SYLLABUS

B.Sc.
INFORMATION TECHNOLOGY

B.Sc. - I Year

S. No.	Paper	Paper Name	Marks	Total
1.	I	Information Theory and Digital Electronics	50	200
2.	II	Discrete Mathematics	50	
3.	III	C and C++	50	
4.	Practical	MS Office and C/C++ Programming implementing Data Structure	50	

B.Sc. - II Year

S. No.	Paper	Paper Name	Marks	Total
1.	I	Software Engineering	50	200
2.	II	Operating System	50	
3.	III	Database Concepts and System	50	
4.	Practical	SQL, PL/SQL and Shell Programming(Unix)	50	

B.Sc. - III Year

S. No.	Paper	Paper Name	Marks	Total
1.	I	Computer Graphics	50	300
2.	II	Operation Research & Optimization Techniques	50	
3.	III	Visual Programming and Web Technology	50	
4.	Practical	VB, HTML/DHTML, Graphics in C	75	
5.	Project Report	Project Report-Visual Basic, Web Technology	25	

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B.Sc.-I (INFORMATION TECHNOLOGY)

PAPER- I
Information Theory and Digital Electronics

UNIT- I:
Information- Definition, Characteristics & Interpretation, Data & Its logical and physical concepts.

UNIT- II:
Computers: History of Computers and their classification, Basic Organization, Memory: Primary- RAM, ROM, EPROM etc. Secondary- Magnetic-Floppy and Hard Disks, Optical - CDROM, WORM etc. Concept of Virtual Memory and Cache Memory and why are they needed, I/O Devices, Computer Operation- Instruction Cycle, Program flow of control with and without interrupts, Computer Arithmetic- Number systems Decimal, Binary, Octal, Hexadecimal and their conversion, Binary Addition, Subtraction and Multiplication, Floating point representation and arithmetic, Computer Language- Introduction to computer language, Definition of assembler, compiler and Interpreter

UNIT- III:
TeleCommunication- Concept of Analog and Digital Signal, Channel Capacity(Shannon's Theorem), Transmission Impairments, Concept of Signal to Noise ratio, Encoding/Decoding(Concept of Parity bit, Hamming Code), Transmission Media, A/D and D/A conversion, Modulation, Communication technique- circuit, message, packet switching- their advantages and disadvantages. Type of Networks (LAN, MAN, WAN etc), Topologies, Network configuration- Basic Protocols OSI, TCP/IP, Token ring, Internet- introduction to internet terminologies and concept of WWW, HTTP, E-mail, GIAS, Search engine, Domain name etc., FDM/TDM, Sampling theorem, PAM, PWM, PDM, PPM

UNIT- IV:
Digital electronic signals and switches- concept on digital signal, logic levels, Active high, Active low signals, Transistor.

Logic Gates- AND, OR, NOT, NOR, EX-OR, EX-NOR operations and their truth table, Boolean Algebra and reduction techniques- K- Maps.

Complement Subtraction Circuits- Half Adder, Full Adder, Half Subtracter , Full Subtractor, Various Code convertors.

Multiplexers (MUX)- Working of MUX, Implementation of expression using MUX
Demultiplexers (DEMUX)- Implementation of expression using DEMUX, Decoder.
FLIP FLOPS -Concepts, S-R, J-K, Preset &Clear, Master-Slave J-K D,T, Flip Flops with truth table

Unit-V

Introduction to 8085 microprocessor :-Organization of microprocessor based system, 8085 microprocessor Architecture , Concepts of Address line and memory interfacing, Instruction Format Modern day computer System :- Organization and Architecture, Structure and Function ,System buses ,Input/output modules,
Concept of parallel processing – Multiprocessing -Organization, Time-Shared Bus, Multiport Memory, Central Control Unit. Pipelining

SUGGESTED BOOKS

1. Computer Organization & Architecture –Designing & Performance, William Stallings, Prentice Hall of India.
2. Computer Networks, Andrew S.Tanenbaum, Prentice Hall of India.
3. George Kennedy,"Electrical Communication System",Tata McGraw Hill.
4. Digital Electronics-An Introduction to Theory and Practice, William H.Gothmann, Prentice Hall of India.
5. Microprocessor Architecture and Programming and Applications with the 8085, R.S.Gaonkar, PRI

SYLLABUS

B.Sc.- I (INFORMATION TECHNOLOGY)

PAPER- II
Discrete Mathematics

Unit-I
Fundamentals **–** Sets and subsets, Operations on sets, Sequences, Division in the integers, Mathematical Structures. Logic **–** Propositions and logical operations, Conditional Statements, Methods of Proof, Mathematical induction

Unit -II
Counting **–** Permutation, Combinations, Pigeon hole principal.
Relation and Digraphs – Product sets and partitions , relations and digraphs, Paths in relations and digraphs, Properties of relations , Equivalence relations, Computer representation of relation and digraphs, Manipulation of relations , Transitive closure and Warshall's algorithm. Functions – Function for computer science, Permutation functions growth of function

Unit -III
Graphs Theory **–** Graphs, Euler Paths and circuits, Hamiltonian paths and circuit coloring Graphs .Orders Relations and Structure – Partially ordered sets External elements of Partially ordered sets , Lattices , Finite Boolean Algebra ,Functions on Boolean Algebra.

Unit - IV
Trees **–** Labled tress, Tree searching, Undirected trees, Minimal spanning trees.
Semigroups and groups - Binary operations, Semigroups , Products and quotients of semigroups, Groups and products and quotients of groups, Groups and Coding.

Unit -V
Languages and Finite State machines **-** Languages, representation of special languages and grammars, Finite state machines , Semi groups, machines and languages, machines and regular languages.
Groups and coding- coding of binary information and error detection
Decoding and error correction

SUGGESTED BOOKS

1. Discrete Mathematics,Schaum Series
2. Discrete Mathematics with Application.Susanna S.Epp
3. Discrete Mathematics and its Application ,Kenneth H.Rosen

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B.Sc.-I (INFORMATION TECHNOLOGY)

PAPER- III
C and C++

Unit - I

C Fundamentals- Character set, Identifiers and keywords, Data Types, Constants, Variables and Arrays, Declarations, Operators & Expressions, Library functions, Statements, Symbolic Constants, Preprocessor directives

Data Input and Output- getchar(), putchar(), scanf(), printf(), gets(), puts() functions
Control Statements- if-else, while, do-while, goto , for statements, nested control structures, switch, break, continue statements, comma operator

Functions- Function prototypes, Passing arguments to a function by value, Recursion, Storage classes, Automatic, External, Static, Register variables in single file environment
Arrays- Definition, Processing arrays, Passing arrays to functions, Introduction to multidimensional arrays, arrays and strings

Pointers- declaration, referencing and de-referencing, passing pointers to functions, pointer to arrays, operations of files using pointers

Structures and Unions.

Unit - II

Data Structure- Definition and abstract data types, Stacks- definition, Array based implementation of stacks, Linked list, infix, prefix, postfix representation, Conversions, Applications. Queues , Dqueues and its implementation using C, Trees: Definition of trees and Binary trees : Properties ,Implementation ,Traversal pre-order ,post order ,In-order traversal. Threaded tree.
Graphs & Sorting Algorithms - Graphs- Definition of Undirected and Directed graphs Graph Traversal – Breadth first Traversal, Depth First Traversal, Array based implementation using C. Sorting Algorithm- Introduction of Sorting , sorting by exchange ,selection, insertion : Bubble sort, selection sort, Efficiency of above algorithms Merge sort and algorithms, Quick sort algorithm.

Unit - III

OOPs Concept – Introduction to C++,Structured Oriented programs Vs Object Oriented Programs , Modularity ,Class ,Object , Inheritance and its types , Polymorphism , Operator Overloading, Access Specifiers , Constructors and Destructors, Functions in C++ -Inline function ,Friend Function, Abstract Class ,Virtual Class.

SUGGESTED BOOKS

1. Programming in C by Schaum Series
2. Let Us C by Yashwant Kanitkar BPB
3. Let Us C++ by Yashwant Kanitkar BPB
4. Object Oriented Programming ,Robert Lafore

LAB WORK

PC Hardware:

1. Introduction to all the Peripherals
2. To make comparative study of motherboards
3. To Observe and study various cables, connections, and parts used in computer communication.
4. To study use of LAN Cards etc.
5. To study the installation of softwares and Printers.

PC Software:

1. Study the Application of MS-Office 2003 or 2007.
2. Programs in C and C++
3. Implementation of Data Structure Using C.
4. Implementation of Class and Object Using C++.

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B.Sc. - II (INFORMATION TECHNOLOGY)

PAPER- I
Software Engineering

Unit-I

Introduction, what is software engineering?

Software Development Life Cycle, Requirements Analysis, Software Design, Coding, Testing, Maintenance etc.

Unit-II

Software Requirement Specification, Waterfall Model, Prototyping Model, Iterative Enhancement Model, Spiral Model, Role of Management in Software Development, Role of Metrics and Measurement, Problem Analysis, Requirement Specification, Validation, Metrics, Monitoring and Control

Unit-III

System Design, Problem Partitioning, Abstraction, Top-down and bottom-up design, Structured Approach, Functional v/s Object-Oriented Approach, Design specification & verification, metrics, Monitoring & Control

Coding, Top-down & Bottom-up, Structured Programming, Information Hiding, Programming Style, Internal Documentation, Verification, Metrices, Monitoring & Control

Unit-IV

Testing, Levels of Testing- Functional Testing, Structural Testing, Test Plan, Test Cases Specification, Reliability assessment.

Unit-V

Software Project Management, Cost Estimation, Project Scheduling, Staffing, Software Configuration Management, Quality Assurance, Project Monitoring, Risk Management.

SUGGESTED BOOKS

1. Software Engineering- A Practitioners Approach, R. Pressman, McGraw Hill
2. An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa

SYLLABUS

B.Sc. - II (INFORMATION TECHNOLOGY)

PAPER- II
Operating System

Unit-I
Operating System Introduction- what is an operating system, History of OS, OS concepts, Types of OS, OS Structure, System calls and Types
Processes- Introduction to process, Inter-process Communication, Process Scheduling

Unit-II
Memory Management- Introduction, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory Management- Demand Paging, Page Replacement

Unit-III
Deadlock- Prevention, Avoidance, Detection, Recovery, Algorithms

Unit-IV
Case Study of Unix

(a) Unix Operating System Overview- Unix System Architecture, Operating System Services, General Unix Commands like ls, cp, etc, Unix Utilities like grep , wc etc.
(b) Fundamentals of Unix shell programming - functions, variables, special symbols, looping and decision making, Test command, error checking in shell programming
(c) Introduction to "vi editor", Features, Use of various keys , and overall using vi editor for editing text.
(d) Security in Unix - Password, File Permissions, Directory Permissions.

SUGGESTED BOOKS

1. Operating Systems with case Studies by Achyut S Godbole,TMG.
2. Operating System Principles , Arbraham Silberschatz & Peter Baer Galvin
3. Working With Unix Vijay Mukhi , BPB Publication.
4. The Unix Programming Environment , Pike rob & Kerningham Brain.

SYLLABUS

B.Sc. - II (INFORMATION TECHNOLOGY)

PAPER- III
Database Concepts and System

Unit – I

Introduction –Overview of DBMS ,Various views of data ,data Models, Introduction to Database Languages, Advantages of DBMS over file processing system, Responsibility of Database Administrator

Unit – II

Introduction to Client/Server architecture ,Three Levels Architecture of database system ,E-R Diagram ,Mapping, Constraints , Keys , Models , Normalization(upto 4^{th} Normal forms),BCNF.

Unit –III

a) Relational Model, Relational Algebra &Various operations, Relational and Tuple Calculus.
b) File Organization- Sequential Files, Index Sequential Files, Direct Files, hashing, B-Tree Index files.

Unit-IV

Transaction- transaction Concepts, Concurrent Execution, Implementation of Atomicity and Durability, Serializability, Recoverability, Transaction Definition in SQL.
Concurrency Control- Lock based protocol, Timestamp based Protocol, Validation based protocol, Multiple Granularity
Query Optimization

Unit- V

Other Relevant Advance Topics and Applications- Object Oriented Database, DSS, Data Analysis, Data Mining, Data Warehousing, Mobility and Personal Databases
Oracle 8.0 Database: SQL, PL/SQL, Developer 2000

SUGGESTED BOOKS

1. Database Systems and Concepts, Henry F. Korth
2. DBMS by Date
3. Database Management System by Bipin Desai
4. Principles of Database System, Ullman, Galgotia Publication

LAB WORK

PC Software

1. Shell Programming (Unix)
2. Database Queries using SQL, PL/SQL
3. S/W Application Development using Developer 2000

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B.Sc. - III (INFORMATION TECHNOLOGY)

PAPER- I
Computer Graphics

Unit- I

Introduction, what is computer graphics? Elements of graphics workstation, Video Display Devices- Raster, Random, Input devices, Graphics Software Coordinate Representations, Fundamental problems in Geometry

Unit-II

Algorithms- Line drawing- DDA, Breshenham's, Frame Buffers, Circle and Ellipse generating algorithms- Midpoint Circle Algorithm, Midpoint Ellipse Algorithm, Polynomials and spline curves, Filling- Filled Area Primitives, Scan-Line Polygon Fill Algorithm, Inside-Outside Tests, Scan-Line Fill of Curved Boundary Areas, Boundary-Fill Algorithm, Flood-Fill Algorithm, Character Generation, Attributes of lines, curves, filling, characters etc.

Unit-III

Graphics Primitives, Primitive Operations, Display-File Structure, Display-File Algorithms, Display Control, Polygon Representation
Attributes of Output Primitives, Line Attributes- Line Type, Line Width, Pen and Brush Options, Line Color, Color and Grayscale levels- Color Tables, Grayscale, Area-Fill Attributes- Fill Styles, Pattern Fill, Soft Fill, Character Attributes, Text Attributes

Unit-IV

Geometric Transformations- Matrices, Scaling Transformations- Sin and Cos Rotation, Homogeneous Coordinates and Translation, Coordinate Translations, Rotation about an arbitrary point, Inverse Transformations, Transformation Routines, 2-D Viewing, viewing pipeline, Clipping Operations, 3-D Display methods, Parallel Projection, Perspective Projection, Visible Line and Surface Identification, Bezier Curves and Surfaces, B-Spline Curves and surfaces

Unit-V

Visibility, Image and object precision, Z-buffer algorithm
Computer Animations- Design, Animation Functions- Raster, Key-Frame, Morphing, Simulating Accelerations, Motion Specifications, Kinematics and Dynamics

SUGGESTED BOOKS

1. Computer Graphics, Donald Hearn & M. Pauline Baker, PHI
2. Computer Graphics by Hill Jr
3. Computer Graphics, Steven Harrington, McGraw-Hill

SYLLABUS

B.Sc.-III (INFORMATION TECHNOLOGY)

PAPER- II

Operation Research & Optimization Techniques

Unit-I

Operation Research- History of OR, Definition, Applications, Scope of OR, Limitations of OR, OR Models, Applications of various OR Techniques

Unit-II

Linear Programming Problems and Applications, Various Components of LP problem formulation, Solving Linear Programming problem using simultaneous equations and Graphical Method, Simplex Method and extensions, Sensitivity analysis- Duality theory, Revised Simplex Transportation and assignment problems

Unit-III

Network Analysis- shortest paths, Maximal Flow including PERT-CPM. Integer programming concepts, formulation, solution and application

Unit-IV

Game Theory – Introduction, Decisions under risk, Decision under uncertainty.

Unit –V

Queuing Theory – Introduction , Basic definitions & notations, axiomatic derivation of the arrival & departure distributions for Poission Queue, Poission Queuing model, M/M/1 queues in series, application.

SUGGESTED BOOKS

1. V.K.Kapoor- Operation Research
2. Kanti Swarup- Operation Research
3. Hillier & Liberman – Introduction to Operation Research
4. Vinod Kumar – Linear Programming

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B.Sc.-III (INFORMATION TECHNOLOGY)

PAPER- III
Visual Programming & Web Technology

Unit-I
Windows Concepts and Terminology, Key elements, Concepts of X- Windows System Introduction to Visual Basic, VBIDE and its components, Data types, Events, Methods, Procedure, Sub-function, Procedures, Control Statements and Looping , Array, VB Programming.

Unit –II
Toolbox- VB controls with their properties, Menu-Editor and its application, Dialog Boxes, MDI Application, OLE.

Unit-III
Data Controls and Reporting - RecordSets, ADODC, DAO, RDO, Data Control (Accessing records, Adding, Navigation, Editing and Deleting),Flex Grid, Databound controls.
Database Reporting - Data Environment Designer, Creating Data Report, Crystal Report.

Unit –IV
Web Technologies
HTML & DHTML – Introduction, Tags, Tables, Frames, Style Sheet, Dynamic Web Pages, Embedding Multimedia in Web Pages, Internet Programming with Visual Basic

E-commerce – Introduction, B to B, B to C, EDI, Elements of E-Commerce, Secure Business, Web store, Online Payment, Internet Banking.

Unit – V
Security- E-commerce security issues, Cryptography, Digital Signature & Authentication protocol, Digital Certificates. Online Security, Secure Electronic Transaction (SET)

SUGGESTED BOOKS

1. Visual Basic 6 from the Ground Up, Cornell, TMH
2. Learn Microsoft VB 6.0 Now, Halvorson, PHI/MSP
3. Web Technologies- Godbole A.S. & Kahate A., TMH
4. Web Technology & Design- Xavier C., New Age Publication

LAB WORK

PC Software

1. Creation of graphics using C library functions
2. Programming in Visual Basic
3. Web page development using HTML and DHTML tags, Images, Links, Tables, Frames, Animation
4. Project Development using VB as Front End and MS Access/Oracle as Back End