

## B.Sc. (Computer Science) – First Year

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Pass Marks	Exam Durations
<b>Semester I</b>						
I	Computer Fundamentals & Programming in 'C'	40	5	45	16	3hrs
II	Logical Organization of Computer-I	40	5	45	16	3hrs
III	Practical (Programming in 'C')			60	24	3hrs
<b>Semester II</b>						
IV	PC-Software	40	5	45	16	3hrs
V	Logical Organization of Computer –II	40	5	45	16	3hrs
VI	Practical (PC-Software)			60	24	3hrs

## B.Sc. (Computer Science) - Second Year

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Pass Marks	Exam Durations
<b>Semester III</b>						
I	Data Structures using 'C'	40	5	45	16	3hrs
II	Structured System Analysis & Design	40	5	45	16	3hrs
III	Practical (Implementation of data structure in 'C')			60	24	3hrs
<b>Semester IV</b>						
IV	Operating Systems	40	5	45	16	3hrs
V	Programming in Visual Basic	40	5	45	16	3hrs
VI	Practical (Visual Basic)			60	24	3hrs

## B.Sc. (Computer Science) - Third Year

Paper No.	Title of Paper	External Marks	Internal Assessment	Maximum Marks	Pass Marks	Exam Durations
<b>Semester V</b>						
I	Programming in 'C++'	40	5	45	16	3hrs
II	Introduction to Data Base Systems	40	5	45	16	3hrs
III	Practical ('C++')			60	24	3hrs
<b>Semester VI</b>						

IV	Computer Networks	40	5	45	16	3hrs
V	Relational Database Management System	40	5	45	16	3hrs
VI	Practical (ORACLE)			60	24	3hrs

## **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: 45**

**External: 40**

**Minimum Pass Marks: 16**

**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 Schildt, 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: 45**

**External: 40**

**Minimum Pass Marks: 16**

**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”, 8<sup>th</sup> 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: 45**

**External: 40**

**Minimum Pass Marks: 16**

**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: 45**

**External: 40**

**Minimum Pass Marks: 16**

**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 3<sup>rd</sup> edition.

### **REFERENCE BOOKS:**

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