<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Title of Paper</th>
<th>Ex</th>
<th>Int</th>
<th>Max</th>
<th>Exam Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA-111</td>
<td>Computer &amp; Programming Fundamentals</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-112</td>
<td>PC Software</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-113</td>
<td>Computer-Oriented Numerical Methods</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-114</td>
<td>Logical Organization of Computer – I</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-115</td>
<td>Mathematical Foundations – I</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-116</td>
<td>Communication Skills</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-117</td>
<td>Lab – I Windows, and Power Point</td>
<td>100</td>
<td></td>
<td></td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-118</td>
<td>Lab – II Word, and Excel</td>
<td>100</td>
<td></td>
<td></td>
<td>3hrs</td>
</tr>
</tbody>
</table>

**Semester - II**

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Title of Paper</th>
<th>Ex</th>
<th>Int</th>
<th>Max</th>
<th>Exam Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA-121</td>
<td>‘C’ Programming – I</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-122</td>
<td>Logical Organization of Computer – II</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-123</td>
<td>Computer-Oriented Statistical Methods</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-124</td>
<td>Mathematical Foundations – II</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-125</td>
<td>Accounting &amp; Financial Management</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-126</td>
<td>Personality Development</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-127</td>
<td>Lab – I Programming in ‘C’</td>
<td>100</td>
<td></td>
<td></td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-128</td>
<td>Lab – II Statistical Methods implementation in ‘C’</td>
<td>100</td>
<td></td>
<td></td>
<td>3hrs</td>
</tr>
</tbody>
</table>

Internal assessment will be based on the following criteria:

(I) Two Handwritten Assignments : 10%
   (1st Assignment after one month & 2nd Assignment after two months)

(ii) One Class Test : 5%
   (one period duration)

(iii) Attendance : 5%

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.
<table>
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<tr>
<th>Paper No.</th>
<th>Title of Paper</th>
<th>Internal Marks</th>
<th>Maximum Marks</th>
<th>Exam Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA-231</td>
<td>‘C’ Programming – II</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-232</td>
<td>Data Structures – I</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-233</td>
<td>Computer Architecture – I</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-234</td>
<td>Introduction to Data Base System</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-235</td>
<td>Structured System Analysis &amp; Design</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-236</td>
<td>Mathematical Foundations – III</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-237</td>
<td>Lab – I Programming in ‘C’</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCA-238</td>
<td>Lab – II Implementation of Data Structure in ‘C’</td>
<td>100</td>
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</tbody>
</table>

**Semester – IV**

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Title of Paper</th>
<th>Internal Marks</th>
<th>Maximum Marks</th>
<th>Exam Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA-241</td>
<td>Web Designing – I</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-242</td>
<td>Data Structures – II</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-243</td>
<td>Computer Architecture – II</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-244</td>
<td>Relational Data Base Management System</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-245</td>
<td>Management Information System</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-246</td>
<td>Mathematical Foundations-IV</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>BCA-247</td>
<td>Lab – I Web designing using HTML</td>
<td>100</td>
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<tr>
<td>BCA-248</td>
<td>Lab – II ORACLE</td>
<td>100</td>
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</tbody>
</table>

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(I) Two Handwritten Assignments : 10%
(1st Assignment after one month & 2nd Assignment after two months)

(ii) One Class Test : 5%
(one period duration)

(iii) Attendance : 5%

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4. 70% to 75% : 2 Marks*
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# BACHELOR OF COMPUTER APPLICATIONS
## SCHEME OF EXAMINATION – THIRD YEAR (w.e.f 2013-14)

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Title of Paper</th>
<th>ExTERNAL MARKS</th>
<th>INTERNAl ASSESSMENT</th>
<th>MAXIMUM MARKS</th>
<th>EXAM DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA-351</td>
<td>Introduction to Object oriented Programming</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-352</td>
<td>Operating Systems</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-353</td>
<td>Software Engineering</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-354</td>
<td>Computer Networks</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-355</td>
<td>Computer Graphics</td>
<td>80</td>
<td>20</td>
<td>100</td>
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<tr>
<td>BCA-356</td>
<td>Web Designing – II</td>
<td>80</td>
<td>20</td>
<td>100</td>
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<tr>
<td>BCA-357</td>
<td>Lab – I Programming in ‘C++’</td>
<td>100</td>
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<tr>
<td>BCA-358</td>
<td>Lab – II Web designing</td>
<td>100</td>
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**Semester - VI**

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Title of Paper</th>
<th>ExTERNAL MARKS</th>
<th>INTERNAl ASSESSMENT</th>
<th>MAXIMUM MARKS</th>
<th>EXAM DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCA-361</td>
<td>Programming in ‘C++’</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-362</td>
<td>Introduction to Linux</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-363</td>
<td>Internet Technology</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-364</td>
<td>Visual Basic</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-365</td>
<td>Multimedia Technology</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-366</td>
<td>Introduction to .NET</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>3hrs</td>
</tr>
<tr>
<td>BCA-367</td>
<td>Lab – I Linux and C++</td>
<td>100</td>
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<tr>
<td>BCA-368</td>
<td>Lab – II Programming in VB</td>
<td>100</td>
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</tr>
</tbody>
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   (one period duration)

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5. 65% to 70% : 1 Mark*

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BCA – 111    Computer & Programming Fundamentals

Maximum Marks: 100

External: 80
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
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, definition of software, relationship between hardware and software, types of software.
Overview of operating system: Definition, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.
Computer Virus: Definition, types of viruses, Characteristics of viruses, anti-virus software.

UNIT-III
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 Languages: Analogy with natural language, machine language, assembly language, high-level language, compiler, interpreter, assembler, characteristics of a good programming language.

UNIT-IV
Searching, Sorting, and Merging: Linear & Binary Searching, Bubble, Selection, and Insertion Sorting, Merging.
Overview of Networking: An introduction to computer networking, Network types (LAN, WAN, MAN), Network topologies, introduction to internet and its uses.

TEXT BOOKS
2. Dromey, R.G., How to Solve it By Computer, PHI

REFERENCE BOOKS
3. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
4. Rajaraman, V., Fundamentals of Computers, PHI
5. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.
BCA-112     PC SOFTWARE

Maximum Marks: 100

External: 80
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
MS-Windows: Operating system-Definition & functions, basics of Windows. Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance. Using windows accessories.

UNIT – II

UNIT – III
Electronic Spread Sheet using MS-Excel - Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation, Database Management using Excel-Sorting, Filtering, Table, Validation, Goal Seek, Scenario.

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

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

REFERENCES BOOKS
 Maximum Marks: 100 

External: 80
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
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.

UNIT-II

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.
BCA-114 LOGICAL ORGANIZATION OF COMPUTER-I

Maximum Marks: 100
External: 80
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
Information Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode

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

UNIT - III

UNIT - IV

TEXT BOOKS

REFERENCE BOOKS
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
publishers of distributors.
3. S.L. Ross : Ordinary differential equations
4. Babu Ram: Discrete Mathematics
5. Shanti Narayana : Differential & Integral calculus
Maximum Marks: 100

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
Q 1. One essay type question (with internal choice) from the prescribed text.
Q 2. Five short answer type questions (with internal choice) from the prescribed text.

UNIT-II
Q 3. A comprehension passage from the prescribed text book (Reflection) with five questions at the end.
Q 4. 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
Q 5. 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
Q 6. A paragraph of about 150 words on any one of the given topics.

UNIT-IV
Q 7. Official letters / applications (With internal choice)
Q 8. 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.

TEXT BOOKS
1. Reflections by I. P. Anand & Dr. R. K. Malhotra

RECOMMENDED BOOKS:
2. English in Situations by R. O. Neil (OUP)
BCA-121 ‘C’ PROGRAMMING - I

Maximum Marks: 100
External: 80
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
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 viz. scanf(), getc(), getche(), getchar(), gets(), output functions viz. printf(), putc(), putche(), 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

REFERENCE BOOKS
2. Yashwant Kanetker, Let us C, BPB.
3. Rajaraman, V., Computer Programming in C, PHI.
4. Yashwant Kanetker, Working with C, BPB.
Maximum Marks: 100

External: 80
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
Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master-Slave flip-flops. State table, state diagram and state equations. Flip-flop excitation tables

UNIT - II
Sequential Circuits: Designing registers – Serial Input Serial Output (SISO), Serial Input Parallel Output (SIPO), Parallel Input Serial Output (PISO), Parallel Input Parallel Output (PIPO) and shift registers. Designing counters – Asynchronous and Synchronous Binary Counters, Modulo-N Counters and Up-Down Counters

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

UNIT - IV

TEXT BOOKS

REFERENCE BOOKS
BCA – 123  COMPUTER-ORIENTED STATISTICAL METHODS

Maximum Marks: 100  
External: 80  
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: Measure of Central Tendency, Preparing frequency, distribution table, Mean Arithmetic, Mean Geometric, Mean Harmonic, Mean, Media, Mode.
Measure of Dispersion: Range, Variance and Standard Deviations; Frequency Distributions and Cumulative Frequency Distributions: Moments and Moments Generating Functions.

UNIT-II
Distribution Patterns: Types of Theoretical Probability; Normal Binomial Poisson distribution.
Correlation and Regression: Types of Correlation, Properties of Coefficient of Correlation, Methods of studying Correlation; Aim of Regression Analysis, Kinds of Regression Analysis.

UNIT-III
Tests of significance: Z-test, Student T-test, Chi-square test.
Curve fitting: Method of least squares and Polynomial fit.

UNIT-IV
ANOVA: Meaning, Assumptions, Cochran’s Theorem (only statement), One way classification, ANOVA Table for One-Way Classified Data, Baye’s theorem in decision-making, Forecasting techniques.

REFERENCE BOOKS
Maximum Marks: 100

External: 80
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
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
Maximum Marks: 100

External: 80
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

UNIT - II

UNIT - III
Pay roll department, Preparation of Pay roll, Preparation of wage record, Methods of payments of wages, overview of computerized method for payroll preparation.

UNIT - VI
Inventory account and store record, inventory or stock control and cost accounting, Department demand and supply method of stock control. Classification and condition of material Report on material handling. Overview of computerized accounting process – Introduction to accounting system software, their features and some basic operations.

TEXT BOOKS
1. Mazda, Engineering Management, Addisen Wesley
2. Dr. S P Gupta, Management Accounting
Maximum Marks: 100

External: 80
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

Personality & Personal Grooming – A Brief Introduction
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 workplace

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
(3) Im OK, You re OK, by : Thomas A. Harris, Published 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
BCA – 231                ‘C’ PROGRAMMING – II

Maximum Marks: 100

External: 80
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

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

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

REFERENCE BOOKS
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, Stroing strings, String operations, Pattern matching algorithms.

UNIT – II
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.

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.
Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs.

TEXT BOOKS

REFERENCE BOOKS:
UNIT – I

UNIT – II
Arithmetic Unit: Main sub-units – memory data register, accumulator, multiplier quotient register, adder and logic processor, shift counter, status flip-flops. Arithmetic operations – addition and subtraction, shifting, data transfer, multiplication, division, logic operations, storing. Innovations in Arithmetic Unit: Speed of addition – addition without carries, carry storage adders, carry anticipation, the carry look ahead scheme. Multiplication – multiplication in half words, Booth’s algorithm, multiplication using a power of two radix, multiplication using carry storage adders.

UNIT – III
Memory Systems: Speed imbalance between the arithmetic and memory units, advantages of memory hierarchies, memory interleaving, problems of management of memory hierarchies, operation of virtual memories. Associative memories. Cache memories – operation of the cache, comparison of cache and virtual memory system, schemes for cache organization, word or block replacement, writing into the cache, multilevel caches.

UNIT – IV
General Organization and Control: Addressing schemes – one, two and three address schemes, no-address scheme, address modification and index registers, general purpose registers, addressing modes, stack organization, use of stack for evaluation of expressions, interrupt processing, subroutine return, storing local variables, storing parameters, implementation of stacks, stack organized processors. Register Transfer Language, Microprogramming, implementation of a microprogrammed control, vertical and horizontal microprogramming.

TEXT BOOKS:

REFERENCE BOOKS:
BCA – 234  INTRODUCTION TO DATABASE SYSTEM

Maximum Marks: 100
External: 80
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
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
Entity-Relationship Model – Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams.
Basic Concepts of Hierarchical and Network Data Model.

UNIT – IV
Relational Data Model:-Brief History, Relational Model Terminology-Relational Data Structure, Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations, Base Tables and Views.

TEXT BOOKS:

REFERENCE BOOKS:
BCA – 235  STRUCTURED SYSTEM ANALYSIS AND DESIGN
Maximum Marks: 100  External: 80
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
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:

REFERENCE BOOKS:
Maximum Marks: 100
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
Derivative of functions of defined parametrically, Derivative of Logarithmic exponential, trigonometric, inverse trigonometric and hyperbola functions. Derivatives of higher orders, Successive differentiation. Leibnitz’s Theorem.

UNIT – II
Tangents and Normals: Length of tangent, suntangent, normal and subnormal. Polar subtangent, polar subnormal, pedal equations. Taylor’s theorem and Maclaurin’s theorem: Taylors and Maclaurin’s series expansion, indeterminate forms. Functions of more than one variables and its continuity.

UNIT– III
Asymptotes: Cartesian coordinate, intersection of curve and its asymptotes, Asympotes in polar coordinates. Multiple points: cusp, nodes and conjugate points, types of cusp, test for concavity and convexity. Points of inflexion.

UNIT – IV
Curvature: radius of curvature for Cartesian, parametric, polar curves. Newton’s method, radius of curvature for pedal curve, tangential polar equation, center of curvature, circle of curvature, code of curvature and evolute. Tracing of curves in Cartesian, parametric and polar coordinates.

REFERENCE BOOKS:
BCA – 241  WEB DESIGNING – I

Maximum Marks: 100
External: 80
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 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
Web Publishing: Hosting your Site; Internet Service Provider; Planning and designing your Web Site; Steps for developing your Site; Choosing the contents; Home Page; Domain Names; Creating a Website and the Markup Languages (HTML, DHTML);

UNIT – III
Web Development: Introduction to HTML; Hypertext and HTML; HTML Document Features; HTML command Tags; Creating Links; Headers; Text styles; Text Structuring; Text colors and Background; Formatting text; Page layouts;

UNIT – IV
Images; Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with Forms and Menus; Working with Radio Buttons; Check Boxes; Text Boxes;

TEXT BOOKS:

REFERENCE BOOKS:
3. Deitel and Goldberg, “Internet and World Wide Web, How to Program”, PHI.
BCA – 242  DATA STRUCTURE – II

Maximum Marks: 100

External: 80

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: Header nodes, Threads, Binary search trees, Searching, Insertion and deletion in a Binary search tree, AVL search trees, Insertion and deletion in AVL search tree, m-way search tree, Searching, Insertion and deletion in an m-way search tree, B-trees, Searching, Insertion and deletion in a B-tree, Huffman’s algorithm, General trees.

UNIT – II

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

REFERENCE BOOKS
Maximum Marks: 100  
External: 80  
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

Computer Arithmetic: Unsigned addition, subtraction, multiplication and division algorithms, 2's complement addition, subtraction and multiplication algorithms, floating point numbers addition, subtraction, multiplication and division algorithms. IEEE 754 floating-point standard.

UNIT – II

Interrupt Structures: Types of interrupts, Interrupt processing, levels and priorities of interrupts, implementing interrupts inside the CPU.  
Instruction set architectures. Reduced Instruction Set Computing (RISC): Characteristics of RISC, RISC instruction set, RISC vs CISC.

UNIT – III

Look Ahead & Pipelining: Instruction look ahead, look ahead and look behind, advantages of look ahead systems. Pipelined execution of instruction – operation of pipelines, optimizing a pipeline, speedup due to pipelining, running the pipeline with minimum idling, multifunction pipelines, organization of pipelines in a general purpose computer.

UNIT – IV

Introduction to Parallel Processing: Parallelism in uniprocessor systems, organization of multiprocessor systems, Flynn’s classification, system topologies, MIMD system architectures, communication in multiprocessor systems, fixed connections, reconfigurable connections, routing on multistage interconnection networks, data flow computing.

TEXT BOOKS:

REFERENCE BOOKS:
BCA – 244 RELATIONAL DATA BASE MANAGEMENT SYSTEM

Maximum Marks: 100
Exterior: 80
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, Specifying Constraints in SQL, Schema, Change statement,
Basic Queries in SQL, Insert, Delete and Update Statements, Views.

UNIT – IV
PL/SQL-Introduction, 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.

TEXT BOOKS:

REFERENCE BOOKS:
BCA – 245 MANAGEMENT INFORMATION SYSTEM

Maximum Marks: 100
External: 80
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

UNIT – II

UNIT – III

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:

REFERENCE BOOK:
Maximum Marks: 100

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
Partial derivatives of first and second order. Euler’s theorem on homogeneous functions. Differentiation of composite and implicit functions. The notion of total differential, Extreme values: Maxima and Minima of function of two or more variable, Lagrange’s method of multiplier.

UNIT – II
Reduction formula, rectification of curve represented in Cartesian, parametric and polar forms, intrinsic equation of curve.

UNIT – III
Quadrature: area of curves and area of surfaces of solid of revolution in Cartesian, parametric and polar forms. Jacobian, Double and Triple integration, substitution method for double and triple integrals, Application of double and triple integrals for finding volume and surfaces.

UNIT – IV
Beta and Gamma functions, their properties and relationships. Differentiation under integral sign. Equation and simple properties of spheres, cones, cylinders.

REFERENCE BOOKS:
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, Static Data Members and Member Functions, Nested and Local Class, Accessing Members of Class and Structure, Preprocessor Directives, Namespace.

UNIT – II
Initialization & Cleanup: Constructors – Default, Parameterized & Copy Constructors, and Default Values to Parameters, Destructors.
Console I/O: Hierarchy of Console Stream Classes, Unformatted And Formatted I/O Operations, Manipulators.

UNIT – III
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

TEXT BOOKS:
2. Robert Lafore, Object Oriented Programming in C++

REFERENCE BOOKS:
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
Introductory Concepts: Operating system functions and characteristics, historical evolution of operating systems, Real time systems, Distributed systems, Methodologies for implementation of O/S service system calls, system programs.

UNIT – II
CPU Scheduling: Scheduling criteria, Levels of Scheduling, Scheduling algorithms, Multiple processor scheduling.
Deadlocks: Deadlock characterization, Deadlock prevention and avoidance, Deadlock detection and recovery, practical considerations.

UNIT – III
Storage Management: memory management of single-user and multiuser operating system, partitioning, swapping, paging and segmentation, virtual memory, Page replacement Algorithms, Thrashing.

UNIT – IV

TEXT BOOKS:

REFERENCE BOOKS:
BCA – 353 SOFTWARE ENGINEERING

Maximum Marks: 100

External: 80
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
Software Crisis – problem and causes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models.
Software Project Planning: Cost estimation: COCOMO model, Putnam Resource Allocation Model, Risk management, project scheduling, personnel planning, team structure, Software configuration management, quality assurance, project monitoring.

UNIT – II
Software Design: Design fundamentals, problem partitioning and abstraction, design methodology, Cohesion & Coupling, Classification of Cohesiveness & Coupling.

UNIT – III
Coding: Programming style, structured programming.
Software Testing: Testing fundamentals, Functional testing: Boundary Value Analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Control flow based and data flow based testing, loop testing;

UNIT – IV
Software testing strategies: unit testing, integration testing, Validation testing, System testing, Alpha and Beta testing.
Software Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.

TEXT BOOKS:

REFERENCE BOOKS:
UNIT – I
Introduction to Computer Communications and Networking Technologies; Uses of Computer Networks; Network Devices, Nodes, and Hosts; Types of Computer Networks and their Topologies; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; Network Applications and Application Protocols; Computer Communications and Networking Models: Decentralized and Centralized Systems, Distributed Systems, Client/Server Model, Peer-to-Peer Model, Web-Based Model, Network Architecture and the OSI Reference Model; Example Networks: The Internet, X.25, Frame Relay, ATM;

UNIT – II
Analog and Digital Communications Concepts: Representing Data as Analog Signals, Representing Data as Digital Signals, Data Rate and Bandwidth, Capacity, Baud Rate; Digital Carrier Systems; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Dialup Networking; Analog Modem Concepts; DSL Service;

UNIT - III
Data Link Layer: Framing, Flow Control, Error Control; Error Detection and Correction; Sliding Window Protocols; Media Access Control: Random Access Protocols, Token Passing Protocols; Token Ring; Introduction to LAN technologies: Ethernet, switched Ethernet, VLAN, fast Ethernet, gigabit Ethernet, token ring, FDDI, Wireless LANs; Bluetooth;

Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways;

UNIT – IV
Network Layer and Routing Concepts: Virtual Circuits and Datagrams; Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control Algorithms; Internetworking; Network Security Issues: Security threats; Encryption Methods; Authentication; Symmetric –Key Algorithms; Public-Key Algorithms;

TEXT BOOKS:

REFERENCE BOOKS:
BCA – 355  COMPUTER GRAPHICS

Maximum Marks: 100
External: 80
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
Overview of Computer Graphics: Historical background of Computer Graphics; Applications of Computer Graphics; Popular Graphics Softwares; Display devices: Pixel, Resolution, Aspect Ratio; Raster-Scan Systems and Display: CRT, Refresh Rate and Interlacing; Bit Planes, Color Depth and Color Palette, Frame Buffer, Video Controller, Raster-Scan Display Processor, Lookup Table, RGB Color Model, Color CRT monitors; Random-Scan Displays; Flat Panel Display: LCD, Plasma Panel; Graphics Monitors and Workstations; Popular Graphics Input Devices; Hard-Copy Devices;

UNIT – II
Coordinate Representations; Graphics Primitives: Line Drawing Algorithms- DDA Algorithm, Bresenham’s Algorithm; Different Line Styles; Circle-Generating Algorithms- Properties of Circles, Circle Drawing using Polar Coordinates, Bresenham’s Circle Drawing Algorithm; Ellipse-Generating Algorithms; Anti-aliasing;

UNIT – III
Geometric Transformations: Scaling, Translation, Rotation; Matrix Representations and Homogeneous Coordinates; Rotation Relative to an Arbitrary Point; Reflection; Shearing; Coordinate Transformation; Inverse Transformation; Affine Transformation; Raster Transformation; Composite Transformations; Fixed-point Scaling; Input Techniques: Pointing, Positioning, Rubber-band method, Dragging;

UNIT – IV
Two-Dimensional Viewing: Window-to-Viewport Coordinate Transformation; Zooming; Panning; Clipping: Point Clipping, Line Clipping- Cohen-Sutherland line clipping, Mid-point Subdivision Line Clipping; Polygon Clipping – Sutherland-Hodgeman Polygon Clipping; Text Clipping; Graphics in Three Dimensions: Displays in Three Dimensions, 3-D Transformations; 3-D Viewing : Viewing Parameters, Projections, Parallel and Perspective projection; Hidden Surfaces: Z-Buffer Method, Painter’s Algorithm;

TEXT BOOKS:

REFERENCE BOOKS:
BCA-356    Web DESIGNING – II

Maximum Marks: 100

External: 80
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
Brief Introduction to Interactivity tools: CGI; Features of Java; Java Script; Features of ASP; VBScript; Macromedia Flash; Macromedia Dreamweaver; PHP;

UNIT – II
Introduction and Features of Adobe Photoshop; Microsoft FrontPage Introduction; Features; Title Bar; Menu bar; FrontPage Tool Bar; Style, FontFace and Formatting Bar; Scroll Bars;

UNIT – III
Introduction to DHTML and its features; Events; Cascading Style Sheets: 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;

UNIT – IV
Extensible Mark-up Language(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:
1. Internet and Web Technologies, Raj Kamal, Tata McGraw-Hill.
3. Internet and Web Design, ITLES Research and Development Wing, Macmillan India.

REFERENCE BOOKS:
2. Internet and World Wide Web, How to Program, Deitel and Goldberg, PHI.
Maximum Marks: 100  
External: 80  
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  

UNIT – II  
Type Conversion: Basic Type Conversion, Conversion Between Objects And Basic Types, Conversion Between Objects Of Different Classes.  

UNIT – III  
Genericity in C++: Template Function, Template Class, Inheritance and Templates.  
Exception Handling: try, throw and catch constructs, rethrowing an exception, catch all Handlers.  

UNIT – IV  
Files I/O in C++: Class Hierarchy for Files I/O, Text versus Binary Files, Opening and Closing Files, File Pointers, Manipulators and Error Handling.  

TEXT BOOKS:  
2. Robert Lafore, Object Oriented Programming in C++  

REFERENCE BOOKS:  
BCA – 362  INTRODUCTION TO LINUX

Maximum Marks: 100

External: 80
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 Linux: Linux distributions, Overview of Linux operating system, Linux architecture, Features of Linux, Accessing Linux system, Starting and shutting down system, Logging in and Logging out. Comparison of Linux with other operating systems.

UNIT – II
Commands in Linux: General-Purpose commands, File oriented commands, directory oriented commands, Communication-oriented commands, process oriented commands, etc.
Regular expressions & Filters in Linux: Simple filters viz. more, wc, diff, sort, uniq, grep. Introducing regular expressions.

UNIT – III
Linux file system: Linux files, inodes and structure and file system, file system components, standard file system, file system types.
Processes in Linux: starting and stopping processes, initialization Processes, mechanism of process creation, Job control in linux using at, batch, cron & time.

UNIT – IV
Shell Programming: VI editor, shell variables, I/O in shell, control structures, loops, subprograms, creating & executing shell scripts in linux.

TEXT BOOKS:
1. Yashwant Kanetkar, UNIX & Shell programming – BPB.
2. M.G.Venkateshmurthy, Introduction to UNIX & Shell Programming, Pearson Education.

REFERENCE BOOKS:
BCA – 363  INTERNET TECHNOLOGY

Maximum Marks: 100  
External: 80  
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
Internet and TCP/IP: Introduction to the Internet; Internet History, Internet Administration; Internet and Intranet; Internet Services; TCP/IP model and its protocols; IP addresses: IPv4; Subnetting IPv4 addresses; Supernetting; Next generation Internet Protocol (IPv6); The need for IPv6; Packet Format; IPv6 Addresses; Extension Headers;

UNIT – II
TCP/IPs Transport and Network Layer Protocols: Role of TCP, UDP, IP, and Port numbers; Format of TCP, UDP and IP; TCP services; TCP connection management; Remote Procedure Call; SCTP; IP address resolution- DNS; Domain Name Space; DNS mapping; Recursive and Iterative resolution; Resource records; Mapping Internet Addresses to Physical Addresses; ARP, RARP, BOOTP, DHCP; ICMP; IGMP;

UNIT – III
TCP/IP Application Level Protocols: Electronic Mail: Architecture; 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, Resource Reservation and Quality of Service, 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: SNMP; Internet Security: IPSec, E-Mail Security; Web Security; Firewalls; Digital Signatures; Certificates;

TEXT BOOKS

REFERENCE BOOKS:
4. “Introduction to Data Communications and Networking”, Wayne Tomasi, Pearson Education.
BCA – 364        VISUAL BASIC

Maximum Marks: 100

External: 80
Internal: 20

Time: 3 hours

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UNIT – I

UNIT – II

UNIT – III

UNIT – IV
Programming with VB: Procedures: General & event procedures, Subroutines, Functions, Calling procedures, Arguments- passing mechanisms, Optional arguments, Named arguments, Functions returning custom data types, Functions returning arrays. Working with forms: Adding multiple forms in VB, Hiding & showing forms, Load & unload statements, Activate & deactivate events, Form-load event, menu designing in VB Simple programs in VB.

TEXT BOOKS:

REFERENCE BOOKS:
BCA – 365  MULTIMEDIA TECHNOLOGY

Maximum Marks: 100

External: 80
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 Multimedia: Components of Multimedia; Hypermedia and Multimedia; Overview of Multimedia Software Tools; Multimedia Hardware and Software; Basic Software Tools; Making Instant Multimedia; Presentation Tools; Multimedia Authoring; Types of Authoring Tools; Card- and Page-Based Authoring Tools; Icon-Based Authoring Tools; Time-Based Authoring Tools; Object-Oriented Authoring Tools; VRML;

UNIT – II
Graphics and Image Data Representation: Graphics/Image Data Types, Popular File Formats; Color Models in Images and Video; Types of Video Signals; Analog and Digital Video: Broadcast Video Standards: NTSC, PAL, SECAM, HDTV; Chroma Subsampling; CCIR Standards for Digital Video;

UNIT – III
Digital Audio: Digitization of Sound; MIDI Versus Digital Audio; Quantization and Transmission of Audio: Coding of Audio; Pulse Code Modulation; Differential Coding of Audio; Lossless Predictive Coding; DPCM; DM; ADPCM;

UNIT – IV
Multimedia Data Compression: Run-Length Coding; Variable-Length Coding; Dictionary-Based Coding; Transform Coding; Image Compression Standards – JPEG standard; Video Compression Techniques: H.261, H.263, MPEG;

TEXT BOOKS:

REFERENCE BOOKS:
BCA – 366     INTRODUCTION TO .NET

Maximum Marks: 100
External: 80
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

UNIT – II

UNIT – III
Operators and expressions: Arithmetic, relational, logical, bitwise, special operators, evolution of expressions, operator precedence & associativity.
Control constructs in C#: Decision making, loops.
Classes & methods: Class, methods, constructors, destructors, overloading of operators & functions.

UNIT – IV
Inheritance & polymorphism: visibility control, overriding, abstract class & methods, sealed classes & methods, interfaces.
Advanced features of C#: Exception handling & error handling, automatic memory management, Input and output (Directories, Files, and streams).

TEXT BOOKS:
1. Introduction to C# using .NET By Robert J. Oberg, PHI, 2002.
2. Programming in C# By E. Balaguruswamy, Tata McGraw Hill

REFERENCES BOOKS:
1. The Complete Guide to C# Programming by V. P. Jain