SYLLABUS

FOR

B.Sc. (IT) Programme

Ordinance for
B.Sc (IT) Programme

1. Admission

Admission to the B.Sc.(IT) Ist semester will be made as per rules prescribed by the Academic Council of the University **or** as per guidelines prescribed by the State Govt. from time to time.

2. Eligibility

Intermediate.

3. Attendance

3.1 Every candidate is required to attend all the lectures, tutorials, practical and other prescribed curricular and co-curricular activities. It can be condoned up to 25% on medical grounds or for other genuine reasons.

3.2 A further relaxation of attendance up to 15% can be given by Principal/Dean/ Director of the Institute for the students, who have been absent with prior permission, for reasons acceptable to Head of the Institution/ College/ University.

3.3 No candidate will be allowed to appear in the end semester examinations if he/she does not satisfy the overall average attendance requirements as per clause 3.1 and clause 3.2.

4. Duration

4.1 Total duration of the B.Sc.(IT) Course shall be three years, each year comprising two semesters.

4.2 Each semester shall normally have teaching for the 90 working days.

4.3 A student failing 2 times in I and / or II semester (of first year) and ineligible for the carry over system (clause 8) shall not be permitted to continue studies further.

4.4 Maximum time allowed for completing the B.Sc.(IT) course will be 5 (five) years. Those who are unlikely to satisfy the condition shall not be allowed to continue the studies any further.

5. Curriculum

5.1 The 3 (Three) years curriculum will be divided into six semesters. Each semester include lectures, tutorials, practical and seminars as defined in the scheme of instructions and examinations.

5.2 It will also include co-curricular and extra curricular activities as prescribed from time to time by the Institute/college/university.

6. Examination

6.1 Student's performance will be evaluated through continuous assessment in the form of Class Tests, Assignments, Quizzes, Viva voce/Practical etc. There shall also be an examination at the end of each semester in theory subjects, practical and project.

6.2 The distribution of marks for the class tests, quiz test, assignments, end semester theory, practical, project, seminar and other examination shall be as per the prescribed scheme of examination.

6.3 The maximum marks for the theory subjects shall consist of marks allotted for end semester examination and sessional work.

6.4 The maximum marks for the practical shall consist of marks allotted for practical examination and sessional work.

6.5 Pass/fail in a subject shall be declared on the basis of total marks obtained in theory/practical examination and the sessional award for theory/practical subjects.

6.6 The minimum pass marks in the theory subjects (including sessional marks) shall be 40%.

6.7 The minimum pass marks in the practical subjects (including sessional marks) shall be 50%.

6.8 The marks of the previous semester(s) shall not be added in declaring the result of any semester examination.

6.9 To pass a semester candidate must secure 50% of aggregate marks in that semester.

6.10 No merit position shall be awarded to a candidate who has qualified for promotion to higher classes with back papers.

6.11 The student failing in the project only but satisfying all other requirements including obtaining 50% or more marks in aggregate will be allowed to submit a new / modified project at any time after three months of the declaration of result without repeating the whole session.

7. Promotion Rules

7.1 A candidate satisfying all the conditions under clause 6 shall be promoted to the next semester.

7.2 A candidate not satisfying the above conditions but failing in not more than 3 subjects (Theory and/or practical) of a semester examination shall be governed by the clause No. 8.

7.3 All other candidates will be required to repeat the semester either as regular candidate, after re-admission or opting for ex-studentship. This facility is however subject to the time limits stipulated in clause No. 4.

8. Promotion under carry-over system

8.1 A candidate who fails in the category of clause No. 7.2 shall become eligible for provisional promotion to next semester and the carry-over system as per the following table.

For promotion to & exam	Max. permitted no. of carry over subjects of semester					
	I	II	III	IV	V	VI
II	2	-	-	-	-	-
III	2	2	-	-	-	-
IV	2	2	2	-	-	-
V	-	-	2	2	-	-
VI	-	-	2	2	2	-

Admission to & Semester Exams. not Permitted	Carry over subjects not cleared of semester
V	I & II

8.2 No separate carry-over Examination will be held for any subject except for B.Sc.(IT) Final year. Any candidate eligible for the carry-over system shall have to appear in the carry over subjects in the subsequent University Examination for the same semester.

9. Ex-studentship

Sessional marks in the subject of an ex-student shall remain the same as those secured by him/her earlier.

10. Result

Results at the end of final year will be declared with the following weightages:

I year 100%
II year 100%
III year 100%

11. Award of Division

11.1 If candidate passes all examinations in single attempt and secures 75% or more in aggregate marks he/she shall be placed in the First Division with Honours.

11.2 If candidate passes all examinations and secures aggregate marks of 60% or more but less than 75% **OR** greater than or equal to 75% after back in any examination, he/she shall be placed in First Division.

11.3 If candidate passes all examinations and secures aggregate marks of 50% or more but less than 60%, he/she shall be placed in Second Division.

12. Seminar and Project

12.1 Candidate must secure 50% marks to pass in seminar and project.

13. Grace Marks

A candidate shall be entitled to grace marks of a maximum of 5 in any one subject in a semester to enable him to pass, provided he is failing in only one subject and has secured the necessary minimum aggregate. The grace marks shall not be added to the marks of the subject or to the aggregate. The grace marks will not be awarded to enable a candidate to pass in a practical or project.

14. Scrutiny shall be allowed as per the rules of the University. Revaluation is not permitted.

B.Sc. (Information Technology)

Programme Structure

SEMESTER - I

BS101 : Fundamental of Computers and Information Technology

BS102 : Programming in 'C'

BS103 : Mathematical Foundation

BS104 : Financial Accounting

BSP11 : Programming in 'C'

BSP12 : PC Packages(Introduction to DOS & MS Office)

SEMESTER - II

BS201 : Data Structures

BS202 : Object Oriented Programming using 'C++'

BS203 : System Analysis and Design

BS204 : Probability & Statistical Techniques

BSP21 : Data Structures

BSP22 : Object Oriented Programming using 'C++'

SEMESTER - III

BS301 : Computer Based Numerical Techniques

BS302 : DBMS

BS303 : Digital Electronics

BS304 : Web technology

BSP31 : DBMS

BSP32 : Web technology

SEMESTER - IV

BS401 : Operating system

BS402 : Advance RDBMS

BS403 : Management Information System

BS404 : Multimedia Technology and Application

BSP41 : Operating system

BSP42 : Advance RDBMS

SEMESTER – V

BS501 : Programming in JAVA

BS502 : Data Communication & Networks

BS503 : Network Security

BS504 : Software Engineering

BSP51 : Programming in JAVA

BSP52 : Data Communication & Networks

SEMESTER VI

BS601 : E-Governance

BS602 : Advance programming in JAVA

BSP61 : Advance programming in JAVA

BSSM : Seminar

BSPR : Project

FIRST SEMESTER:

S. No	Course No.	Subject	Evaluation – Scheme							
			Period			Sessional			Examination	
			L	T	P	TA	CT	TOT	ESE	Sub. Total
Theory										
1.	BS101	Fundamental of Computers and Information Technology	3	1	-	10	20	30	70	100
2.	BS102	Programming in 'C'	3	1	-	10	20	30	70	100
3.	BS103	Mathematical Foundation	3	1	-	10	20	30	70	100
4.	BS104	Financial Accounting	3	1	-	10	20	30	70	100
Practical										
1.	BSP11	Programming in 'C'	-	-	4	50	-	50	100	150
2.	BSP12	PC Packages(Introduction to Operating system & MS Office)	-	-	4	50	-	50	100	150
		Total	12	4	8	-	-	220	480	700

Total Period = 24
Total Marks = 700

SECOND SEMESTER:

S. No	Course No.	Subject	Evaluation – Scheme							
			Period			Sessional			Examination	
			L	T	P	TA	CT	TOT	ESE	Sub. Total
Theory										
1.	BS201	Data Structures	3	1	-	10	20	30	70	100
2.	BS202	Object Oriented Prog. using 'C++'	3	1	-	10	20	30	70	100
3.	BS203	System Analysis & Design	3	1	-	10	20	30	70	100
4.	BS204	Probability & Statistical Techniques	3	1	-	10	20	30	70	100
Practical										
1.	BSP21	Data Structures	-	-	4	50	-	50	100	150
2.	BSP22	Programming in C++	-	-	4	50	-	50	100	150
		Total	12	4	8	-	-	220	480	700

TA : Teacher Assessment
CT : Class Test
ESE : End Semester Examination

Total Period = 24
Total Marks = 700

SUB TOT. : Subject Total

TOT. : Total

THIRD SEMESTER:

S. No	Course No.	Subject	Evaluation – Scheme							
			Period			Sessional			Examination	
			L	T	P	TA	CT	TOT	ESE	Sub. Total
Theory										
1.	BS301	Computer Based Numerical Techniques	3	1	-	10	20	30	70	100
2.	BS302	DBMS	3	1	-	10	20	30	70	100
3.	BS303	Digital Electronics	3	1	-	10	20	30	70	100
4.	BS304	Web Technology	3	1	-	10	20	30	70	100
Practical										
1.	BSP31	Computer Based Numerical Techniques	-	-	4	50	-	50	100	150
2.	BSP32	Web Technology	-	-	4	50	-	50	100	150
		Total	12	4	8	-	-	220	480	700

Total Period = 24
Total Marks = 700

FOURTH SEMESTER:

S. No	Course No.	Subject	Evaluation – Scheme							
			Period			Sessional			Examination	
			L	T	P	TA	CT	TOT	ESE	Sub. Total
Theory										
1.	BS401	Operating system	3	1	-	10	20	30	70	100
2.	BS402	Advance RDBMS	3	1	-	10	20	30	70	100
3.	BS403	Management Information System	3	1	-	10	20	30	70	100
4.	BS404	Multimedia Technology & Application	3	1	-	10	20	30	70	100
Practical										
1.	BS405	Operating system & UNIX	-	-	4	50	-	50	100	150
2.	BS406	Advance RDBMS	-	-	4	50	-	50	100	150
		Total	12	4	8	-	-	220	480	700

TA : Teacher Assessment
CT : Class Test

Total Period = 24
Total Marks = 700

ESE : End Semester Examination
SUB TOT. : Subject Total
TOT. : Total

FIFTH SEMESTER:

S. No	Course No.	Subject	Evaluation – Scheme							
			Period			Sessional			Examination	
			L	T	P	TA	CT	TOT	ESE	Sub. Total
Theory										
1.	BS501	Programming in JAVA	3	1	-	10	20	30	70	100
2.	BS502	Data Communication & Networks	3	1	-	10	20	30	70	100
3.	BS503	Network Security	3	1	-	10	20	30	70	100
4.	BS504	Software Engineering	3	1	-	10	20	30	70	100
Practical										
1.	BSP51	Programming in JAVA	-	-	4	50	-	50	100	150
2.	BSP52	Data Communication & Networks	-	-	4	50	-	50	100	150
		Total	14	4	8	-	-	220	480	700

Total Period = 24
Total Marks = 700

SIXTH SEMESTER:

S. No	Course No.	Subject	Evaluation – Scheme							
			Period			Sessional			Examination	
			L	T	P	TA	CT	TOT	ESE	Sub. Total
Theory										
1.	BS601	E-Governance	3	1	-	10	20	30	70	100
2.	BS602	Advance Programming in JAVA	3	1	-	10	20	30	70	100
Practical										
1.	BSP62	Advance Programming in JAVA	-	-	4	-	-	50	100	150
2.	BSSM	Seminar	-	-	2	-	-	-	50	50
3.	BSPR	Project	-	-	10	-	-	-	100	100
		Total	6	2	16	-	-	110	390	500

TA : Teacher Assessment

Total Period = 24

CT : Class Test Total Marks = 500
ESE : End Semester Examination

SUB TOT. : Subject Total

TOT. : Total

Note: The students with the help of the Institution may do summer training of 6-8 weeks duration, after II and IV Semester in an organization (academic or industrial) which will be submitted in the organization.

Each theory paper will of 100 marks comprising of 70 marks for University examination and 30 Marks for sessional. Each practical will be of 150 marks (100 marks of University examination and 50 Marks for sessional). The following in the distribution for marks (Semester wise):

	Theory	Practical	Total
1. Semester I	4x100	2x150	700
2. Semester II	4x100	2x150	700
3. Semester III	4x100	2x150	700
4. Semester IV	4x100	2x150	700
5. Semester V	4x100	2x150	700
6. Semester VI	2x100	1x150	350
6. Semester VI (a) Seminar (b) Project		50 100	
TOTAL			4000

BS101 : Fundamental of Computers and Information Technology

Computer system concept, computer system characteristics, capabilities and limitations, types of computers – analog, digital, hybrid, general, special purpose, micro, mini, mainframe, super. generations of computers, personal computer (PC) - IBM PC, characteristics, PC/PCXT/PCAT - configurations, Pentium and newer PC specifications and main characteristics. Types of PC- desktop, laptop, notebook, palmtop, workstations etc, their characteristics, add on cards on PC : sound card, video card, network card etc. Basic components of a Computer System - Control Unit, ALU, Input / Output functions and Characteristics, Memory – RAM, ROM, EPROM, PROM and other types of memory.

Input devices-Keyboard, Mouse, Trackball, Joystick, Digitizing Tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light Pen, Touch Screen – Working Principles, Areas of use & characteristics.
Output Devices – Monitors, Characteristics and Types of Monitor – Digital, Analog, Size, Resolution, Refresh Rate, Interlaced / Non Interlaced, Dot Pitch, Video Standard – VGA, SVGA, XGA etc.

Printers - Daisy Wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter
Storage Devices –Fundamentals, Primary Vs Secondary, Data Storage and Retrieval
Methods - Sequential, Direct and Index Sequential, Various storage devices - Magnetic Tape, Magnetic Disks, Cartridge Tape, Hard Disk Drives, Floppy Disks(Winchester Disk), Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drive.

Need, Types of Software - System Software, Application Software, System Software - Operating System, Utility Program, Programming Languages, Assemblers, Compilers and Interpreter, Operating Systems - Functions, Types - Batch, Single, Multiprogramming, Multiprocessing, Programming Languages- Machine, Assembly,
High Level, 4GLs, Their merits and demerits, Application Software – Word Processing, Spreadsheet, Presentation Graphics, Data Base Management Software, Characteristics, Uses and examples and area of applications of each of them.
Virus, Types of Viruses, Virus detection and prevention Viruses on Network. Introduction to Multimedia.

References:

1. INTRODUCTION TO COMPUTERS AND INFORMATION TECHNOLOGY BY ANURAG SEETHA, RAM PRASAD & SONS, BHOPAL.
2. COMPUTERS TODAY BY S.K.BASANDRA, GALGOTIA PUBLICATIONS.
3. FUNDAMENTALS OF INFORMATION TECHNOLOGY BY ALEXIS LEON & MATHEWS LEON, VIKAS PUBLISHING HOUSE, NEW DELHI.

BS102 : Programming in 'C'

Programming in C: History, Introduction to C Programming Languages, Structure of C programs, compilation and execution of C programms. Debugging Techniques, Data Types and Sizes, Declaration of variables, Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor

Operators: Unary operators, Arithmetic & logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation. Control Statements: if-else, switch, break, continue, the comma operator, go to statement.

Loops: for, while, do-while.

Functions: built-in and user-defined, function declaration, definition and function call, parameter passing: call by value, call by reference, recursive functions, multifile programs.

Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure. And address of (&) operator, pointer to pointer, Dynamic Momory Allocation, calloc and malloc functions, array of pointers, function of pointers, structures and pointers.

References:

1. V. Rajaraman, "Fundamentals of Computers", PHI
2. Pater Norton's "Introduction to Computer", TMH
3. Hahn, "The Internet complete reference", TMH
4. Peter Nortton's, "DOS Guide", Prentice Hall of India
5. Gottfried, "Programming in C, Schaum's Series Tata McGraw Hill

BS103 : Mathematical Foundation

Relation: Type and compositions of relations, Pictorial representation of relations, Equivalence relations, Partial ordering relation.

Function: Types, Composition of function, Recursively defined function.

Mathematical Induction: Piano's axioms, Mathematical Induction, Discrete Numeric Functions and Generating functions, Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients, Asymptotic Behaviour of functions

Algebric Structures: Properties, Semi group, monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups.

Prepositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram.

Lattices: Introduction, Ordered set, Hasse diagram of partially ordered set, Consistent enumeration, Isomorhic ordered set, Well ordered set, Lattices, Properties of lattices, Bounded lattices, Distributive lattices, and Complemented lattices.

Classification & Presentation of Data including diagrammatic presentation. Measures of central tendency – Mean, Mode, Median, Geometric & Harmonic. Measures of dispersion - Range, Quartile Deviation, Average & Standard deviation.

Type of sampling : Probability Vs. Non Probability, Sampling, Random, Non Random, Sampling, Size of sample. Probability theory – Baye’s Probability.

Simple Bivariate, Correlation & regression. Only concept of partial & multivariate correlation & regression. Index numbers – Aggregative & average of price relative methods.

References:

1. Liptschutz, Seymour, "Discrete Mathematics", TMH.
2. Trembley, J.P. & R. Manohar, "Discrete mathematical Structure with Application to Computer Science", TMH.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications', TMH.
4. C.L.Liu "Elements of Discrete Maehmatics", McGraw Hill.
5. Peter Grossman, "Discrete Mathematics for Computer", Palgrave Macmillian.

BS104 : Financial Accounting

Accounting: Principles, Concepts and conventions, double entry system of accounting, Ledger posting and Trial balance. Final Accounts: Trading, profit and loss accounts and balance sheet of sole proprietary concern with normal closing entries. Introduction to manufacturing account of partnership firms, limited company.

Capital Budgeting: Meaning, importance, difficulties, Introduction to evaluation techniques - Traditional techniques (ARR Payback method). Discounting cash flow techniques (Present value, NPV, IRR) Ratio Analysis: Meaning, advantages, limitations of ratio analysis, Types of ratios and their usefulness.

Costing: Nature, importance and Types of cost Marginal costing: Nature, scope and importance of marginal costing. Break-even analysis, its uses and limitations, construction of break-even charts. Practical applications of marginal costing. Inventory Control System: The need cost of inventory, methods of inventory costing.

References:

1. S.N. Maheswari & S.K. Maheshwari, "Introduction of Fincncial Accountancy" Vikas Pulication.
2. S.N. Maheshwari & S.K. Maheshwari, "Advanced Accountancy" Vikas Pub.
3. S.N. Maheshwari & S.K. Maheshwari "Financial Management, Vikas Pub.

BS201 : Data Structures

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off. Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered list, Sparse Matrices, and Vector. Stacks: Array Representation and Implementation of stack, Operations and Stacks: Push and POP, Array Representation of Stack, Linked Representation of stack, Operations Associated with Stacks, Application of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes.

Queues: Array and linked representation and implementation of queues, Operations on Queue; Create, Add, Delete, Full and Empty, Circular queue, Dequeue, and Priority
Queue. Link List: Representation and implementation of Singly linked lists, Two-way
Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Trees: Basic terminology, Binary Tree, Binary tree representation algebraic Expressions, Complete Binary Tree, Extended Binary Tree, Array and Linked Representation of
Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary tree, Huffman algorithm. Searching and Hashing: Sequential search, comparison and analysis, Hash Table, Hash Function, Collection Resolution Strategies, Hash Table Implementation.

Sorting: Insertion Sort, Bubble sorting, Quick Sort, Two way Merge Sort, Trees: Binary Search (BST), Insertion and Deletion in BST.

References:

1. Horowitz and Sahani, "Fundamentals of data Structures" Galgotia
2. R. Kruse etal, "Data Structures and Program Design in C" Person Education
3. A.M. Tenenbaum etal, "Data Structures and Program Design in C" Person Education
4. Lipschutz, "Data Structure", TMH
5. K Loudon, "Mastering Algorithms With C", Shroff Publishers and Distributors
6. Bruno R Preiss, "Data Structure and Algorithms with Object Oriented Design Pattern in C++, Jhon Wiley & Sons, Inc.
7. Adm Frozdek, "Data Structures and Algorithms in C++" Thomson Asia
8. Pal G. Sorenson, "An Introduction to Data Structures with Application", TMH

BS202 : Object Oriented Programming using 'C++'

Introduction: Introduction to OOP, Basic Concepts of OOP, Applications of OOP. Introduction to C++, Introduction to C++ stream I/O, declarations in C++, Creating New data types in C++, function Prototypes, Inline functions, Reference Parameters, Const Qualifier, Dynamic memory allocation, default arguments, Unary Scope resolution operator, Linkage specifications.

Class, Constructors, Friend Class : Introduction, Comparing class with Structure, Class Scope, Accessing Members of a class, Constructor, Destructor, Const objects, Const member functions, Friend class, Friend function, This pointer, Data abstraction and Information hiding, container classes and Iterators

Overloading & Inheritance: Operator Overloading, Fundamentals, Restrictions, Overloading stream, Insertion and stream extraction operators, Overloading unary & binary operators, Converting between types, Overloading ++ and --. Inheritance, Introduction, Protected members, Casting base _class pointers to derived _class pointers Overloading Base class members in a Derived class, Public, Protocols and Private inheritance, Direct base classes and Indirect Base Classes, Using Constructors and Destructors in Derived classes, Implicit Derived class object to base class object conversion.

Virtual Functions: Introduction, Type fields and switch statements, Virtual functions, Abstract base classes and concrete classes, Polymorphism, Dynamic binding, Virtual destructors.

C++ Stream I/O: Streams, Stream Input, Stream Output, Unformatted I/O, Stream manipulators, Stream format states, Stream error, States.

Files : File Operations –File pointers – error Handling during file Operations

References:

1. Deitel H.M. & Deitel P.J. – "How to Program C++" – PHI – 2003
2. Al stevenes – "C++ Programming" – Wiley dreamtech – 2003.
3. Herbert Scheldt, "Complete Reference".
4. E. Balagurusamy "Object Oriented Programming with C++".
5. Yashwant Kanetkar, "Let Us C++".
6. C++ Programming by Herbert Scheldt – 2004.

BS203 : System Analysis and Design

System Concepts and Information System Environment: The System Concept, Definition, Characteristics of Systems, Elements of a System, Open and Closed and closed system, Formal & Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

The System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation & Maintenance.

The Role of the Systems Analyst: Historical Perspective, Academic & Personal Qualifications, the multifaceted role of the Analyst, The Analyst/User Interface, Behavioral issues.

Systems Planning & Initial Investigation: Strategies for Determining Information
Requirement, Problem Definition & Project initiation, Background Analysis, Fact
Analysis, Review of Written Documents, Onsite Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Information Gathering: Kind of Information needed. Information about the firms,
Information gathering tools, the art of Interviewing, Arranging the Interview, Guides to Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

The Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.

Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, Requirements form Design.

References:

1. Elias M.Awad, "Systems Analysis & Design" Galgotia Publication
2. Hoffer, "Modern Systems Analysis & Design" Addision Wesley
3. Kendall, "Introduction to System Analysis & Desogm", McGraw Hill

BS204 : Probability & Statistical Techniques

Data representation, Histogram, frequency distribution, Ogive, Arithmetic mean and Geometric Mean, Harmonic Mean, Medium quadrates.

Probability Theory: Sample space & events, the axioms of probability, some elementary theorem, conditional probability, Baye's Theorem, mathematical expectation.

Probability distribution: random variables, binomial distribution, hyper geometric distribution, chebyshev distribution, Poisson distribution, geometric distribution, Erlang distribution.

Probability Densities: continuous random variables, normal distribution, uniform distribution.

Example of Least square, fitting of curves. Correlation and regression.

Theory of Sampling: Sampling, sampling of attributes, Mean of standard deviation of sample, Sampling distribution, Distribution of the means.

Chi square test as a goodness of fit, Chi square test as test of independence.

References:

1. Bernstein: " Element of statistics", PHI
2. Hogg:" Introduction Mathematical Statistics", Pearson Education
3. Lipschutz, " Introduction to Probability & Statistics" PHI

BS301 : Computer Based Numerical Techniques

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation. Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration method, Regula-Falsi method, Newton Raphson method, Secant method, Rate of convergence of iterative methods.

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct method and pivoting, III conditioned system of equations, Refinement of solution. Gauss Seidal iterative method, Rate of Convergence. Interpolation and approximation: Finite Differences, Difference tables. Polynomial Interpolation: Newton's forward and backward formula Central Difference Formulae: Gauss forward and backward formula, stirling's Bassel's Everett's formula. Interpolation with unequal intervals: Language's Interpolation, Newton Divided difference formula, Hermite's interpolation Approximation of function by Taylor's series and Chebyshev polynomial.

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapazoidal rule, Simpon's rules, Boole's Rule Euler-Maclaurin
Formula Solution of Differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta methods, Predictor-corrector method, Automatic error monitoring, stability of solution.

References:

1. Rajaraman V., :Computer Oriented Numerical Methods". PHI
2. Gerald and Wheatley, "Applied Numerical Analyses", AW
3. Jain, Lyengar and Jain, "Numerical Methods for Scientific and Engineering Computations:, New Ager Int.
4. Grewal B.S., "Numerical methods in Engineering and Science. Khanna Publishers, Delhi.
5. T.Veerarajan, T Ramchandran, "Theory and Problems of Numerical Methods", TMH

BS302 : DBMS

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DMI, Overall Database structure. Data modeling using the Entity Relationship Model:
ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Relational Data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joints, Unions, Intersection, Minus, Cursors in SQL. PL/SQL, Triggers and clusters.

Database Design & Normalization: Functional dependencies, normal forms, first, second third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design

Transaction Processing Concepts: Transaction system, Testing of seralizability, Seralizability of schedules, conflict and view seralizable schedule, recoverability, Recovery form transaction failures, deadlock handling .

References:

1. Date C.J. "An Introduction to Database System". Addision Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
3. Elmasri, Navathe, "Fundamentals of Database Systems" Addision Wesley
4. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Pub.

BS303 : Digital Electronics

Representation of information & Basic Building Blocks: Introduction to Computer,
Computer hardware generation, Number System: Binary, Octal, Hexadecimal, Character Codes (BCD), ASCII, EBCDIC and their conversion. Logic gates, Boolean Algebra, Kmap simplification, Half Adder, Full Adder, Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer, Carry look ahead adder, Combinational logic Design, Flip-Flops, Registers, Counters (Synchronous and asynchronous), ALU, Micro-operation. ALU-chip, Faster Algorithm and Implementation (multiplication & Division).

Basic Organization: Operational flow chart (Fetch, Execute, Instruction Cycle),
Organization of Central Processing Unit, Hardwired & micro programmed control unit, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, data transfer & Manipulation, I/O Organization, Bus Architecture, Programming Registers.

Memory Organization: Memory hierarchy, Main memory (RAM/ROM) chips), Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.

I/O Organization: Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication. I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.

References:

1. Willam Stalling, "Computer Organization & Architecture" Pearson Education Asia
2. Mano Morris, "Computer System Architecture" PHI
3. Zaky & Hamacher, "Computer Organization: McGraw Hill
4. B. Ram, "Computer Fundamental Architecture & Organization" New Age
5. Tannenbaum, "Structured Computer Organization" PHI.

BS304 : Web technology

History of the web, Growth of the Web, Protocols governing the web, Introduction to Cyber Laws in India, Introduction to International Cyber laws, Web project, Web Team, Team dynamics.

Communication Issues, the client, Multi-departmental & Large scale Websites, Quality Assurance and testing, Technological advances and Impact on Web Teams.

HTML: Formatting Tags, Links, List, Tables, Frames, forms, Comments in HTML, DHTML. Java Script: Introduction, Documents, Documents, forms, statements, functions, objects in Java Script, Events and Event Handling, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.

XML: Introduction, Display and XML Documents, Data Interchange with an XML document, Document types definitions, Parsers using XML, Client-side usage, Server Side usage.

Common Gateway Interface (CGI), PERL, RMI, COM/DCOM, VBScript, Active Server Pages (ASP).

References:

1. Burdman, "Collaborative Web Development", Addison Wesley
2. Sharma & Sharma, "Developing E-Commerce Sites" Addison Wesley
3. Iva Bayross, "Web Technologies Part-II" BPB Publications
4. Shishir Gundavarma, CGI Programming on the World Wide Web" O'Reilly & Associate
5. DON Box, "Essential COM" Addison Wesley
6. Greg Buczek, " ASP Developer's Guide" TMH

BS401 : Operating system

Introduction: Definition, Design Goals, Evolution; Concept of User, job and Resources; Batch processing, Multi-programming, Time sharing; Structure and Functions of Operating System.

Process Management: Process states, State Transitions, Process Control Structure, Context Switching, Process Scheduling, Threads.

Memory Management: Address Binding, Dynamic Loading and Linking Concepts,
Logical and Physical Addresses, Contiguous Allocation, Fragmentation, Paging, Segmentation, Combined Systems, Virtual Memory, Demand Paging, Page fault, Page replacement algorithms, Global Vs Local Allocation, Thrashing, Working Set Model, Paging.

Concurrent Processes: Process Interaction, Shared Data and Critical Section, Mutual Exclusion, Busy form of waiting, Lock and unlock primitives, Synchronization, Classical
Problems of Synchronization, Semaphores, Monitors, Conditional Critical Regions, System Deadlock, Wait for Graph, Deadlock Handling Techniques: Prevention, Avoidance, Detection and Recovery.

File and Secondary Storage Management: File Attributes, File Types, File Access Methods, Directory Structure, File System Organization and Mounting, Allocation Methods, Free Space management; Disk Structure, Logical and Physical View, Disk Head Scheduling, Formatting, Swap Management. Protection & Security.

References:

1. Silberschatz and Galvin, Operating System Concepts 6/ed, Addison Wesley.
2. William Stalling, Operating Systems: Internals and Design Principles 5/ed, PHI.
3. Tanenbaum, Modern operating Systems, PHI.
4. J Bach, The Design of UNIX Operating System, Pearson Education.
5. Vijay Mukhi, The C Odessy, BPB.
6. Peterson and Silberschatz, Operating System Concepts, Addison Wesley.
7. P. B. Hansen, Operating System Principles, PHI.
8. K. Christian, The UNIX Operating System, John Wiley.
9. A. N. Haberman, Introduction to Operating System Design, Galgotia.

BS402 : Advance RDBMS

Data Processing Systems. Transaction Processing and Concepts: Transaction system, Testing of seralizability, Seralizability of schedules, conflict and view seralizable schedule, recoverability, Recovery form transaction failures, deadlock handling .

File processing system. File Management system. Components of RDBMS. Database Architecture.
Object Oriented Databases. Distributed Databases. Client/server database. Data Dictionary. Database models. Normalization. The Database Administration. Database Manager responsibilities.
Monitoring Database performance. Database Machine overview.
Designing RDBMS for organization. Object modeling. Perspectives of Data Modelling. Evolving the logical model. Transformation from Logical to Phical model.

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control. CODD's 12 rules for a fully relational DBMS.

Data Integrity. Redundancy. Primary and Foreign keys.

Object database management. Database design and choosing the database server. SQL and MySql. Database access and ODBC.

Middleware: Kinds of middleware. Sockets-talking to database, virtual database engine defined, web based middleware, Microsoft JET engine,

Database security and Recovery. Data Mining and Warehouse.

References:

1. Adv. DBMS by V.K. Jain, Cyber Tech Publication, 5A/13 Ansari Road, Daryagang, N.Delhi.-110002
2. Date C.J. "An Introduction to Database System". Addision Wesley
3. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
4. Elmasri, Navathe, "Fundamentals of Database Systems" Addision Wesley
5. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
6. Bipin C. Desai, "An introduction to Database Systems", Galgotia Pub.

BS403 : Management Information System

Fundamentals of Information Systems, Systems approach to problem solving, Developing information system solutions, Levels of MIS (Top, Middle, Lower).

Corporate Databases & Database Management, Data Organization, Data models, Data Security & Information quality.

Transaction Processing Systems, Executive Information Systems, Decision Support Systems, Expert Systems, Information Systems in Marketing, Manufacturing, HRM, Accounting and Finance.

Information Resource Management, Planning Implementing & Controlling Information Systems, Computer Crime, Ethics & Society.

References:

1. Brein James O. – Management Information Systems
2. Murdick & Ross – Information Systems for Modern Management
3. Parker C.S. – Management Information Systems – Strategy and Action.
4. Aktas A.Ziya – Structured Analysis and Design of Information Systems.

BS404 : Multimedia Technology and Application

Evolution of Multimedia and its objects, Scope of multimedia in business & work, production and planning of Multimedia applications. Multimedia hardware, Memory of Storage Devices, Communication Devices, Multimedia Software, Presentation and object generation tools, Video, sound, Image capturing Authoring Tools, Card & Page Based Authoring Tools.

Production and Planning of Multimedia building blocks, Text, sound (MIDI), Digital Audio, Audio File Formats, MIDI under Windows environment, Audio & Video Capture.

Macromedia products, Basic drawing techniques, Advance animation techniques, Creating Multi layer combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.

Digital Audio Concepts, Sampling variables, Loss Less compression, of sound, Lossy compression & Silence compression.

Multimedia monitor bitmaps, Vector drawing , Lossy graphic compression, Image file formatic animations, Image standards, JPEG compression, Zig Zag coding. Video representation, colors, video compression, MPEG standards, MHEG standard, recent development in multimedia. Multimedia Application Planning, Costing, Proposal preparation, and Financing-Case study of a typical industry.

References:

1. Andreas Halzinger, "Multimedia Basics" Vol-I to VOL-III Firewall Media
2. Tay Vaughan, "Multimedia Making It work" Tata McGraw Hill
3. Buford, "Multimedia Systems" Addison Wesley

BS501 : Programming in JAVA

Java Programming: Introduction, Operator, Data types, Variables, Methods and Classes, Multi threaded programming, I/O Java applet.

Java Library: String handling, I/O exploring JAVA, Networking, Applet Classes, Event Handling, Introduction to AWT, Working with windows, Graphics, AWT Controls, Layout manager and menu, Images, Additional Packages.

Software Development Using Java: Java Bean, Java Swing, Java Servlets, Migrating from C++ to Java, Application of JAVA, Dynamic Billboard Applet.

Image Menu: An image based menu, Lavatron Applets, Scrabblets JDBC, Brief functioning of Upper Layer E-mail and their applications.

References:

1. Naughton, Schidt, "The Complete Reference JAVA2", TMH
2. Balagurusamy E, "Programming in JAVA, TMH
3. Dustin R. Calway, "Inside Serviets" Addison Wesley
4. Mark Wutica, "Java Enterprise Edition" QUE
5. Steven Hoizner, "Java2 Black book" Dreamtech

BS502 : Data Communication & Networks

Introductory Concepts: Goals and Applications of Networks, Network structure and architecture, the OSI reference model, services, networks topology, Physical Layer transmission, switching methods, Integrated services digital networks, terminal handling.

Medium Access sub Layer: Channel allocations, LAN protocols, ALOHA Protocols-Pure Aloha, slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, IEEE standards, FDDI, Data Linked Layer elementary data link protocols, sliding windows protocols, error handling, High Level Data Link Control.

Network Layer: Point-to Point networks, routing algorithms, congestion control algorithms, internetworking, TCP/IP packet, IP addresses, Ipv6.

Transport Layer: Design issues, connection management, TCP window Management, User Datagram Protocol, Transmission Control Protocol.

Application Layer: Network Security, DES, RSA algorithms, Domain Name System, Simple Network Management Protocol, Electronic mail, File Transfer Protocol, Hyper Text Transfer Protocol, Cryptography and compression Techniques.

References:

1. A.S. Tanenbaum, "Computer Networks, 3rd Edition," PHI
2. W.Stallings, "Data and Computer Communication" Macmillan Press
3. Comer, "Internetworking with TCP/IP" PHI
4. Comer, "Computer networks & Inter" PHI
5. Forouzan, "Data Communication and Networking:. TMH

BS503 : Network Security

Introduction To security: Attacks, Services & Mechanisms, Security, Attacks, Security Services, Conventional Encryption: Classical Techniques, Conventional Encryption Model, and steganography, Classical Encryption Techniques. Modern Techniques: Simplified DES, Block Cipher Principles, DES Standard, DES Strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of Operations.

Conventional Encryption Algorithms: Triples DES, Blowfish, International Data Encryption Algorithm, RCS, CAST-128, CR2 Placement & Encryption Function, Key Distribution, Random Number Generation, Placement of Encryption Function.

Hash Functions: Message Authentication & Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Function Birthday Attacks, Security of Hash Function & MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA), Digital Signatures: Digital Signature, Authentication Protocol, Digital Signature Standard (DDS) Proof of Digital Signature Algorithm.

Network & System Security: Authentication Applications: Kerberos X-509, Directory Authentication Service, Electronic Mail Security, Pretty Good Privacy (PGP),S/Mine Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management.

References:

1. William Stallings, "Cryptography and Network Security: Principles and Practice"' Prentice hall, New Jersey
2. Johannes A. Buchmann, "Introduction to Cryptography" Springer-Verlag
3. Atul Kahate, "Cryptography and Network Security" TMH

BS504 : Software Engineering

Introduction: Introduction to software engineering, Importance of software, evolving role of software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software engineering problems, Software Development Life Cycle, Software Process.

Software Requirement Specification: Analysis, Principles, Water Fall Model, The Incremental Model, Prototyping, Spiral Model, Role of management in software development, Role of matrices and Measurement, Problem Analysis, Requirement specification, Monitoring and Control.

Software-Design: Design principles, problem partitioning, abstraction, top down and bottom up-design, Structured approach functional versus object oriented approach, design specifications and verification, Monitoring and control, Cohesiveness, coupling, Forth generation techniques, Functional independence, Software Architecture, Transaction and Transaction and Transform Mapping, Component level Design, Forth Generation Techniques.

Coding: Top-Down and Bottom-Up programming, structured programming, information hiding, programming style and internal documentation.

Testing principles, Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, software testing strategies, Verification and validation, Unit testing, Integration Testing, Alpha & Beta testing, system testing and debugging.

Software Project Management: The Management spectrum (The people, the product, the process, the project) Cost estimation, project scheduling, staffing, software configuration management, Structured Vs. Unstructured maintenance, quality assurance, project monitoring, risk management.

Software Reliability & Quality Assurance: Reliability issues, Reliability metrics, Reliability growth modeling, Software quality, ISO 9000 Certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM. CASE (Computer Aided Software Engineering): CASE and its scope, CASE support in software life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

References:

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach Ed. Boston: McGraw Hill, 2001
2. Jalote, Pankaj, "Software Engineering Ed.2"New Delhi: Narosa 2002
3. Schaum's Series, "Software Engineering" TMH
4. Ghezzi Carlo and Others "Fundamentals of Software Engineering" PHI
5. Alexis, Leon and Mathews Leon, "Fundamental of Software Engg.
6. Sommerville, Ian, "Software Engineering" AWL

BS601 : E-Governance

Introduction: E-Governance - Technology and Prospects, Definition of E-Governance, Economic potential of E-Governance, Incentives for engaging in E-Governance, forces behind E-Governance, Advantages and Disadvantages, Architectural framework, Impact of E-Governance.

Network Infrastructure of E-Governance: Internet based E-Governance Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY).

Mobile Commerce: Introduction, Wireless Application Protocol, WAP Technology, Mobile Information device, Mobile Computing Applications.

Web Security: Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging client server, Security Threats, Network Security, Factors to consider in Firewall design, Limitation of Firewalls.

Encryption: Encryption techniques, Symmetric Encryption-Keys and data encryption standard, Triple encryption. Asymmetric encryption-Secret key encryption, public and private pair key encryption, Digital Signature, Virtual Private Network.

Electronic Payments: Overview, The SET protocol, payment Gateway, certificate, digital
Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking EDI Application in business, E-Commerce Law, Forms of Agreement, Govt. policies and Agenda.

References:

1. Ravi Kalakota, Andrew Winston, :Frontiers of Electronic Commerce" Addison Wesley.
2. Bajaj and Nag. "E-Commerce the cutting edge of Business". TMH.
3. P. Loshin, John Vacca, "Electronic Commerce" Firewall Media, N.Delhi.
4. E Business & Commerce: Brahm Cazner, Wiley dreamtech.

BS602 : Advance programming in JAVA

Core Java: Introduction Operator, Data Types, Variable, Arrays, Control statements, Methods & classes, Inheritance , Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling, Introduction to AWT, AWT controls, Layout manager, Menus, Images, Graphics.

Java Swing: Creating a swing applet and application, Programming using Panes,
Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes,
Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box Progress Bar,
Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner Frame. JDBC: The connectivity Model, JDBC/ODBC Bridge, java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database.

Java Beans: Application Builder tools, The bean developer kit (BDK). JAR files, Introspection, Developing a simple bean, using Bound properties. The Java Beans API, Session Beans, Entiry Beans, Introduction to Enterprise Java beans (EJB).

Introduction to RMI (Remote Method Invocation): A simple client server application using RMI.

Java Servlets: Servlet API basic, Life cycle of a servlet, Running Servlet, Debugging Servlets. Thread-safe servlets HTTP Redirects, Cookies, Introduction to Java Server ages (JSP).

References:

1. Margarel Leving Young."The complete Reference Internet" TMH
2. Naughton, Schidt, "The Complete Reference JAVA2", TMH
3. Balagurusamy E, "Programming in JAVA, TMH
4. Dustin R. Calway, "Inside Serviets" Addison Wesley
5. Mark Wutica, "Java Enterprise Edition" QUE
6. Steven Hoizner, "Java2 Black book" Dreamtech