

BACHELOR OF COMPUTER APPLICATIONS (BCA) Regular
Syllabus and SCHEME OF EXAMINATION – Ist , IInd, IIIrd YEAR(6 semesters)

w.e.f. 2012-13

Period per week: 6 for each theory paper and 6 for each practical group in each semester.

Paper No.	Title of Paper	Max. Marks		Pass Marks	Exam Duration
		External	Internal		
Semester – I w.e.f. 2012-13					
BCA-101	Computer & Programming Fundamentals	80	20	35	3hrs
BCA-102	PC Software	80	20	35	3hrs
BCA-103	Mathematics	80	20	35	3hrs
BCA-104	Logical Organization of Computer-I	80	20	35	3hrs
BCA-105	Practical software Lab – Based on paper BCA-102 i.e Word, Excel and Power point	80	20	35	3hrs
Semester – II					
BCA-106	'C' Programming	80	20	35	3hrs
BCA-107	Logical Organization of Computer-II	80	20	35	3hrs
BCA-108	Mathematical Foundations of Computer Science	80	20	35	3hrs
BCA-109	Structured System Analysis and Design	80	20	35	3hrs
BCA-110	Practical software Lab – Based on paper BCA-106, i.e.'C' Programming	80	20	35	3hrs
Semester – III w.e.f. 2013-14					
BCA-201	Introduction to Operating System	80	20	35	3hrs
BCA-202	DATA STRUCTURES – I	80	20	35	3hrs
BCA-203	Introduction to database system	80	20	35	3hrs
BCA-204	Communication skills (English)	80	20	35	3hrs
BCA-205	Practical software Lab – Based on paper BCA-202 & 203 using C Language and SQL	80	20	35	3hrs
Semester – IV					
BCA-206	WEB DESIGNING	80	20	35	3hrs
BCA-207	DATA STRUCTURES – II	80	20	35	3hrs
BCA-208	Object Oriented Programming Using C++	80	20	35	3hrs
BCA-209	Software Engineering	80	20	35	3hrs
BCA-210	Practical software Lab– Based on paper BCA-206 & 208, i.e.HTML and C++ Programming	80	20	35	3hrs
Semester – V w.e.f. 2014-15					
BCA-301	Management information system	80	20	35	3hrs
BCA-302	Computer Graphics	80	20	35	3hrs
BCA-303	Data Communication and Networking	80	20	35	3hrs
BCA-304	Visual Basic	80	20	35	3hrs
BCA-305	Practical software Lab– Based on paper BCA-304 i.e. Visual Basic	80	20	35	3hrs
Semester – VI					
BCA-306	E-Commerce	80	20	35	3hrs
BCA-307	Object Technologies & Programming using Java	80	20	35	3hrs
BCA-308	Artificial Intelligence	80	20	35	3hrs
BCA-309	Introduction to .net	80	20	35	3hrs
BCA-310	Practical software Lab– Based on paper BCA-307 & 309 using java & .net	80	20	35	3hrs

Syllabus of BCA I and II semester effective from 2012-13

BCA-101 : COMPUTER & PROGRAMMING FUNDAMENTALS

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. 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: Generations of Computers, Definition, Block Diagram along with its components, characteristics & classification of computers, Limitations of Computers, Human-Being VS Computer, Applications of computers in various fields.

Memory: Concept of primary & secondary memory, RAM, ROM, types of ROM, Cache Memory, flash memory, Secondary storage devices: Sequential & direct access devices viz. magnetic tape, magnetic disk, optical disks i.e. CD, DVD, virtual memory.

UNIT-II

Computer hardware & software: I/O devices, definition of software, relationship between hardware and software, types of software.

Overview of operating system: Definition, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.

Computer Virus: Definition, types of viruses, Characteristics of viruses, anti-virus software.

UNIT-III

Computer Languages: Analogy with natural language, machine language, assembly language, high-level languages, forth generation languages, compiler, interpreter, assembler, Linker, Loader, characteristics of a good programming language, Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming, Advantages and disadvantages of Structured programming.

UNIT-IV

Overview of Networking: An introduction to computer networking, Network types (LAN, WAN, MAN), Network topologies, Modes of data transmission, Forms of data transmission, Transmission channels(media), Introduction to internet and its uses, Applications of internet, Hardware and Software requirements for internet, Intranet, Applications of intranet.

SUGGESTED READINGS

1. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
2. Balagurusamy E, Computing Fundamentals and C Programming, Tata McGraw Hill.
3. Norton, Peter, Introduction to Computer, McGraw-Hill
4. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
5. Rajaraman, V., Fundamentals of Computers, PHI
6. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.
7. Chhillar, Rajender Singh: Application of IT to Business, Ramesh Publishers, Jaipur.

8. Gill, Nasib Singh: Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi

Note: Latest and additional good books may be suggested and added from time to time.

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. 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

MS-Windows: Operating system-Definition & functions, basics of Windows. Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance. Using windows accessories.

UNIT - II

Documentation Using MS-Word - Introduction to word processing interface, Toolbars, Menus, Creating & Editing Document, Formatting Document, Finding and replacing text, Format painter, Header and footer, Drop cap, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Previewing and printing document, Advance Features of MS-Word-Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

UNIT - III

Electronic Spread Sheet using MS-Excel - Introduction to MS-Excel, Cell, cell address, Creating & Editing Worksheet, Formatting and Essential Operations, Moving and copying data in excel, Header and footer, Formulas and Functions, Charts, Cell referencing, Page setup, Macros, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation, Database Management using Excel-Sorting, Filtering, Validation, What if analysis with Goal Seek, Conditional formatting.

UNIT - IV

Presentation using MS-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.

SUGGESTED READINGS

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

Note: Latest and additional good books may be suggested and added from time to time.

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. 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

SETS: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

DETERMINANTS: Definition, Minors, Cofactors, Properties of Determinants, Applications of determinants in finding area of triangle, Solving a system of linear equations.

MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, solving system of linear equation Cramer's Rule.

UNIT II

RELATIONS AND FUNCTIONS: Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions.

LIMITS & CONTINUITY: Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity of a function at a Point, Continuity Over an Interval, Sum, product and quotient of continuous functions, Intermediate Value Theorem, Type of Discontinuities.

UNIT III

DIFFERENTIATION: Derivative of a function, Derivatives of Sum, Differences, Product & Quotient of functions, Derivatives of polynomial, trigonometric, exponential, logarithmic, inverse trigonometric and implicit functions, Logarithmic Differentiation, Chain Rule and differentiation by substitution.

UNIT IV

INTEGRATION: Indefinite Integrals, Methods of Integration by Substitution, By Parts, Partial Fractions, Integration of Algebraic and Transcendental Functions, Reduction Formulae for simple and Trigonometric Functions, Definite Integral as Limit of Sum, Fundamental Theorem of Integral Calculus, Evaluation of definite integrals by substitution, using properties of definite integral,

SUGGESTED READINGS

1. C.L.Liu: Elements of Discrete Mathematics, McGraw Hill.
2. Lipschutz, Seymour: Discrete Mathematics, Schaum's Series
3. Babu Ram: Discrete Mathematics, Vinayek Publishers, New Delhi.
4. Trembley, J.P & R. Manohar: Discrete Mathematical Structure with Application to Computer Science, TMH.
5. Kenneth H. Rosen: Discrete Mathematics and its applications, TMH.
6. Doerr Alan & Levasseur Kenneth: Applied Discrete Structures for Computer Science, Galgotia Pub. Pvt. Ltd.
7. Gersting: Mathematical Structure for Computer Science, WH Freeman & Macmillan.
8. Hopcroft J.E, Ullman J.D.: Introduction to Automata theory, Languages and Computation, Narosa Publishing House, New Delhi.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-104 : LOGICAL ORGANIZATION OF COMPUTER-I

External Marks: 80

Internal Marks: 20

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. 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

UNIT - II

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 - III

Digital Logic: Introduction to digital signals, Basic Gates – AND, OR, NOT, Universal Gates and their implementation – NAND, NOR, Other Gates – XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT implementations of digital circuits, Combinational Logic – Characteristics, Design Procedures, analysis procedures, Multilevel NAND and NOR circuits.

UNIT - IV

Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Parallel binary adder/subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven-Segment Decoder.

SUGGESTED READINGS

1. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
2. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
3. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.
4. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
5. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

Note: Latest and additional good books may be suggested and added from time to time.

BCA-105 : Practical- Software lab

(Based on paper BCA-102, PC Software)

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. 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

Overview of C: History of C, Importance of C, Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant, Structure of a C Program, printf(), scanf() Functions, Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, shorthand assignment operators, conditional operators and increment and decrement operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.

UNIT-II

Decision making & branching: Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement.

Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement, Nested loops.

UNIT-III

Functions: Standard Mathematical functions, Input/output: Unformatted & formatted I/O function in C, Input functions viz. getch(), getche(), getchar(), gets(), output functions viz., putchar(), puts(), string manipulation functions.

User defined functions: Introduction/Definition, prototype, Local and global variables, passing parameters, recursion.

UNIT-IV

Arrays, strings and pointers: Definition, types, initialization, processing an array, passing arrays to functions, Array of Strings. String constant and variables, Declaration and initialization of string, Input/output of string data, Introduction to pointers.

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

Algorithm development, Flowcharting and Development of efficient program in C.

SUGGESTED READINGS

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill
2. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
3. Balagurusamy, E., Programming in ANSI C, 4E, Tata McGraw-Hill
4. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
5. Yashwant Kanetker, Let us C, BPB.
6. Rajaraman, V., Computer Programming in C, PHI.
7. Yashwant Kanetker, Working with C, BPB.

Note: Latest and additional good books may be suggested and added from time to time.

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. 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

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

UNIT - II

Sequential Circuits: 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 - III

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

UNIT - IV

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, I/O Channels, IOP.

SUGGESTED READINGS

1. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
2. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
3. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.
4. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
5. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

Note: Latest and additional good books may be suggested and added from time to time.

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. 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

Basic Statistics: Measure of Central Tendency, Preparing frequency distribution table, Mean, Mode, Median, Measure of Dispersion: Range, Variance and Standard Deviations, Correlation and Regression.

UNIT-II

Algorithm: Algorithms, merits and demerits, Exponentiation, How to compute fast exponentiation. Linear Search, Binary Search, "Big Oh" notation, Worst case, Advantage of logarithmic algorithms over linear algorithms, complexity.

Graph Theory: Graphs, Types of graphs, degree of vertex, sub graph, isomorphic and homeomorphic graphs, Adjacent and incidence matrices, Path Circuit ; Eulerian, Hamiltonian path circuit.

UNIT-III

Tree: Trees, Minimum distance trees, Minimum weight and Minimum distance spanning trees.

Recursion: Recursively defined function.

Merge sort, Insertion sort, Bubble sort, and Decimal to Binary.

UNIT-IV

Recurrence Relations: LHRR, LHRRWCCs, DCRR. Recursive procedures.

Number Theory: Principle of Mathematical induction, GCD, Euclidean algorithm, Fibonacci numbers, congruences and equivalence relations, public key encryption schemes.

SUGGESTED READINGS

1. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, Sultan Chand and Sons, 1995.
3. Graybill, Introduction to Statistics, McGraw.
4. Anderson, Statistical Modelling, McGraw.
5. Babu Ram : Discrete Mathematics

Note: Latest and additional good books may be suggested and added from time to time.

Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. 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

Introduction to system, Definition and characteristics of a system, Elements of system, Types of system, System development life cycle, Role of system analyst, Analyst/user interface, System planning and initial investigation: Introduction, Bases for planning in system analysis, Sources of project requests, Initial investigation, Fact finding, Information gathering, information gathering tools, Fact analysis, Determination of feasibility.

UNIT-II

Structured analysis, Tools of structured analysis: DFD, Data dictionary, Flow charts, Gantt charts, decision tree, decision table, structured English, Pros and cons of each tool, Feasibility study: Introduction, Objective, Types, Steps in feasibility analysis, Feasibility report, Oral presentation, Cost and benefit analysis: Identification of costs and benefits, classification of costs and benefits, Methods of determining costs and benefits, Interpret results of analysis and take final action.

UNIT-III

System Design: System design objective, Logical and physical design, Design Methodologies, structured design, Form-Driven methodology(IPO charts), structured walkthrough, Input/Output and form design: Input design, Objectives of input design, Output design, Objectives of output design, Form design, Classification of forms, requirements of form design, Types of forms, Layout considerations, Form control.

UNIT-IV

System testing: Introduction, Objectives of testing, Test plan, testing techniques/Types of system tests, Quality assurance goals in system life cycle, System implementation, Process of implementation, System evaluation, System maintenance and its types, System documentation, Forms of documentation.

SUGGESTED READINGS

1. Systems Analysis and design BY e.m. aWAD Galgotia Pub.(P) Ltd.
2. Data Management and Data Structures by Loomis (PHI)
3. System Analysis and Design by Elias Awad.
4. Introductory System analysis and Design by Lee Vol. I & II

Note: Latest and additional good books may be suggested and added from time to time.

BCA-110: Practical- Software lab

(Based on paper BCA-106, C Programming)