



**TRIPURA UNIVERSITY**

(A Central University)  
Suryamaninagar-799022

**Syllabus**

**OF**

**Computer Science**

**Semester III & VI**

**2014**

SEMESTER III

Year - III

Subject: Data and File Structures (Programming)

Marks: 60 (45 - Internal) -15)

### 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.

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 - II

Queue : 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, Binary Search tree, In order, Preorder & Post order traversal, Applications of binary tree and binary search tree.

Graph : Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Application of graph.

Searching: linear search, Binary search, Sorting: Insertion sort, Selection sort, Quick sort, Bubble sort, merge sort, heap sort.

### TEXT BOOKS

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

SEMESTER -II:

Paper: III

Subject: Computer Programming Laboratory using C (Practical)

Marks: 40 (32+ Internal -08)

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.  
Techniques of Problem Solving: Flowcharting, algorithms, pseudo code, decision table.  
Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

Overview of C: History of C, Importance of C, Structure of a C Program.  
Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables.  
Assignment statement, Symbolic constant, preprocessor directives.  
Input/output: Unformatted & formatted I/O function, Input functions viz. scanf(), getch(), getche(), getchar(), gets(), output functions viz printf(), putchar(), puts().  
Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, conditional operators and special operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.

Decision making & branching: Decision making with IF statement, IF-ELSE statement, nested IF statement, ELSE-IF ladder, switch statement, goto statement  
Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement.

Functions: Definition, prototype, passing parameters, recursion.  
Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime.  
Arrays: Definition, types, initialization, processing an array, Strings & arrays.  
Basic concept of pointer.

**TEXT BOOKS**

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill.
2. Balagurusamy, E., Computing Fundamentals and C Programming, Tata McGraw-Hill.
3. B.W. Kernighan, D. Ritchie., The C Programming

SEMESTER - IV

Paper: H4

**Subject: Database Management Systems (Theory)**

**Marks: 60 (48 + Internal -12)**

**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.

**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.

**Entity-Relationship Model** – Entity Types, Entity Sets, Attributes, Relationship Types, Relationship Instances and ER Diagrams.

Basic Concepts of Hierarchical and Network Data Model.

**UNIT - II**

Database Design: Normalization, Redundancy, and Data Integrity. Relational Database Design: Relational Algebra, Base Tables and Views.

Relational Algebra: Selection and Projection, Structured Query Language, Set Operators, Joining, Join and Division, Functional Dependencies and Normalization: Primary Key, Transitive functional dependency, 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).

ER model to relational model conversion.

#### **TEXT BOOKS**

1. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts, 6th Edition, McGraw-Hill 2010.
2. C.J. Date, An Introduction to Database Systems, Pearson

#### **REFERENCE BOOKS**

1. R. Ramakrishnan, J. Gehrke, Database Management Systems, 3rd Edition, McGraw-Hill 2002.
3. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems, 6th Edition, Pearson Education 2010.

### **SEMESTER –IV**

**Paper: H4**

**Subject: Database Management System Laboratory (Practical)**

**Marks: 40 (32+ Internal -08)**

**Introduction to SQL:** Data Definition Commands, Data Manipulation Commands, Select queries, Advanced Data Definition Commands, Advanced Select queries, Joining Database Tables.

**Advanced SQL:** Relational Set Operators, SQL Join Operators, Subqueries and correlated queries, SQL Functions, Updatable Views, and Procedural SQL, Trigger.

Simple DBMS Application.

## **TEXT BOOKS**

1. Ivan Bayross, SQL, PL/SQL-The Programming Language of ORACLE, BPB Publications, 3rd edition.

## **SEMESTER -V**

### **Paper: H5**

### **Subject: Operating System and Object Oriented Language (Theory)**

**Marks: 100 (80 + Internal -20)**

### **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, OS Commands, shell, shell scripts.

Process management: Process concepts, Process states and Process Control Block (PCB).

CPU Scheduling: Scheduling criteria, Levels of Scheduling, Scheduling algorithms, Multiprocessor scheduling.

Deadlocks: Deadlock characterization, Deadlock prevention and avoidance, Deadlock detection and recovery, practical considerations.

Case Study: Linux and Windows

### **UNIT - II**

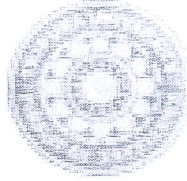
Concurrent Processes: Critical section problem, Semaphores, Mutual exclusion, Classical process co-ordination problems and their solutions, Inter-process Communications.

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

Case Study: Linux and Windows

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

Case Study: Linux and Windows



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**SYLLABUS**

**OF**

**Philosophy**  
(Major and General)

**Semester III**

**Year 2014**  
**SYLLABUS**

**B.A. TDP/TDPH (Honours/Major)**

2. Tanenbaum, A.S., Operating System- Design and Implementation, Prentice Hall of India, New Delhi.
3. Programming in C++ by Robert Lafore
4. C++ - The complete reference by Herbert Schildt (TMH)
5. Programming with C++ - Schaum Series
6. Michael R. Blaha, J R Rambaugh, Object Oriented Modeling and Design with UML. Pearson

## SEMESTER -V

Paper: H6

**Subject: Object Oriented Programming Laboratory (Practical)**

**Marks: 100 (80 + Internal -20)**

### Unit - I

Evolution of Programming paradigms, Object based and Object oriented themes, Basic Concepts of Object-Oriented Programming, Advantages and Application of OOPS.

Introduction to C++: Streams in C++, Basic Data Types, User-Defined Data Types. Derived Data Types, Keywords, Identifiers, C++ structures, Type Cast Operator.

Control Structures:if-else statements, jump statement, break statement, continue statement, switch statement and nested switch case statement, for Loop, nested for Loops, while loop, do-while loop.

Functions in C ++ :call by value and call by reference, inline function vs macro, function overloading, friend and virtual Functions.

Classes and Objects : C ++ Program with Class, specifying a Class, defining members of a class, nesting of member functions. The role of public, private and protected keywords.static data members, static member functions, creating objects, arrays of objects, objects as function arguments, returning objects, friendly functions, constant member functions, pointers to members.

### Unit - II

Constructors and Destructors : Multiple Constructors in a Class. Parameterized Constructors. Constructor overloading, Copy Constructor, Dynamic Constructor, Destructors.



Operator Overloading and Type Conversions: Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Overloading Binary Operators Using Friends, Type Conversions.

Inheritance: Extending Classes, Benefit of Inheritance, Overloading and Overriding, Different types of Inheritance: Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Visibility modifiers in Inheritance.

Pointer, Virtual Functions and Polymorphism: Pointers to Objects, this Pointer, Pointers to Derived Classes, Virtual Functions.

### Unit – III

Java Fundamentals: Fundamentals of Object Oriented programming: Object Oriented paradigm, Basic concepts of Object Oriented Programming, Benefits of OOP, Applications of OOP.

Java Evolution: Java Features, How Java differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Environment.

Overview of Java Language: Simple Java Program, Java Program Structure, Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments.

Constants, Variables and Data types: Constants – Variables – Data types – Declaration of Variables-Giving Values to variables- Scope of Variables-Symbolic Constants-Type Casting.

### Unit – IV

Ops Concepts in Java Operators and Expressions: Arithmetic Operators – Relational Operators- Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Operator Precedence and Associativity.

Decision Making and Branching: Decision Making with If statement – Simple If Statement-If else Statement-Nesting If Else Statement- The switch Statement.

Decision Making and Looping: The while statement – The do statement – The for statement – Jumps in Loops. Class, Objects and Methods: Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing class members – Constructors- Methods Overloading – Static Members – Nesting of Methods – Inheritance – Overriding Methods – Final Variables and Methods – Final Classes – Abstract Methods and Classes – Visibility Control

Prescribed books :

1. E. Balaguruswamy, Programming with Java, A primer, 3e, TATA McGraw-Hill Company (2008).
2. Robert Lafore, Data Structures & Algorithms in Java, Second Edition, Pearson Education (2008)
3. E. Balagurusamy, Object Oriented Programming with C++, McGrawHill Educaion.

Reference Books :

1. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, Tata McGrawhill (2007).
2. Timothy Budd, Understanding Object Oriented Programming with Java, Pearson Education (2007).
3. Adam Drozdek, Data Structures and Algorithms in Java, Second Edition, Cengage Learning (2008).
4. John R. Hubbard, Anita Hurry, Data Structures with Java, Pearson Education (2008).
5. Cay S. Horstmann, Core Java, Volume 1 : Fundamentals, Pearson India
6. Hubbard, Programming with C++, Second Edition, Schaum's outline Series, Tata McGrawhill.

**SEMESTER -VI**

**Paper: H7**

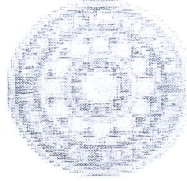
**Subject: Data Communication and Networking (Theory)**

**Marks: 100 (80 + Internal -20)**

**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, TCP/IP Model, Example Networks: The Internet, X.25, Frame Relay, ATM.



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**SYLLABUS**

**OF**

**Philosophy**  
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**Semester III**

**Year 2014**  
**SYLLABUS**

**B.A. TDP/TDPH (Honours/Major)**

**SEMESTER –VI**

**Paper: H8**

**Subject: Client Server Based Business Application (Project)**

**Marks: 100 (80 + Internal -20)**

A Client Server based application is to be developed based on the following technologies

- HTML
- HTML 5
- Java Script
- CSS
- VB.Net/ASP.Net
- Tomcat Apache Web Server
- PHP
- MySQL/Oracle/SQL Server /PostgreSQL

Student should prepare a project report containing the following

1. Title
2. Requirement Analysis
3. Design – DFD/ER Diagram
4. Development
5. Testing & Analysis.
6. Conclusion and Future scope of improvement
7. Bibliography

**Marks allotment**

Project Report-	15
Presentation-	20
Project Work	30
Viva-	15
Total-	80

**Text Books**

1. Steven M. Schafer, HTML, XHTML and CSS Bible, 5th Edition, Wiley-Eastern Publishing Inc., 2011.
2. Mercer W.Dave, Allan Kent, Steven D Nowichi, David Mercer, Dan Squier, Wankyer Choi Beg inning PHP5, Wiley –Dreamtech India Pvt. Ltd., 2008
3. Danny Goodman, JavaScript Bible, 3rd Edition, Wiley-Eastern Private Ltd., 2010.

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