENCE BOOKS

1. D.A. Murray: Introductory course in differential equations, Orient Longman(India) 1967.

2. H.T.H. Piaggio: Elementary Treatise on differential equation and their applications
C.B.S. publishers of distributors.
3. S.L. Ross : Ordinary differential equations
4. Babu Ram: Discrete Mathematics
5. Shanti Narayana : Differential & Integral calculus

BCA-106 Communicative English

Maximum Marks: 100
Minimum Pass Marks: 35
Time: 3 hours

External: 80
Internal: 20

Note: Examiner will be required to set ten Questions in all, two questions from each Unit. A candidate will be required to answer five questions in all, selecting exactly one question from each unit. All questions will carry equal marks.

UNIT- I

One essay type question (with internal choice) from the prescribed text.
Five short answer type questions (with internal choice) from the prescribed text.

UNIT-II

A comprehension passage from the prescribed text book (Reflection) with five questions at the end.

Faxes, e-mails, and text messages composing. This question will carry three parts A, B, and C with questions on all the three above mentioned items.

UNIT-III

Grammar questions on the following items: (i) Articles (ii) Preposition (iii) Tenses (iv) Subject verb agreement (v) Voice (vi) Tag questions (vii) Reported speech (viii) Comparatives and superlatives

A paragraph of about 150 words on any one of the given topics.

UNIT-IV

Official letters / applications (With internal choice)

English in situations (for example: greetings, in the post office, catching a train, at a bank, making a telephone call, buying vegetables, at the hospital, on the bus etc.

UNIT - V

Right to Information Act, 2005 : Definition, Meaning, Nature and Scope of Right to Information, Obligations and functioning of PIO's(Public Information Officers), Information, which cannot be disclosed, Functioning of Appellate Authorities(State Information Commission(s) and Central Information Commission), Terms and conditions of appointment of members in State Information Commission(s) and Central Information Commission.

TEXT BOOKS

1. Reflections by I. P. Anand & Dr. R. K. Malhotra
2. Remedial English Grammar by F. T. Wood.

RECOMMENDED BOOKS:

1. Business Letter Writing by Jasmin S. and S. Bright, Universal, New Delhi, 1984.
2. English in Situations by R. O. Neil (OUP)