B.A. (Computer Science) – First Year(w.e.f. 2010-11)

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Exam Durations
	Semester I				
I	Computer Fundamentals & Programming in 'C'	30	5	35	3hrs
II	Logical Organization of Computer-I	30	5	35	3hrs
III	Practical (Programming in 'C')			30	3hrs
	Semester II				
IV	PC-Software	30	5	35	3hrs
V	Logical Organization of Computer –II	30	5	35	3hrs
VI	Practical (PC-Software)			30	3hrs

B.A. (Computer Science) - Second Year(w.e.f. 2011-12)

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Exam Durations
	Semester III				
I	Data Structures using 'C'	30	5	35	3hrs
II	Structured System Analysis & Design	30	5	35	3hrs
III	Practical (Implementation of data structure in 'C')			30	3hrs
	Semester IV				
IV	Operating Systems	30	5	35	3hrs
V	Programming in Visual Basic	30	5	35	3hrs
VI	Practical (Visual Basic)			30	3hrs

B.A. (Computer Science) - Third Year(w.e.f. 2012-13)

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Exam Durations
	Semester V				
I	Programming in 'C++'	30	5	35	3hrs
II	Introduction to Data Base Systems	30	5	35	3hrs
III	Practical ('C++')			30	3hrs
	Semester VI				
IV	Computer Networks	30	5	35	3hrs
V	Relational Database Management System	30	5	35	3hrs
VI	Practical (ORACLE)			30	3hrs

PAPER – I DATA STRUCTURES USING 'C'

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (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.

Maximum Marks: 35 **External: 30**
Internal: 5

Time: 3 hours

UNIT – I

The concept of data structure, Abstract data type, data structure operations, algorithms complexity, time-space tradeoff. Introduction to strings, storing strings, string operations, pattern matching algorithms.

UNIT – II

Linked list: Introduction and basic operations, Header nodes, Doubly Linked List, Circular Linked List, Applications of Linked List. Stack: primitive operation on stack, Representation of Stack as Linked List and array, Stacks applications.

UNIT – III

Introduction to queues, Primitive Operations on the Queues, Circular queue, Priority queue, Representation of Queues as Linked List and array, Applications of queue.
Trees - Basic Terminology, Binary Trees, Tree Representations using Array & Linked List, Basic operation on Binary tree, Traversal of binary trees:- In order, Preorder & post order, Applications of Binary tree.

UNIT – IV

Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs.
Searching: linear search, Binary search, Sorting: Insertion sort, Selection sort, Quick sort, Bubble sort.

TEXT BOOKS

1. Seymour Lipschutz, "Data Structures", Tata McGraw- Hill Publishing Company Limited, Schaum's Outlines, New Delhi.
2. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice Hall of India Pvt. Ltd., New Delhi.

REFERENCE BOOKS

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

PAPER – II STRUCTURED SYSTEM ANALYSIS AND DESIGN

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (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.

Maximum Marks: 35 **External: 30**
Internal: 5

Time: 3 hours

UNIT – I

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

UNIT – II

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

UNIT – III

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

UNIT – IV

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Igor Hawryszkiewyez, "Introduction to System Analysis and Design", 4th edition, Prentice-Hall.
2. Jeffrey L. Whitten, and Lonnie D. Bentey, "Systems analysis and Design Methods", 4th edition, Tata McGraw-Hill.
3. Mark Lejk, and David Deeks, "An Introduction to System Analysis Techniques", Prentice Hall.
4. Don Yeates, Maura Shields and David Helmy, "System Analysis and Design", Longman group limited, 1994.

PAPER – IV OPERATING SYSTEMS

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (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.

Maximum Marks: 35 **External: 30**
Internal: 5

Time: 3 hours

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

Process management: Process concepts, Process states and Process Control Block.
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

Concurrent Processes: Critical section problem, Semaphores, Classical process co-ordination problems and their solutions, Inter-process Communications.
Storage Management: memory management of single-user and multiuser operating system, partitioning, swapping, paging and segmentation, virtual memory, Page replacement Algorithms, Thrashing.

UNIT – IV

Device and file management: Disk scheduling, Disk structure, Disk management, File Systems: Functions of the system, File access and allocation methods, Directory Systems: Structured Organizations, directory and file protection mechanisms.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

PAPER – V PROGRAMMING IN VISUAL BASIC

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (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.

Maximum Marks: 35 **External: 30**
Internal: 5

Time: 3 hours

UNIT – I

Introduction to VB: Visual & non-visual programming, Procedural, Object-oriented and event-driven programming languages, The VB environment: Menu bar, Toolbar, Project explorer, Toolbox, Properties window, Form designer, Form layout, Immediate window. Visual Development and Event Driven programming.

UNIT – II

Basics of Programming: Variables: Declaring variables, Types of variables, Converting variables types, User-defined data types, Forcing variable declaration, Scope & lifetime of variables. Constants: Named & intrinsic. Operators: Arithmetic, Relational & Logical operators. I/O in VB: Various controls for I/O in VB, Message box, Input Box, Print statement.

UNIT – III

Programming with VB: Decisions and conditions: If statement, If-then-else, Select-case. Looping statements: Do-loops, For-next, While-wend, Exit statement. Nested control structures. Arrays: Declaring and using arrays, one-dimensional and multi-dimensional arrays, Static & dynamic arrays, Arrays of array. Collections: Adding, Removing, Counting, Returning items in a collection, Processing a collection.

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:

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

REFERENCE BOOKS:

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

PAPER I PROGRAMMING in 'C++'

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (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.

Maximum Marks: 35 **External: 30**
Internal: 5

Time: 3 hours

UNIT – I

Introduction to Programming C++: Object-Oriented Features of C++, Class and Objects, Data Hiding & Encapsulation, Structures, Data members and Member functions, Inline Functions, Static Data Members and Member Functions, Friend Functions, Preprocessor Directives, Namespace, Comparing C with C++.

UNIT – II

Constructors & Destructors: Roles and types of Constructors, Roles of Destructors, Dynamic Memory Allocation: Pointers and their Manipulation, new and delete Operators 'this' Pointer.
Console I/O: Formatted and Unformatted I/O, Manipulators.

UNIT – III

Compile-Time Polymorphism: Unary and Binary Operators overloading through Member Functions and Friend Functions, Function Overloading.
Inheritance: Types of Derivations, Forms of Inheritance, Roles of Constructors and Destructors in Inheritance.

UNIT – IV

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

TEXT BOOKS:

1. Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, PHI

REFERENCE BOOKS:

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

PAPER – II INTRODUCTION TO DATABASE SYSTEMS

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (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.

Maximum Marks: 35 **External: 30**
Internal: 5

Time: 3 hours

UNIT – I

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

UNIT – II

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

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:

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

REFERENCE BOOKS:

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

PAPER IV COMPUTER NETWORKS

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (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.

Maximum Marks: 35 **External: 30**
Internal: 5

Time: 3 hours

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; Congestion Control Algorithms; Internetworking;
Network Security Issues: Security threats; Encryption Methods; Authentication; Symmetric –Key Algorithms; Public-Key Algorithms;

TEXT BOOKS:

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

REFERENCE BOOKS:

1. James F. Kurose, Keith W. Ross, "Computer Networking", Pearson Education.
2. Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.

PAPER – V RELATIONAL DATABASE MANAGEMENT SYSTEM

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of six (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.

Maximum Marks: 35 **External: 30**
Internal: 5

Time: 3 hours

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:

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

REFERENCE BOOKS:

1. C. J. Date, "An Introduction to Database Systems", 8th edition, Addison Wesley N. Delhi.