BACHELOR OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION – FIRST YEAR(w.e.f. 2013-14)

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Pass Marks	Exam Duration
	Semester – I					
BCA-111	Computer and Programming Fundamentals	80	20	100	35	3hrs
BCA-112	Windows and PC Software	80	20	100	35	3hrs
BCA-113	Mathematical Foundations-I	80	20	100	35	3hrs
BCA-114	Logical Organization of Computers – I	80	20	100	35	3hrs
BCA-115	Communicative English	80	20	100	35	3hrs
BCA-116	Programming in C	80	20	100	35	3hrs
	Semester – II					
BCA-121	Advanced Programming in C	80	20	100	35	3hrs
BCA-122	Logical Organization of Computers – II	80	20	100	35	3hrs
BCA-123	Mathematical Foundations-II	80	20	100	35	3hrs
BCA-124	Office Automation Tools	80	20	100	35	3hrs
BCA-125	Structured System Analysis and Design	80	20	100	35	3hrs
BCA-126	Personality Development	80	20	100	35	3hrs
BCA-131	Lab-I Based on BCA-112 & BCA-124	100			35	3hrs
BCA-132	Lab – II Based on BCA-116 & BCA-121	100			35	3hrs

Internal assessment will be based on the following criteria:

    (I) Two Handwritten Assignments   :   10 marks
        (Ist Assignment after one month & IInd Assignment after two months)
    (II) One Class Test   :   5 marks
        (one period duration)
    (III) Attendance   :   5 marks

    Marks for Attendance will be given as under:

        (1) 91% onwards :   5 Marks
        (2) 81% to 90% :   4 Marks
        (3) 75% to 80% :   3 Marks
        (4) 70% to 75% :   2 Marks*
        (5) 65% to 70% :   1 Mark*

* For students engaged in co-curricular activities of the colleges only/authenticated medical grounds duly approved by the concerned Principal.

NOTE: 1. Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.

BACHELOR OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION – SECOND YEAR(w.e.f. 2014-15)

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Pass Marks	Exam Duration
Semester – III						
BCA-231	Object Oriented Programming Using C++	80	20	100	35	3hrs
BCA-232	Data Structures	80	20	100	35	3hrs
BCA-233	Computer Architecture	80	20	100	35	3hrs
BCA-234	Software Engineering	80	20	100	35	3hrs
BCA-235	Fundamentals of Data Base Systems	80	20	100	35	3hrs
BCA-236	Computer Oriented Numerical Methods	80	20	100	35	3hrs
Semester – IV						
BCA-241	Advanced Data Structures	80	20	100	35	3hrs
BCA-242	Advanced Programming using C++	80	20	100	35	3hrs
BCA-243	E-Commerce	80	20	100	35	3hrs
BCA-244	Relational Data Base Management System	80	20	100	35	3hrs
BCA-245	Computer Oriented Statistical Methods	80	20	100	35	3hrs
BCA-246	Management Information System	80	20	100	35	3hrs
BCA -251	Lab – I Based on BCA-231 & BCA-242	100			35	3hrs
BCA -252	Lab – II Based on BCA-232 & BCA-241	100			35	3hrs

Internal assessment will be based on the following criteria:

(I)   Two Handwritten Assignments   :   10 marks
        (Ist Assignment after one month & IInd Assignment after two months)
(II)   One Class Test   :   5 marks
        (one period duration)
(III)   Attendance   :   5 marks

Marks for Attendance will be given as under:

1.   91% onwards   :   5 Marks
2.   81% to 90%   :   4 Marks
3.   75% to 80%   :   3 Marks
4.   70% to 75%   :   2 Marks*
5.   65% to 70%   :   1 Mark*

* For students engaged in co-curricular activities of the colleges only/authenticated medical grounds duly approved by the concerned Principal.

NOTE: 1. Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.

BACHELOR OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION – THIRD YEAR(w.e.f 2015-16)

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Pass Marks	Exam Duration
Semester – V						
BCA-351	Web Designing Fundamentals	80	20	100	35	3hrs
BCA-352	Operating System-I	80	20	100	35	3hrs
BCA-353	Artificial Intelligence	80	20	100	35	3hrs
BCA-354	Computer Networks	80	20	100	35	3hrs
BCA-355	Programming Using Visual Basic	80	20	100	35	3hrs
BCA-356	Multimedia Tools	80	20	100	35	3hrs
Semester – VI						
BCA-361	Web Designing Using Advanced Tools	80	20	100	35	3hrs
BCA-362	Operating System-II	80	20	100	35	3hrs
BCA-363	Computer Graphics	80	20	100	35	3hrs
BCA-364	Internet Technologies	80	20	100	35	3hrs
BCA-365	Advanced Programming with Visual Basic	80	20	100	35	3hrs
BCA-366	Programming in Core Java	80	20	100	35	3hrs
BCA-371	Lab – I Based on BCA-351 & 361	100			35	3hrs
BCA-372	Lab – II Based on BCA-355 & 365	100			35	3hrs

Internal assessment will be based on the following criteria:

   (I)   Two Handwritten Assignments   :   10 marks
           (Ist Assignment after one month & IInd Assignment after two months)
   (II)   One Class Test   :   5 marks
           (one period duration)
   (III)   Attendance   :   5 marks

Marks for Attendance will be given as under:

1. 91% onwards :   5 Marks
2. 81% to 90%   :   4 Marks
3. 75% to 80%   :   3 Marks
4. 70% to 75%   :   2 Marks*
5. 65% to 70%   :   1 Mark*

* For students engaged in co-curricular activities of the colleges only/authenticated medical grounds duly approved by the concerned Principal.

NOTE: 1. Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.

BCA – 111 Computer and Programming Fundamentals

Maximum Marks: 100	External: 80
Minimum Pass Marks: 35	Internal: 20
Time: 3 hours	

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, Block Diagram along with its components, characteristics & classification of computers, Applications of computers in various fields.
Memory: Concept of primary & secondary memory, RAM, ROM, types of ROM, flash memory, Secondary storage devices: Sequential & direct access devices viz. magnetic tape, magnetic disk, CD, DVD.

UNIT-II

Computer hardware & software: I/O devices, relationship between hardware and software, types of software, Operating system: Definition, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.

UNIT-III

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, pseudo code, decision table, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.
Computer Virus, WORMS, Trojan,

UNIT-IV

Searching, Sorting, and Merging: Linear & Binary Searching, Bubble, Selection, and Insertion Sorting, Merging, Design of algorithms for searching, sorting and merging. Computer Languages: Analogy with natural language, machine language, assembly language, high-level language, language translators, characteristics of a good programming language.

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

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

BCA-112   Windows and PC Software

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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 : Introduction to Windows and its Features, Hardware Requirements of Windows. Windows Concepts, Windows Structure, Desktop, Taskbar, Start Menu, My Pictures, My Music, My Documents, Recycle Bin. Managing Files, Folders and Disk .
My Computer, Windows Explorer and its Facilities, Using CD, DVD, Pen Drive, Burning CD. Windows Accessories. Entertainment- Media Players, Sound Recorder, Volume Control.

UNIT–II

ADVANCED FEATURES OF WINDOWS:
Managing Hardware & Software - Installation of Hardware & Software, Using Scanner, Web Camera, Printers. System Tools - Backup, Character Map, Clipboard Viewer, Disk Defragmenter, Drive Space, Scandisk, System Information, System Monitor, Disk Cleanup, Using Windows Update. Browsing the Web with Internet Explorer, Multiple User Features of Windows, Creating and Deleting User, Changing User Password, etc.
Accessibility Features of Windows - Sharing Folders and Drives, Browsing the Entire Network, Using Shared Printers. Control Panel & its components

UNIT–III

WORKING WITH SPREAD SHEET:
Introduction and area of use, Working with Excel, Toolbars, Menus and Keyboard Shortcuts, concepts of Workbook & Worksheets, Using Wizards, Various Data Types, Using different features with Data, Cell and Texts, Inserting, Removing & Resizing of Columns & Rows, Working with Data & Ranges, Different Views of Worksheets, Column Freezing, Labels, Hiding, Splitting etc., Using different features with Data and Text, Cell Formatting including Borders & Shading.

UNIT–IV

ADVANCED FEATURES OF EXCEL:
Multiple Worksheets: Concept, Creating and Using Multiple Worksheets; Use of Formulas, Calculations & Functions, Various types of Functions, Cell Referencing, Absolute and Relative Addressing, Working with Different Chart Types, Chart Wizard, Printing of Workbook & Worksheets with various options, Database: Creation, Sorting, Query and Filtering a Database; Creating and Using Macros; Pivot table & Pivot chart

TEXT BOOKS
1. Microsoft Office – Complete Reference – BPB Publication

2. Learn Microsoft Office – Russell A. Stultz – BPB Publication

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

BCA – 113   Mathematical Foundations – I

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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)

UNIT- II

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- III

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

UNIT- IV

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,

REFERENCE BOOKS
1.   D.A. Murray: Introductory course in differential equations, Orient Lengaman(India).
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-114   Logical Organization of Computers-I

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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.

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

UNIT - IV

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

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-114   Logical Organization of Computers-I

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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.

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

UNIT - IV

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

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-115   Communicative English

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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.
2. English in Situations by R. O. Neil (OUP)

BCA-116   Programming in C

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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

Overview of C: History of C, Importance of C, Structure of a C Program.
Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant.
Input/output: Unformatted & formatted I/O function in C, Input functions (scanf(), getch(), getche(), getchar(), gets()), Output functions (printf(), putch(), putchar(), puts()).

UNIT-II

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

UNIT-III

Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement. Functions: Definition, prototype, passing parameters, recursion.

UNIT-IV

Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime. Arrays: Definition, types, initialization, processing an array, passing arrays to functions, Strings & arrays.

TEXT BOOKS
1.   Gottfried, Byron S., Programming with C, Tata McGraw Hill
2.   Balagurusamy, E., Programming in ANSI C, Tata McGraw-Hill

REFERENCE BOOKS
1. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
2. Yashwant Kanetker, Let us C, BPB.
3. Rajaraman, V., Computer Programming in C, PHI.
4. Yashwant Kanetker, Working with C, BPB.

BCA – 121 Advanced Programming in C

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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

Strings in 'C': Introduction, Declaration and initialization of string, String I/O, Array of strings, String manipulation functions: String length, copy, compare, concatenate, search for a substring.
Structure and Union: Introduction, Features of structures, Declaration and initialization of structures, Structure within structure, Array of structures, Structure and functions. Union: Introduction, Union of structures. Typedef, Enumerations.

UNIT – II

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

UNIT – III

Files: Introduction, File types, File operations, File I/O, Structure Read and write in a file, Errors in file handling, Random-access I/O in files.

UNIT – IV

Preprocessor: Introduction, #define, macros, macro versus functions, #include, Conditional compilation directives, undefining a macro. Command line arguments: defining and using command line arguments.

TEXT BOOKS
1. Yashwant Kanetker, "Let us C", BPB publications.
2. Balagurusamy, E., "Programming in ANSI C", Tata McGraw-Hill

REFERENCE BOOKS
1. Jeri R. Hanly & Elliot P. Koffman, "Problem Solving and Program Design in C", Addison Wesley.
2. Gottfried, Byron S., "Programming with C", Tata McGraw Hill
3. Behrouz A. Forouzan & Richard F. Gilberg, "Computer Science: A structured programming approach using C", Cengage Learning
4. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education.
5. Herbert Schildt, "The Complete Reference: C", Tata-McGraw-Hill.

BCA-122 Logical Organization of Computers – II

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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

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

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 – 123   Mathematical Foundations - II

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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

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

UNIT- II

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- III

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

UNIT- IV

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 –Hermitan matrices, Diagonalization of a square matrix.

REFERENCE BOOKS
1. Babu Ram : Discrete Mathematics
2. Shanti Naryana : A text book of matrices
3. Alan Doerr And Kenneth Levaseur, Applied Discrete Structures For Computer Science, Galgotia Publications Pvt. Ltd., New Delhi.
4. Seymour Lipschutz And Marc Lars Lipson, Discrete Mathematics", Mcgrraw- Hill International Editions, Schaum's Series, New York.

BCA 124 Office Automation Tools

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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

Desktop Publishing: Concept, Need and Applications; Hardware and Software requirements for DTP, An Overview and comparison between DTP packages, Common features of DTP. Introduction to Page Maker: Features, System Requirements, Components of Page Maker Window, Introduction to Menu and Toolbars, PageMaker Preferences

UNIT – II

Creating of Publications: Starting PageMaker, Setting Page size, Placing the text Formatting the text: Character Specification Paragraph setting: Paragraph Specification, Paragraph Rules, Spacing, Indents/Tabs, Define Styles, Hyphenation, Header & Footer, Page Numbering, Saving and Closing publication.
Editing Publication: Open a publication ,Story editor, Find and change the text, Change character and Paragraph attributes ,spell checking ,Selecting text, Cut, Copy, Paste, Paste multiple, Working with columns

UNIT – III

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

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. PageMaker-Complete by R. Shamms, Mortier &Rick Wallacl ,Techmedia
2. Learning PageMaker 7 by Ramesh Bangia of Khanna Book Publishing Co Pvt Ltd

3. Microsoft Office – Complete Reference – BPB Publication
4. Learn Microsoft Office – Russell A. Stultz – BPB Publication

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

BCA – 125 Structured System Analysis and Design

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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

System Concept: Definition, Characteristics, Elements of system, Physical and abstract system, open and closed system, man-made information systems.
System Development Life Cycle: Various phases of system development, Considerations for system planning and control for system success.
Role of system analyst.

UNIT – II

System Planning: Bases for planning in system analysis: Dimensions of Planning.
Initial Investigation: Determining user's requirements and analysis, fact finding process and techniques.
Tools of structured Analysis: Data Flow diagram, data dictionary, IPO and HIPO charts, Gantt charts, pseudo codes, Flow charts, decision tree, decision tables.
Feasibility study: Technical, Operational & Economic Feasibilities.

UNIT – III

Cost/Benefit Analysis: Data analysis cost and benefit analysis of a system.
Input/ Output and Form Design, File Organization and database design: Introduction to files and database, File structures and organization, objectives of database design, logical and physical view of data.

UNIT – IV

System testing: Introduction, objectives of testing, test planning, testing techniques.
Quality assurance: Goal of quality assurance, levels of quality assurance
System implementation and software maintenance: primary activities in maintenance, reducing maintenance costs.

TEXT BOOKS:
1. Awad M. Elias, "System Analysis and Design", Galgotia Publication.

REFERENCE BOOKS:
1. Igor Hawryszkiewyez, "Introduction to System Analysis and Design", Prentice-Hall.
2. Jeffrey L. Whitten, and Lonnie D. Bentey, "Systems analysis and Design Methods", Tata McGraw-Hill.
3. Mark Lejk, and David Deeks, "An Introduction to System Analysis Techniques", Prentice Hall.

BCA- 126 Personality Development

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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

Personality & Personal Grooming – A Brief Introduction to Personality and self-concept, Element of Personality, Determinants of Personality, Causes of deranged Personality, Personality Analysis.
Grooming, Personal hygiene, Social, Business and Dining Etiquettes, Body language use and misuse, Art of good Conversation, Art of Intelligent Listening.

UNIT- II

Interpersonal Skills & Role playing: Dealing with seniors, colleagues, juniors, customers, suppliers, contract workers, owners etc at work place

UNIT- III

Group Discussion & Presentation skills: Team behavior, how to effectively conduct yourself during GD, do's and don'ts, clarity of thoughts and its expression
Presentation skills & seminar skills

UNIT- IV

Interviews Preparation: Intent and purpose, selection procedure, types of interviews, Self planning, writing winning resume, knowledge of company profiles, academics and professional knowledge review, update on current affairs and possible questions, time – keeping, grooming, dress code, document portfolio, frequently asked questions and their appropriate answers, self – introduction, panel addressing, mental frame – work during interviews

REFERENCE BOOKS
(1) Personal management and Human Resources, by C.S. Venkata Ratanam and B.K. Srivastava, Published by Tata McGraw Hill Publishing Ltd. New Delhi
(2) Human Behaviour at Work, by: Keith Davis, Tata McGraw Hill Pub. Ltd. N. Delhi
(3) Im OK, You re OK, by : Thomas A. Harris, Publsihed By : Pan Books, London and Sydney
(4) Pleasure of your Company, by : Ranjana Salgaocar, Published By : Pyramid Publishers, Goa
(5) How to get the job you want, by : Arun Agarwal, Published By : Vision Books, New Delhi
(6) Get That Job, Rohit Anand & Sanjeev Bikhachandani, Harper Collins

BACHELOR OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION – SECOND YEAR(W.E.F. 2014-15)

Paper No.	Title of Paper	External marks	Internal Assessment	Maximum Marks	Pass marks	Exam Duration
Semester – III						
BCA-231	Object Oriented Programming Using C++	80	20	100	35	3hrs
BCA-232	Data Structures	80	20	100	35	3hrs
BCA-233	Computer Architecture	80	20	100	35	3hrs
BCA-234	Software Engineering	80	20	100	35	3hrs
BCA-235	Fundamentals of Data Base Systems	80	20	100	35	3hrs
BCA-236	Computer Oriented Numerical Methods	80	20	100	35	3hrs
Semester – IV						
BCA-241	Advanced Data Structures	80	20	100	35	3hrs
BCA-242	Advanced Programming using C++	80	20	100	35	3hrs
BCA-243	E-Commerce	80	20	100	35	3hrs
BCA-244	Relational Data Base Management System	80	20	100	35	3hrs
BCA-245	Computer Oriented Statistical Methods	80	20	100	35	3hrs
BCA-246	Management Information System	80	20	100	35	3hrs
BCA-251	Lab – I Based on BCA-231 & BCA- 242	100			35	3hrs
BCA-252	Lab – II Based on BCA-232 & BCA- 241	100			35	3hrs

INTERNAL ASSESSMENT WILL BE BASED ON THE FOLLOWING CRITERIA:
(I) TWO HANDWRITTEN ASSIGNMENTS   : 10 MARKS
(IST ASSIGNMENT AFTER ONE MONTH & IIND ASSIGNMENT AFTER TWO MONTHS)
(II) ONE CLASS TEST   : 5 MARKS
(ONE PERIOD DURATION)
(III) ATTENDANCE   : 5 MARKS

MARKS FOR ATTENDANCE WILL BE GIVEN AS UNDER:
1. 91% ONWARDS   : 5 MARKS
2. 81% TO 90%   : 4 MARKS
3. 75% TO 80%   : 3 MARKS
4. 70% TO 75%   : 2 MARKS*
5. 65% TO 70%   : 1 MARK*

* FOR STUDENTS ENGAGED IN CO-CURRICULAR ACTIVITIES OF THE COLLEGES ONLY/AUTHENTICATED MEDICAL GROUNDS DULY APPROVED BY THE CONCERNED PRINCIPAL.
NOTE: 1. PRACTICAL EXAM WILL BE CONDUCTED ANNUALLY IN TWO SESSIONS. HOWEVER THE WORKLOAD WILL BE DISTRIBUTED IN BOTH THE SEMESTERS ACCORDING TO THE RELEVANT PAPERS.

BCA – 231 OBJECT ORIENTED PROGRAMMING USING 'C++'

Maximum Marks: 100   **External: 80**

Minimum Pass Marks: 35   **Internal: 20**

Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT - I
Object oriented Programming: Object-Oriented programming features and benefits. Object-Oriented features of C++, Class and Objects, Data Hiding & Encapsulation, Structures, Data members and Member functions, Scope resolution operator and its significance, Static Data Members, Static member functions, Nested and Local Class, Accessing Members of Class and Structure.

UNIT - II
Constructor, Initialization using constructor, types of constructor– Default, Parameterized & Copy Constructors, Constructor overloading, Default Values to Parameters, Destructors, Console I/O: Hierarchy of Console Stream Classes, Unformatted and Formatted I/O Operations.

UNIT - III
Manipulators, Friend Function, Friend Class, Arrays, Array of Objects, Passing and Returning Objects to Functions, String Handling in C++, Dynamic Memory Management: Pointers, new and delete Operator, Array of Pointers to Objects, this Pointer, Passing Parameters to Functions by Reference & pointers.

UNIT - IV
Polymorphism: Operators in C++, Precedence and Associativity Rules, Operator Overloading, Unary & Binary Operators Overloading, Function Overloading, Inline Functions

TEXT BOOKS:
1.   Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill
2.   Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

REFERENCE BOOKS:
1. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
2. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill.

BCA – 232 DATA STRUCTURES

Maximum Marks: 100   **External:**
80
Minimum Pass Marks: 35   **Internal:**
20
Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notation.
Strings: Introduction, String strings, String operations, Pattern matching algorithms.

UNIT – II

Arrays: Introduction, Linear arrays, Representation of linear array in memory, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, Sparce matrics.
Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Garbage collection, Applications of linked lists. Algorithms for Insertion, deletion in array, Single linked list

UNIT – III

Stack: Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.
Queues: Introduction, Array and linked representation of queues, Operations on queues, Deques, Priority Queues, Applications of queues.

UNIT – IV

Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks and using recursion.
Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs.

TEXT BOOKS

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill

2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", University Press

REFERENCE BOOKS:

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw- Hill International Student Edition, New York.
2. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.
3. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice- Hall of India Pvt. Ltd., New Delhi.

BCA – 233 COMPUTER ARCHITECTURE

Maximum Marks: 100   External: 80

Minimum Pass Marks: 35   Internal: 20

Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT -I

Basic Computer Organisation and Design: Instruction Codes, Computer registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory reference instructions, Input-Output and Interrupt, Design of Basic computer, Design of accumulator logic

UNIT -II

Register Transfer and Microoperations: Register Transfer Language (RTL), register transfer, Bus and Memory Transfers, Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit, Microprogrammed Control: Control memory; address sequencing, microprogram sequencer, Design of Control Unit

UNIT -III

Central Processing Unit: General registers Organization, Stack Organization, Instruction formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Program Interrupt, RISC, CISC.

UNIT -IV

Memory Organization: Memory hierarchy, Auxiliary Memory, Associative Memory, Interleaved memory, Cache memory, Virtual Memory, Memory Management Hardware, Input Output Organization : Peripheral devices , Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access(DMA),Input-Output Processor(IOP).

TEXT BOOKS

1. Computer System Architecture By. Moris Mano, Pearson Education
2. Computer Architecture and Organization By J.P. Hayes, Tata McGraw Hill

REFERENCE BOOKS:

1. W. Stallings, Computer Organisation and Architecture, 4th Edition, Pearson Education
2. Harry, Jordan, Computer Systems Design & Architecture, Edition, Addison Wesley
3. J.D. Carpinelli, Computer Systems Organization & Architecture, Addison Wesley.
4. P.V.S. Rao, "Computer System Architecture", PHI, 2009

BCA – 234   SOFTWARE ENGINEERING

Maximum Marks: 100   **External:**
80
Minimum Pass Marks: 35   **Internal:**
20
Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I
Introduction: Program vs. Software, Software Engineering, Programming paradigms, Software Crisis – problem and causes, Phases in Software development: Requirement Analysis, Software Design, Coding, Testing, Maintenance, Software Development Process Models: Waterfall, Prototype, Evolutionary and Spiral models, Role of Metrics.

UNIT – II
Feasibility Study, Software Requirement Analysis and Specifications: SRS, Need for SRS, Characteristics of an SRS, Components of an SRS, Problem Analysis, Information gathering tools, Organizing and structuring information, Requirement specification, validation and Verification.. SCM

UNIT – III
Structured Analysis and Tools: Data Flow Diagram, Data Dictionary, Decision table, Decision tress, Structured English, Entity-Relationship diagrams, Cohesion and Coupling.
Gantt chart, PERT Chart, Software Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.
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UNIT – IV
Software Project Planning: Cost estimation: COCOMO model, Project scheduling, Staffing and personnel planning, team structure, Software configuration management, Quality assurance plans, Project monitoring plans, Risk Management. Software testing strategies: unit testing, integration testing, Validation testing, System testing, Alpha and Beta testing.

TEXT BOOKS:
1. Pressman R. S., "Software Engineering – A Practitioner's Approach", Tata McGraw Hill.
2. Jalote P., "An Integrated approach to Software Engineering", Narosa.

REFERENCE BOOKS:
1. Sommerville, "Software Engineering", Addison Wesley.

2. Fairley R., "Software Engineering Concepts", Tata McGraw Hill.
3. James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons.

BCA – 235 FUNDAMENTALS OF DATABASE SYSTEM

Maximum Marks: 100   **External: 80**

Minimum Pass Marks: 35   **Internal: 20**

Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT - I

Basic Concepts – Data, Information, Records and files. Traditional file – based Systems-File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, Advantages and Disadvantages of DBMS, Roles in the Database Environment - Data and Database Administrator, Database Designers, Applications Developers and Users.

UNIT - II

Database System Architecture – Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances, Data Independence – Logical and Physical Data Independence, Classification of Database Management System, Centralized and Client Server architecture to DBMS.

UNIT - III

Data Models: Records- based Data Models, Object-based Data Models, Physical Data   Models and Conceptual Modeling, Entity-Relationship Model – Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams.

UNIT - IV

Relational Data Model:-Brief History, Terminology in Relational Data Structure, Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations, Base Tables and Views, Basic Concepts of Hierarchical and Network Data Model.

TEXT BOOKS:
1. Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson   Education.

REFERENCE BOOKS:
1. Thomas Connolly Carolyn Begg, "Database Systems", 3/e, Pearson Education
2. C. J. Date, "An Introduction to Database Systems", 8th edition, Addison Wesley N. Delhi.

BCA- 236   COMPUTER-ORIENTED NUMERICAL METHODS

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

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

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. Iteration method, discussion of convergence, Bairstow's method.

UNIT-II
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, Euler modified method, Taylor-series method, Runge-Kutta methods, Predictor-Corrector methods.

UNIT-III
Interpolation and Approximation:
Polynomial interpolation: Newton, Lagranges, Difference tables, Approximation of functions by Taylor Series.
Chebyshev polynomial: First kind, Second kind and their relations, Orthogonal properties.

UNIT-IV
Numerical Differentiation and integration: Differentiation formulae based on   polynomial fit, pitfalls in differentiation, Trapezoidal & Simpson Rules, Gaussian Quadrature.

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.

BCA – 241 ADVANCED DATA STRUCTURE

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT – I
Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks, Binary search trees: introduction, storage, Searching, Insertion and deletion in a Binary search tree, Huffman's algorithm, General trees.

UNIT – II
Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs, operations on graphs, traversal algorithms in graphs and their implementation, Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path.

UNIT – III
Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort, Comparison of various sorting and searching algorithms on the basis of their complexity.

UNIT – IV
Files: Introduction Attributes of a file, Classification of files, File operations, Comparison of various types of files, File organization: Sequential, Indexed-sequential, Random-access file.
Hashing: Introduction, Collision resolution.

TEXT BOOKS
1. Seymour Lipschutz, "Data Structure using C", Tata-McGraw-Hill
2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", University Press

REFERENCE BOOKS
1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw- Hill International Student Edition, New York.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.

BCA - 242 Advanced PROGRAMMING USING C++

Maximum Marks: 100   **External: 80**

Minimum Pass Marks: 35   **Internal: 20**

Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT - I

Dynamic Polymorphism: Function Overriding, Virtual Function and its Need, Pure Virtual Function, Abstract Class, Virtual Derivation, Virtual Destructor.

UNIT - II

Type Conversion: Basic Type Conversion, Conversion between objects and basic types, Conversion between objects of different classes, Inheritance: Rules of Derivations – Private, Protected and Public Derivations.

UNIT - III

Different Forms of Inheritance – Single, Multiple, Multilevel, Hierarchical and Multipath Inheritance Roles of Constructors and Destructors in Inheritance, Genericity in C++: Templates in C++, Function templates.

UNIT - IV

Class templates in C++, Exception Handling in C++: try, throw and catch, Files I/O in C++: Class Hierarchy for Files I/O, Text versus Binary Files, Opening and Closing Files, File Pointers, Operation on files.

TEXT BOOKS:
1. Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

REFERENCE BOOKS:
1. Bjarne Stroustrup, The C++ Programming Language, Pearson Education
2. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill

BCA-243 E-Commerce

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

Unit-I

Introduction to E-Commerce:-Business operations; E-commerce practices vs. traditional business practices; concepts of b2b, b2c,c2c,b2g,g2h,g2c; Features of E-Commerce, Types of Ecommerce Systems, Elements of E-Commerce, principles of E-Commerce, Benefits and Limitations of E-Commerce.

Management Issues relating to e-commerce. Operations of E-commerce: Credit card transaction; Secure Hypertext Transfer Protocol (SHTP); Electronic payment systems; Secure electronic transaction (SET); SET`s encryption; Process; Cybercash; Smart cards; Indian payment models.

Unit-II

Applications in governance: EDI in governance; E-government; E-Governance applications of Internet; concept of government –to- business, business-to-government and citizen-to-government; E-governance models; Private sector interface in E-governance. Applications in B2C: Consumers shopping procedure on the Internet; Impact on disinter mediation and re-intermediation; Global market; Strategy of traditional department stores.

Unit-III

Products in b2c model; success factors of e-brokers; Broker-based services on-line; On-line travel tourism services; Benefits and impact of e-commerce on travel industry; Deal estate market; online stock trading and its benefits; Online banking and its benefits; On-line financial services and their future; E-auctions – benefits, implementation and impact.

Unit-IV

Applications in B2B: Key technologies for b2b; architectural models of b2b, characteristics of the supplier –oriented marketplace, buyer-oriented marketplace and intermediary-oriented marketplace; Just In Time delivery in b2b; Internet-based EDI from traditional EDI; Marketing Issues in b2b.

Emerging Business models: Retail model; Media model; advisory model, made-to-order manufacturing model; Do-it- yourself model; Information service model; Emerging hybrid

models; Emerging models in India, Internet & E-Commerce scenario in India; Internet security Issues; Legal aspects of E-commerce

TEXT BOOKS:
1. Turban E,. Lee J., King D. and Chung H.M: "Electronic commerce-a Managerial Perspective", Prentice-Hall International, Inc.
2. Bhatia V., "E-commerce", Khanna Book Pub. Co.(P) Ltd., Delhi.

BCA – 244 RELATIONAL DATABASE MANAGEMENT SYSTEM

Maximum Marks: 100   **External: 80**

Minimum Pass Marks: 35   **Internal: 20**

Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT - I

Relational Model Concepts, Codd's Rules for Relational Model, Relational Algebra:-Selection and Projection, Set Operation, Renaming, Join and Division, Relational Calculus: Tuple Relational Calculus and Domain Relational Calculus.

UNIT - II

Functional Dependencies and Normalization:-Purpose, Data Redundancy and Update Anomalies, Functional Dependencies:-Full Functional Dependencies and Transitive Functional Dependencies, Characteristics of Functional Dependencies, Decomposition and Normal Forms (1NF, 2NF, 3NF & BCNF).

UNIT - III

SQL: Data Definition and data types, SQL Operators, Specifying Constraints in SQL, Basic DDL, DML and DCL commands in SQL, Simple Queries, Nested Queries, Tables, Views, Indexes, Aggregate Functions, Clauses

UNIT - IV

PL/SQL architecture, PL/SQL and SQL*Plus, PL/SQL Basics, Advantages of PL/SQL, The Generic PL/SQL Block: PL/SQL Execution Environment, PL/SQL Character set and Data Types, Control Structure in PL/SQL, Cursors in PL/SQL, Triggers in PL/SQL, Programming using PL/SQL.

TEXT BOOKS:

1.   Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson   Education.
2.   Ivan Bayross, "SQL, PL/SQL-The Programming Language of ORACLE", BPB Publications 3rd edition.

REFERENCE BOOKS:

1. C. J. Date, "An Introduction to Database Systems", 8th edition, Addison Wesley N. Delhi.
2. Oracle 8 –PL/SQL programming –Scott Urman
3. A Guide to the SQL Standard, Data,C. and Darwen, H.3rd Edition, Reading, MA:1994, Addison-Wesley Publications, New Delhi.

BCA – 245 COMPUTER-ORIENTED STATISTICAL METHODS

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours
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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT-I
Basic Statistics: Preparing Frequency Distribution Table and Cumulative frequency, Measure of Central Tendency, Types: Arithmetic mean, Geometric Mean, Harmonic Mean, Median, Mode.
Measure of Dispersion: Range, Quartile Deviation, mean deviation, Coefficient of mean Deviation, Standard Deviation
Moments : Moments About mean, Moments about any point, Moment about origin, Moment about mean in terms of moment about any point, Moment about any point in terms of Moment about mean.

UNIT-II
Probability Distribution: Random Variable- Discrete Random and Continuous Random variable, Probability Distribution of a Random Variable, Mathematical Expectation
Types: Binomial, Poisson, Normal Distribution, Mean and Variance of Binomial, Poisson, and Normal Distribution.
Correlation: Introduction, Types, Properties, Methods of Correlation: Karl Pearson's Coefficient of Correlation, Rank Correlation and Concurrent Deviation method, Probable error.

UNIT-III
Regression: Introduction, Aim of Regression Analysis, Types of Regression Analysis, Lines of Regression, Properties of Regression Coefficient and Regression Lines, Comparison with Correlation.
Curve Fitting: Straight Line, Parabolic curve, Geometric Curve and Exponential Curve
Baye's Theorem in Decision Making, Forecasting Techniques

UNIT-IV
Sample introduction, Sampling: Meaning, methods of Sampling, Statistical Inference: Test of Hypothesis, Types of hypothesis, Procedure of hypothesis Testing, Type I and Type II error, One Tailed and two tailed Test, Types of test of Significance: Test of significance for Attribute-Test of No. of success and test of proportion of success, Test of significance for large samples - Test of significance for single mean and Difference of mean, Test of significance for small samples (t-test) – test the significance between the mean of a random sample, between the mean of two independent samples

Chi square Test, ANOVA: Meaning, Assumptions, One way classification, ANOVA Table for One-Way Classified Data

REFERENCE BOOKS

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.

BCA – 246   MANAGEMENT INFORMATION SYSTEM

Maximum Marks: 100   **External: 80**

Minimum Pass Marks: 35   **Internal: 20**

Time: 3 hours

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. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks.

UNIT - I

Introduction to system and Basic System Concepts, Types of Systems, The Systems Approach, Information System: Definition & Characteristics, Types of information, Role of Information in Decision-Making, Sub-Systems of an Information system: EDP and MIS management levels, EDP/MIS/DSS.

UNIT -II

An overview of Management Information System: Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS: Information requirements & Levels of Management, Simon's Model of decision-Making, Structured Vs Un-structured decisions, Formal vs. Informal systems.

UNIT - III

Developing Information Systems: Analysis & Design of Information Systems: Implementation & Evaluation, Pitfalls in MIS Development.

UNIT - IV

Functional MIS: A Study of Personnel, Financial and production MIS, Introduction to e-business systems, ecommerce – technologies, applications, Decision support systems – support systems for planning, control and decision-making

TEXT BOOK:
1. J. Kanter, "Management/Information Systems", PHI.
2. Gordon B. Davis, M. H. Olson, "Management Information Systems – Conceptual foundations, structure and Development", McGraw Hill.

REFERENCE BOOK:
1. James A. O'Brien, "Management Information Systems", Tata McGraw-Hill.
2. James A. Senn, "Analysis & Design of Information Systems", Second edition, McGraw Hill.
3. Robert G. Murdick & Joel E. Ross & James R. Claggett, "Information Systems for Modern Management", PHI.
4. Lucas, "Analysis, Design & Implementation of Information System", McGraw Hill.

BACHELOR OF COMPUTER APPLICATIONS
SCHEME OF EXAMINATION – THIRD YEAR(w.e.f 2015-16)

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Pass Marks	Exam Duration
	Semester – V					
BCA-351	Web Designing Fundamentals	80	20	100	35	3hrs
BCA-352	Operating System-I	80	20	100	35	3hrs
BCA-353	Artificial Intelligence	80	20	100	35	3hrs
BCA-354	Computer Networks	80	20	100	35	3hrs
BCA-355	Programming Using Visual Basic	80	20	100	35	3hrs
BCA-356	Multimedia Tools	80	20	100	35	3hrs
	Semester – VI					
BCA-361	Web Designing Using Advanced Tools	80	20	100	35	3hrs
BCA-362	Operating System-II	80	20	100	35	3hrs
BCA-363	Computer Graphics	80	20	100	35	3hrs
BCA-364	Internet Technologies	80	20	100	35	3hrs
BCA-365	Advanced Programming with Visual Basic	80	20	100	35	3hrs
BCA-366	Programming in Core Java	80	20	100	35	3hrs
BCA-371	Lab – I Based on BCA-351 & 361	100			35	3hrs
BCA 372	Lab II Based on BCA 355 & 365	100			35	3hrs

Internal assessment will be based on the following criteria:

(I)	Two Handwritten Assignments	:	10 marks
	(Ist Assignment after one month & IInd Assignment after two months)		
(II)	One Class Test	:	5 marks
	(one period duration)		
(III)	Attendance	:	5 marks

Marks for Attendance will be given as under:

1. 91% onwards   :   5 Marks
2. 81% to 90%   :   4 Marks
3. 75% to 80%   :   3 Marks
4. 70% to 75%   :   2 Marks*
5. 65% to 70%   :   1 Mark*

* For students engaged in co-curricular activities of the colleges only/authenticated medical grounds duly approved by the concerned Principal.

NOTE: 1. Practical exam will be conducted annually in two sessions. However the workload will be distributed in both the semesters according to the relevant papers.

BCA-351: Web Designing Fundamentals

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Introduction to Internet and World Wide Web; Evolution and History of World Wide Web; Basic Features; Web Browsers; Web Servers; Hypertext Transfer Protocol; URLs; Searching and Web-Casting Techniques; Search Engines and Search Tools

UNIT – II

Steps for Developing Website; Choosing the Contents; Home Page; Domain Names; Internet Service Provider; Planning and Designing Web Site; Creating a Website; Web Publishing: Hosting Site;

UNIT-III

Introduction to HTML; Hypertext and HTML; HTML Document Features;
HTML Tags; Header, Title, Body, Paragraph, Ordered/Unordered Line, Creating Links; Headers; Text Styles; Text Structuring; Text Colors and Background; Formatting Text; Page layouts; Insertion of Text, Movement of Text

UNIT – IV

Images: Types of Images, Insertion of Image, Movement of Image, Ordered and Unordered lists; Inserting Graphics; Table Handling Functions like Columns, Rows, Width, Colours; Frame Creation and Layouts; Working with Forms and Menus; Working with Buttons like Radio, Check Box;

TEXT BOOKS:
- Bayross Ivan, "Web Enabled Commercial Applications Development using HTML, Javascript, DHTML & PHP", BPB Publication, 2005
- Powell Thomas, "The Complete Reference HTML & CSS", Tat Mc-Graw Hill, 2010

REFERENCE BOOKS:
- Wendy Willard, "HTML Beginners Guide", Tata McGraw-Hill
- Deitel and Goldberg, "Internet and World Wide Web, How to Program", PHI.

BCA-352: Operating System-I

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Operating System: Definition, Characteristics, Components, Functions, Examples; Types of Operating System: Single User/Multi User, Classification of Operating System: Batch, Multiprogrammed, Timesharing, Multiprocessing, Parallel, Distributed, Real Time; System Calls and System Programs: Process Control, File Manipulation, Device Manipulation, Information Maintenance, Communications

UNIT – II

Process Management: Process concept, Process states and Process Control Block; Process Scheduling: Scheduling Queues, Schedulers, Context Switch; Operation on Processes: Process Creation, Process Termination; Cooperating Processes, Introduction to Threads, Inter-process Communication; CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Priority, Round-Robin, Multilevel Queue, Multilevel Feedback Queue Scheduling

UNIT – III

Deadlocks: System Model, Deadlock Characterization, Methods of Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery

Memory Management: Introduction, Swapping, Contiguous Allocation: Single-Partition/Multiple Partition Allocation, External/Internal Fragmentation; Paging: Basic Method, Hardware, Implementation of Page table; Segmentation: Basic Method, Hardware, Implementation of Segment Table, Advantages/Disadvantages of Paging/Segmentation

UNIT – IV

Virtual Memory: Introduction, Demand Paging, Page Replacement, Page Replacement Algorithms: FIFO, Optimal, LRU, Counting; Thrashing and its cause; File Management: File Concepts, File Attributes, File Operations, File Types, File Access/Allocation Methods, File Protection, File Recovery

TEXT BOOKS:

- Silberschatz A., Galvin P.B.,and Gagne G., "Operating System Concepts", John Wiley & Sons, Inc.,New York.
- Godbole, A.S., "Operating Systems", Tata McGraw-Hill Publishing Company, New Delhi.

REFERENCE BOOKS:

- Deitel, H.M., "Operating Systems", Addison- Wesley Publishing Company, New York.
- Tanenbaum, A.S., "Operating System- Design and Implementation", Prentice Hall of India, New Delhi.

BCA-353: Artificial Intelligence

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Artificial Intelligence : Intelligence, AI Concepts, Various definitions of AI, Knowledge, Knowledge Pyramid, People and Computers: What computers can do better that people, what people can do better than computers; Characteristics of AI Problems, Problem Representation in AI, Components of AI, AI Evolution, Application Areas of AI, History of AI, The Turing Test, The Revised Turing Test

UNIT – II

Expert System: Components of Expert System: Knowledge Base, Inference Engine, User Interface, Features of Expert System, Expert System Life Cycle, Categories of Expert System, Rule Based vs. Model Based Expert Systems, Advantages/Limitations of Expert System, Developing an Expert System: Identification, Conceptualization, Formalization, Implementation, Testing, Using an Expert System, Application Areas of Expert System

UNIT-III

AI and Search Process: Brute Force Search – Depth First/Breadth First Search, Heuristic Search: Hill Climbing, Constraint Satisfaction, Mean End Analysis, Best First Search, A* Algorithm, AO* Algorithm, Beam Search.

UNIT – IV

Natural Language Processing: Introduction, Need, Goal, Fundamental Problems in Natural Language Understanding, How People overcome Natural Language Problems, Speech Recognition: Introduction, Advantages and Approaches, Introduction to Robotics: Parts of a Robot, Controlling a Robot, Intelligent Robots, Mobile Robots

TEXT BOOKS:
- Henry C.Mishkoff, "Understanding Artifical Intelligence"
- V S Janakiraman, "Foundation of Artificial Intelligence and Expert Systems"

REFERENCE BOOKS:
- Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems"

BCA-354: Computer Networks

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Introduction to Data Communication and Computer Networks; Uses of Computer Networks; Types of Computer Networks and their Topologies; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; OSI Reference Model; Networking Models: Distributed Systems, Client/Server Model, Peer-to-Peer Model, Web-Based Model and Emerging File-Sharing Model;

UNIT – II

Analog and Digital data and signals; Bandwidth and Data Rate, Capacity, Baud Rate; Transmission Impairment; Data Rate Limits; Guided Transmission Media; Wireless Transmission ; Communication Satellites; Switching and Multiplexing; Modems and Modulation techniques; ADSL and Cable Modems;

UNIT - III

Data Link Layer Design issues; Error Detection and Correction; Sliding Window Protocols: One-bit, Go Back N and Selective Repeat; Media Access Control: ALOHA, Slotted ALOHA, CSMA, Collision free protocols; Introduction to LAN technologies: Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet; Token Ring; Introduction to Wireless LANs and Bluetooth; VLANs

UNIT – IV

Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control; Traffic shaping; Choke packets; Load shedding; Elements of Transport Protocols; Network Security Issues: Security attacks; Encryption methods; Digital Signature; Digital Certificate

TEXT BOOKS:

- Andrew S. Tanenbaum, "Computer Networks", Pearson Education.
- Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", CENGAGE Learning.

REFERENCE BOOKS:

- Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.
- Bhushan Trivedi, "Computer Networks", Oxford

Maximum Marks: 100	External: 80
Minimum Pass Marks: 35	Internal: 20
Time: 3 hours	

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. All questions will carry equal marks.

UNIT – I

Introduction to VB: Visual & Non-Visual programming, Procedural, Object-Oriented, Object-Based and Event-Driven Programming Languages, VB as Even-Driven and Object-Based Language, VB Environment: Menu bar, Toolbar, Project explorer, Toolbox, Properties Window, Form Designer, Form Layout, Immediate window, Default Controls in Tool Box Visual Development and Event Driven programming

UNIT – II

Basics of Programming: Variables: Declaring Variables, Types of variables, Converting Variables Types, User Defined Data Types, Forcing Variable Declaration, Scope & Lifetime of Variables. Constants: Named & Intrinsic, Operators: Arithmetic, Relational & Logical operators, Input/output in VB: Various Controls for I/O, Message box, Input Box, Print statement.

UNIT – III

Decision Statements in VB - if statement, if-then-else, select-case; Looping Statements in VB: do-loop, for-next, while-wend; Exit statement, Nested Control Structure; Arrays: Declaring and using Arrays, One-dimensional, Two-dimensional and Multi-dimensional Arrays, Static and Dynamic arrays, Array of Arrays.

UNIT – IV

Procedures: General & Event Procedures, Subroutines, Functions, Calling Procedures, Arguments - Passing Mechanisms, Optional Arguments, Named Arguments, Functions Returning Custom Data Types
Simple Program Development in VB such as Sum of Numbers, Greatest among Numbers, Checking Even/Odd Number, HCF of Two Numbers, Generate Prime Numbers, Generate Fibonacci Series, Factorial of a Number, Searching, Sorting, etc.

TEXT BOOKS:
- Steven Holzner, "Visual Basic 6 Programming: Black Book", Dreamtech Press.
- Evangelos Petroutsos, "Mastering Visual Baisc 6", BPB Publications.
- Julia Case Bradley & Anita C. Millspaugh, "Programming in Visual Basic 6.0", Tata McGraw-Hill Edition

REFERENCE BOOKS:
- Michael Halvorson, "Step by Step Microsoft Visual Basic 6.0 Professional", PHI
- "Visual basic 6 Complete", BPB Publications.
- Scott Warner, "Teach Yourself Visual basic 6", Tata McGraw-Hill Edition
- Brian Siler and Jeff Spotts, "Using Visual Basic 6", Special Edition, PHI.

BCA-356: Multimedia Tools

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Multimedia: Basic Concept, Definition, Components & Applications of Multimedia; Hypermedia and Multimedia; Multimedia Hardware and Software; Multimedia Software Tools; Presentation Tools; Multimedia Authoring: Introduction, Features, Types of Authoring Tools: Card or Page-Based, Icon-Based, Time-Based, Object-Oriented; VRML: History, Features

UNIT – II

Images: Graphics/Image Data Types, File Formats; Color Models in Images and Video;
Video: Introduction, Types of Video Signals; Analog and Digital Video; Analog Video Standards: NTSC, PAL, SECA; Digital Video Standards: Chroma Subsampling, CCIR Standards, HDTV

UNIT – III

Digital Audio: Basic Concepts, Analog vs. Digital Audio, Digitization of Sound; Digital Audio File Formats, MIDI
Quantization and Transmission of Audio: Coding of Audio; Pulse Code Modulation; Differential Coding of Audio; Lossless Predictive Coding; DPCM; DM; ADPCM

UNIT – IV

Compression Techniques: Introduction, Types of Data Compression, Run-Length Coding, Variable-Length Coding, Dictionary-Based Coding, Transform Coding
Image and Video Compression Techniques: JPEG Standard for Image Compression; JPEG Mode, Video Compression Techniques: H.261, H.263, MPEG

TEXT BOOKS:
- Ze-Nian Li, Mark S. Drew, "Fundamentals of Multimedia", Pearson Education.
- Tay Vaughan, "Multimedia Making It Work", Tata McGraw- Hill.

REFERENCE BOOKS:
- Ramesh Bangia, "Multimedia and Web Technology", Firewall Media.
- John F. Koegel Buford, " Multimedia Systems", Addison Wesley, Pearson Education.
- Ana Weston Solomon, "Introduction to Multimedia", Tata McGraw-Hill.

BCA-361: Web Designing Using Advanced Tools

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Interactivity Tool - JavaScript: Introduction, Features, Data types, Operators, Statements, Functions, Event Handling, Use of Predefined Object and Methods, Frames, Windows, Tables, Images, Links

Interactivity Tool - VBScript: Introduction, Features, Variables, Data Types, Numeric and Literal Constants, Arrays, Operators, Subroutine Procedures, Function Procedures, Control Statements, Strings, Message and Input Boxes, Date and Time, Event Handlers, Embedding VBScript in HTML

UNIT – II

Interactivity Tool - Active Script Pages – Introduction, Features, Client-Server Model, Data Types, Decision Making Statements, Control statements, Use of Various Objects of ASP, Various Techniques of Connecting to Database

Other Interactivity Tools - Macromedia Flash, Macromedia Dreamweaver, PHP: Basic Introduction and Features

UNIT – III

DHTML: Introduction, Features, Events, Dynamic Positioning, Layer Object, Properties of STYLE, Dynamic Styles, Inline Styles, Event Handlers; Cascading Style Sheets (CSS): Basic Concepts, Properties, Creating Style Sheets; Common Tasks with CSS: Text, Fonts, Margins, Links, Tables, Colors; Marquee; Mouseovers; Filters and Transitions; Adding Links; Adding Tables; Adding Forms; Adding Image and Sound; Use of CSS in HTML Documents Linking and Embedding of CSS in HTML Document

UNIT – IV

Microsoft FrontPage: Introduction, Features, Title Bar, Menu bar, FrontPage Tool Bar, Style, FontFace and Formatting Bar, Scroll Bars

XML: Introduction, Features, XML Support and Usage, Structure of XML Documents, Structures in XML, Creating Document Type Declarations, Flow Objects, Working with Text and Font, Color and Background Properties;

TEXT BOOKS:
- Jon Duckett, "Beginning web programming with HTML, XHTML, CSS and JavaScript" – Wiley India Pvt. Ltd.
- Paul Wilton, "Beginning JavaScript" – Wiley India Pvt. Ltd.
- Mitchell and Atikinson, "Active Sever Pages" – Techmedia Publishing
- Adrian Kingsley ,"VB Script Programming Reference" – Wiley India Pvt. Ltd.

REFERENCE BOOKS:
- Thomas A. Powell, "Web Design: The Complete Reference", 4/e, /Tata McGraw-Hill
- Deitel and Goldberg, "Internet and World Wide Web", How to Program, PHI.
- Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill.
- Ramesh Bangia, "Multimedia and Web Technology", Firewall Media.
- Internet and Web Design, ITLESL Research and Development Wing, Macmillan India.

BCA-362: Operating System-II

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Process Synchronization: The Critical Section Problem – Single Process/Two Process Solutions; Semaphores – Types, Implementation, Deadlocks and Starvation; Classical Problems of Synchronization – The Bounded Buffer Problem, The Readers and Writers Problem, The Dining-Philosophers Problem, Critical Regions, Monitors

Directory Structure: Single Level, Two Level, Tree Structures, Acyclic Graph, General Graph; Directory Implementation, Recovery

UNIT – II

Secondary Storage Structure: Disk Structure, Disk Scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK; Selection of Disk Scheduling Algorithm; Disk Management; Swap Space Management

Network Operating Systems: Remote Login, Remote File Transfer;

Distributed Operating System: Data Migration, Computation Migration, Process Migration

UNIT – III

Linux: Introduction, Features, Architecture, Distributions, Accessing Linux System, Login/Logout/Shutting Down, Comparison of Linux with other Operating Systems, Commands in Linux: General-Purpose Commands, File Oriented Commands, Directory Oriented Commands, Communication Oriented Commands, Process Oriented Commands, Redirection of Input and Output, Pipes

UNIT – IV

Linux File System: Types of Files in Linux, File Attributes, Structure of File System, inode, File Permission, File System Components, Standard File System, File System Types, Disk Related Commands

Processes in Linux: Introduction, Job Control in Linux using at, batch, corn & time commands

The vi editor: Introduction, Modes of vi Editor, Command in vi Editor

Shell Programming: Introduction, Shell Variables, Shell Keywords, Operators, Assigning Values to the Variables, I/O in Shell, Control Structures, Creating & Executing Shell Programs in Linux.

TEXT BOOKS:
- Silberschatz A., Galvin P.B.,and Gagne G., "Operating System Concepts", John Wiley & Sons, Inc.,New York.
- Godbole, A.S., "Operating Systems", Tata McGraw-Hill Publishing Company, New Delhi.
- Richard Petersen, The Complete Reference – Linux, McGraw-Hill.
- Yashwant Kanetkar, UNIX & Shell programming – BPB.

REFERENCE BOOKS:
- Deitel, H.M., "Operating Systems", Addison- Wesley Publishing Company, New York.
- Tanenbaum, A.S., "Operating System- Design and Implementation", Prentice Hall of India, New Delhi.
- Sumitabha Das, Your UNIX - The Ultimate Guide, Tata McGraw-Hill.

BCA-363: Computer Graphics

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Introduction to Computer Graphics; Interactive and Passive Graphics; Applications of Computer Graphics; Display Devices: CRT; Random Scan, Raster Scan, Refresh Rate and Interlacing, Bit Planes, Color Depth, Color Palette, Color CRT Monitor, DVST, Flat-Panel Displays: Plasma Panel, LED, LCD; Lookup Table, Interactive Input Devices, Display Processor, General Purpose Graphics Software, Coordinate Representations;

UNIT – II

Point-Plotting Techniques: Scan Conversion, Scan-Converting a Straight Line: The Symmetrical DDA, The Simple DDA, Bresenham's Line Algorithm; Scan-Converting a Circle: Circle drawing using Polar Coordinates, Bresenham's Circle Algorithm, Scan-Converting an Ellipse: Polynomial Method, Trigonometric Method; Polygon Area Filling: Scan-line Fill and Flood Fill Algorithms;

UNIT – III

Two-Dimensional Graphics Transformation: Basic Transformations: Translation, Rotation, Scaling; Matrix Representations and Homogeneous Coordinates; Other Transformations: Reflection, Shearing; Coordinate Transformations; Composite Transformations; Inverse Transformation; Affine Transformations; Raster Transformation;

Graphical Input: Pointing and Positioning Devices and Techniques

UNIT – IV

Two-Dimensional Viewing: Window and Viewport, 2-D Viewing Transformation

Clipping: Point Clipping; Line Clipping: Cohen-Sutherland Line Clipping Algorithm, Mid-Point Subdivision Line Clipping Algorithm; Polygon Clipping: Sutherland-Hodgman Polygon Clipping Algorithm;

Three-Dimensional Graphics: Three-Dimensional Display Methods; 3-D Transformations: Translation, Rotation, Scaling; Composite Transformations;

TEXT BOOKS:

- Donald Hearn, M. Pauline Baker, "Computer Graphics", PHI.
- Apurva A. Desai, "Computer Graphics", PHI, 2010

REFERENCE BOOKS:

- Newmann & Sproull,"Principles of Interactive Computer Graphics", McGraw Hill.
- Foley, "Computer Graphics Principles & Practice", Addison Wesley.
- Rogers, "Procedural Elements of Computer Graphics", McGraw Hill.
- Zhigang Xiang, Roy Plastock, "Computer Graphics", Tata McGraw Hill.
- D.P. Mukherjee, "Fundamentals of Computer Graphics and Multimedia", PHI.

BCA-364: Internet Technologies

Maximum Marks: 100   External: 80
Minimum Pass Marks: 35   Internal: 20
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Internet: Introduction; History; Internet Services; TCP/IP: Architecture, Layers, Protocols; TCP/IP model versus OSI Model; World Wide Web (WWW) - The Client Side, The Server Side, Creating and Searching Information on the Web, Popular Search Engines, URL, HTTP, Web Browsers, Chat & Bulletin Board, USENET & NNTP (Network News Transfer Protocol); Internet vs. Intranet;

UNIT – II

TCP, UDP and IP Protocols, Port Numbers; Format of TCP, UDP and IP; IPv4 addressing; The need for IPv6; IPv6 addressing and packet format; TCP Services; TCP Connection Management; Remote Procedure Call; IP Address Resolution- DNS; Domain Name Space; DNS Mapping; Recursive and Iterative Resolution; Mapping Internet Addresses to Physical Addresses: ARP, RARP, DHCP; ICMP; IGMP;

UNIT – III

Application Layer: Electronic Mail: Architecture; Protocols - SMTP, MIME, POP, IMAP; Web Based Mail; File Access and Transfer: FTP, Anonymous FTP, TFTP, NFS; Remote Login using TELNET; Voice and Video over IP: RTP, RTCP, IP Telephony and Signaling, RSVP;

UNIT – IV

Routing in Internet: RIP, OSPF, BGP; Internet Multicasting; Mobile IP; Private Network Interconnection: Network Address Translation (NAT), Virtual Private Network (VPN); Internet Management and SNMP; Internet Security: E-Mail Security; Web Security; Firewall; Introduction to IPSec and SSL;

TEXT BOOKS
- Douglas E. Comer, "Internetworking with TCP/IP Volume – I, Principles, Protocols, and Architectures", Fourth Edition, Pearson Education.
- Andrew S. Tanenbaum, "Computer Networks", Pearson Education.

REFERENCE BOOKS:
- Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.
- Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", CENGAGE Learning.
- James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Pearson Education.
- "Introduction to Data Communications and Networking", Wayne Tomasi, Pearson Education.

BCA-365: Advanced Programming with Visual Basic

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Collections: Adding, Removing, Counting, Returning Items in a Collection, Processing a Collection; Working with Forms: Form Properties, Creating, Adding, Removing Forms in Project, Adding Multiple Forms, Managing Forms at Run Time, Hiding & Showing Forms, Load & Unload Statements, Drag and Drop Operation, Activate & Deactivate events, Form-load event, Example using Forms, Programs in VB using Forms

UNIT – II

Working with Menu: Menu Designing in VB, Adding a Menu to a Form, Modifying and Deleting Menu Items, Adding Access Characters, Adding Shortcut Keys, Manipulating Menus using Common Dialog Box, Attaching Code to Events, Creating Submenus, Dynamic Menu Appearance
Advanced Controls in VB: Scroll Bar, Slider Control, Tree View, List View, Rich Text Box Control, Toolbar, Status Bar, Progress Bar, Cool bar, Image List
Program Development in VB using Menus and Advance Controls

UNIT – III

File Handling & File Controls: Sequential & Random files, Opening and Closing Data Files, Viewing the Data in a File, Performing Operations on a File, Creating a Sequential Data File, Writing Data to a Sequential File, Reading the Data in a Sequential File, Finding the End of a Data File, Locating a File, Reading and Writing a Random File (get, put, LOF, seek).
Working with Graphics: Using Paint, Line, Circle, Manipulating Graphics
Program Development in VB using Files and Graphics

UNIT – IV

Accessing Databases: Data Controls, Data-Bound Controls, DAO, RDO, ADO, Creating the Database, Setting Properties, Applying Operations on Database, Viewing the Database, Updating the Database (adding, deleting records)
Program Development in VB using Database and Advance Controls

TEXT BOOKS:
- Steven Holzner, "Visual Basic 6 Programming: Black Book", Dreamtech Press.
- Evangelos Petroutsos. "Mastering Visual Baisc 6", BPB Publications.
- Julia Case Bradley & Anita C. Millspaugh, "Programming in Visual Basic 6.0", Tata McGraw-Hill Edition

REFERENCE BOOKS:
- Michael Halvorson, "Step by Step Microsoft Visual Basic 6.0 Professional", PHI
- "Visual basic 6 Complete", BPB Publications.
- Scott Warner, "Teach Yourself Visual basic 6", Tata McGraw-Hill Edition
- Brian Siler and Jeff Spotts, "Using Visual Basic 6", Special Edition, PHI.

BCA-366: Programming in Core Java

Maximum Marks: 100   **External: 80**
Minimum Pass Marks: 35   **Internal: 20**
Time: 3 hours

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. All questions will carry equal marks.

UNIT – I

Basic Principles of Object Oriented Programming, Introduction to Java, History and Features of Java, Java Virtual Machine (JVM), Java's Magic Bytecode; The Java Runtime Environment; Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Data types, Operators, Assignments; Input/output in Java: Basics, I/O Classes, Reading Console Input, Control Structures in Java: Decision and Loop Control Statements

UNIT – II

Class and Object in Java: Defining Class in Java, Creating Objects of a Class, Defining Methods, Argument Passing Mechanism, Using Class and Objects, Constructors, Nested Class, Inner Class, Abstract Class, Dealing with Static Members; Array & String in Java: Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array, Defining String, Operation on Array and String, Creating Strings using String Class, Creating Strings using StringBuffer Class,; Polymorphism in Java: Basic Concept, Types, Overriding vs. Overloading, Implementation

UNIT – III

Extending Classes and Inheritance in Java: Benefits of Inheritance, Types of Inheritance in Java, Access Attributes, Inheriting Data Members and Methods, Role of Constructors in Inheritance, Use of "super"; Packages & Interfaces: Basic Concepts of Package and Interface, Organizing Classes and Interfaces in Packages, Defining Package, Adding Classes from a Package to Your Program, CLASSPATH Setting for Packages, Import Package, Naming Convention For Packages , Access Protection in Packages, Standard Packages

UNIT – IV

Exception Handling in Java: The Idea behind Exception, Types of Exception, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Un-Checked Exceptions, Catching more than one Exception; Applet in Java: Applet Basics, Applet Architecture, Applet Life Cycle, Applet Tag, Parameters to Applet, Embedding Applets in Web page, Creating Simple Applets; GUI Programming: Designing Graphical User Interfaces in Java, Components and Containers, Using Containers, Layout Managers, AWT Components, AWT Classes, AWT Controls,

TEXT BOOKS:
- Patrick Naughton and Herbert Schlitz,"JAVA-2 Complete Reference" ,TMH, New Delhi.
- Ivor Horton, "Beginning JAVA 2", WROX Publications, New Delhi.

REFERENCE BOOKS:
- "JAVA 2 UNLEASHED", Tech Media Publications, New Delhi.
- E Balaguruswamy,"Programming with Java", TMH, New Delhi.