DATA STRUCTURE AND ALGORITHM

CODE CS 301

L	**T**	**P**
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RATIONALE

The aim of this course is to provide adequate knowledge about Data Structures and Algorithms. In fact any discipline in science and engineering that requires efficient problem solving using programming, undoubtedly calls for the application of appropriate data structures during program development.

The course covers in detail the methods, algorithms, functions and implementation of each and every concept of data structures. It consists of introduction to data structures and algorithms, algorithms on linked list, stack, queue, trees, graphs and sorting and searching algorithms and their analysis.

CONTENTS

1 Introduction to Data Structures and Algorithms :

1.1 Introduction to data representation
1.2 Review of data structures- Array, Pointer, Structure, Lists, Trees, and Graphs
1.3 What is an Algorithm
1.4 Designing Algorithms
1.5 Analyzing Algorithms
1.6 Mathematical Notation and Functions
1.7 Asymptotic Notation (O,θ,Ω)
1.8 Performance Measurement

2 Algorithm on Linked List :

2.1 Linear Linked List and Operations
2.2 Circular Liked List and Operations
2.3 Doubly Linked List and Operations
2.4 Applications of Linked list**:** Polynomial representation**,** Multiple-Precision Arithmetic

3 Algorithms on Stack :

3.1 Representation using array and linked list: Operation and Example
3.2 Push and Pop Operation
3.3 Representation of expressions: Infix, Postfix, Prefix
3.4 Inter conversion of the expressions
3.5 Evaluation of the expression
3.6 Recursion: Tower of Hanoi, Recursive functions

4. Algorithms on Queue :

4.1 Representation using array and linked list
4.2 Insertion and Deletion Operation
4.2 Circular Queue
4.3 Double Ended Queue
4.4 Priority Queue
4.5 Multiple Queues

5 Non-Linear Data Structure: Tree

5.1 General Concept
5.2 Sequential and Linked List Representation of Tree
5.3 Binary Tree
5.4 Conversion of General Trees to Binary Trees
5.5 Binary Tree Traversal Algorithms: Recursive and Non-recursive
  5.5.1 Preorder Traversal
  5.5.2 Inorder Traversal
  5.5.3 Postorder Traversal
  5.5.4 Backward Inorder
5.6 Binary Search Tree
5.7 Applications of Trees

6 Non-Linear Data Structure: Graph :

6.1 Properties of Graphs
6.2 Representation of Graphs
  6.2.1 Adjacency Matrix
  6.2.2 Adjacency List
6.3 Traversal Algorithms- Depth First Search, Breadth First Search
6.4 Minimum Cost Spanning Tree
  6.4.1 Prims Algorithm
  6.4.2 Kruskal's Algorithm
6.5 Shortest Path Algorithms
  6.5.1 Dijkastra's Algorithm
  6.5.2 Bellman-Ford Algorithm
  6.5.3 Warshal Algorithm
6.6 Applications of Graphs

7 Sorting and Searching Algorithms and their Analysis

7.1 Internal and External Sorting
7.2 Sorting Problems: Selection sort, Bubble sort, Insertion Sort, Merge sort, Quick Sort, Heap sort
7.3 Sequential Search
7.4 Binary Search
7.5 Hashing: Hashing Functions Collision Resolution Techniques

PRACTICAL (Implementation in C language)

1. Programs based on linked list.
2. Programs based on stacks and queue.
3. Programs based on tree traversal.
4. Programs based on Graphs
5. Programs based on sorting
6. Programs based on searching.

REFERENCES BOOKS :

1.	A practical approach to Data Structures and Algorithms	Sanjay Pahuja, New Age International
2.	Data Structure	Tenenbaum. TMH
3.	Data Structure and Program Design	Robert L. Kruse, PHI
4.	Data Structure using C	Y. Kanitkar, BPB
5.	Data Sructure	Schaums series, TMH
6.	Data Structure and Algorithms	Horowith sahani, PHI

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OBJECT ORIENTED PROGRAMMING THROUGH C++

CODE CS 302

L	**T**	**P**
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RATIONALE

Today whole application software is developed using object-oriented technology. It helps in reusability of the code, sharing of various resources. The user works in real world environment. This paper give knowledge of object oriented technology. C++ cover the practical implementation of OOPs. Various features like inheritance, encapsulation etc. are covered.

CONTENTS

1. An Overview of Object Oriented Programming :

1.1 The need of object oriented programming
1.2 Characteristics of OOPs: Objects, Classes, Inheritance, Reusability, New data types, Polymorphism and overloading
1.3 Benefits of OOPs

2. Object Oriented Programming Using C++ :

2.1 An overview of C++ Programming
2.2 Data Types, Operators, Manipulators
2.3 **"cin"** and **"cout"** usages
2.4 Statements : Comments, Assignments, if, switch and loops
2.5 Functions and its default arguments
2.6 Inline functions

3. Objects and Classes :

3.1 Class and its members
3.2 Access Specifier : **public, private, protected**
3.3 Static data member and static functions
3.4 Array of objects
3.5 Object as function arguments
3.6 Constructors and Destructors
3.7 Friend function
3.8 Copy constructor

4. Overloading of Functions and Operators :

4.1 Function overloading
4.2 Defining operators over loading
4.3 Rules of overloading operators
4.4 Overloading unary operators
4.5 Overloading binary operators
4.6 Operator overloading using friend functions

5. Inheritance and Polymorphism :

5.1 Inheritance: Using public, private and protected access specifiers
5.2 Types of inheritance
5.3 Virtual base classes
5.4 Virtual and pure virtual functions
5.5 Abstract classes
5.6 Reusability considerations

6. Templates and Exception Handling :

6.1 Generic functions
6.2 Generic classes
6.3 Basics of exception handling
6.4 Exception handling mechanism
6.5 Throwing and catching mechanism
6.6 Rethrowing an exception

7. Managing Console I/O and File I/O :

7.1 C++ streams and stream classes
7.2 Unformatted I/O operations
7.3 Formatted console I/O operations
7.4 Managing output with manipulators
7.5 Classes for file stream operations
7.6 Opening and closing a file
7.7 File modes and file pointers
7.8 Put ( ), get ( ), read ( ), and write ( ) functions

PRACTICALS

1. Practice for Classes and Object Creation
2. Practice for constructors and deconstructors creation
3. Practice for static and friend functions for a class.
4. Practice for Function overloading
5. Practice for Operator overloading
6. Practice for Copy constructor
7. Practice for inheritance
8. Practice for virtual function
9. Practice for exception handling template
10. Practice for read( ) and write( )

REFERENCE BOOKS :

1.	Programming in C++	E. Balaguruswamy, TMH
2.	Oriented Programming TURBO C++	Robert Lafore, Galgotia Pub.
3.	The Complete Reference C++	Herbert Schildt, TMH
4.	The C++ Programming Language	B. Stroustrup, Addison wesley/Pearson
5.	Let us C++	Y. Kanetkar, BPB
6.	Object Oriented Programming and C++	R.Rajaram, New Age

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UNIX, SHELL PROGRAMMING AND ADMINISTRATION

CODE CS 303	**L**	**T**	**P**
IT 303	2	--	2

RATIONALE

The popularity of UNIX at educational, research and govt. institutions, and eventually in commercial world is due to its early advantages. UNIX operating is written in high level language is distributed in source form, and provides powerful operating system primitives on an inexpensive platform. The subject is intended to explore the features like file system, commands, vi editor, features of shell, shell programming and essential system administration.

CONTENTS

1. UNIX An Introduction :

- 1.1 Unix Architecture
- 1.2 Features of UNIX
- 1.3 Command structure and usage

2. File System :

- 2.1 Basics of file
- 2.2 Structure of file systems
- 2.3 File permission
- 2.4 File ownership
- 2.5 Inodes
- 2.6 Partition

3. UNIX Commands :

- 3.1 File management commands : **ls, cat, rm, mv, cp, chmod,cmp,diff, comm**
- 3.2 Directory management commands **: mkdir, rmdir, cd, pwd**
- 3.3 General purpose utilities : **more, ps, wc, printf or echo, lp, banner, bc , cal, date, time, who, man, kill**

4. vi Editor :

4.1 Three modes
4.2 Input mode, Adding and replacing text
4.3 Saving text and quitting – The ex mode
4.4 The repeat factor
4.5 Command mode
4.6 Using operators in deleting and copying text
4.7 Navigation
4.8 Pattern search
4.9 Joining lines
4.10 Undo, Repeating the last command
4.11 Moving text from one file to another file
4.12 Search and replace

5. UNIX Shell :

5.1 Different types of UNIX shell
5.2 Shell interpretive cycle
5.3 Command line structure
5.4 Meta character, Pattern matching
5.5 Escaping , quoting
5.6 I/O Redirection
5.7 Command arguments and parameters
5.8 Command substitution
5.9 Shell variables

6. Shell Programming :

6.1 Shell Script
6.2 Dot command
6.3 Interactive execution (read)
6.4 Command line arguments ($1, $2 etc)
6.5 The && and | | operators
6.6 Conditional statements : if , case
6.7 Loops : for, while, until
6.8 Shell function
6.9 Interrupt handling (trap)

7. Essential System Administration :

7.1 System Administration jobs
7.2 Finding files
7.3 Mounting file system
7.4 File system checking
7.5 Compressing files
7.6 Backing up files (tar, cpio)
7.7 User management (add user, modify user ,remove user and change password)
7.8 Understanding /etc/passwd, /etc/shadow, /etc/inittab

PRACTICALS

Note : Following practicals are perform by using UNIX / LINUX operating system.

1. Installing UNIX/LINUX operating system
2. Practice for login, logout, and shutdown operations
3. Practice for Unix commands
4. Practice for **vi** editor
5. Practice for shell programs using conditional, looping instructions and shell features

6. Practice for finding files
7. Practice for user management
8. Practice for file system checking
9. Practice for Compressing file
10. Practice for user authentication and access rights

REFERENCE BOOKS :

1. UNIX Concepts & Applications	Sumitabha Das, TMH
2. The UNIX Programming Environments	Kernighnan , Pike, PHI
3. Design of UNIX Operating System	Bach , PHI
4. Unix shell programming: A level	Satish Jain, BPB
5. Essential System Administration	Eleen Frisch, O'Reilly
6. UNIX Shell Programming	Yashwant Kanitker

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SOFTWARE ENGINEERING

CODE CS 304

L	**T**	**P**
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RATIONALE

The aim of this course is to provide adequate knowledge about Software Engineering (SE). In this course student are taught about Software Engineering evolution, Emergence of SE, Software life cycle models, Requirements Analysis & Specification, Software Design, Software Testing and Software Reliability & Quality Management.

By acquiring adequate knowledge of this subject student may be able to understand the importance of Software Engineering (SE), that is the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software, and the study of these approaches; is, the application of engineering to software. In today's era when computer applications were developed to handle financial, management, technical, personal means everywhere software applications are present.in life. Hence the real need for systematic development of software was felt like never before, now people realized softwares are extremely important aspect of modern life. After completing this course, the student will be able to understand importance of the application of engineering to software.

CONTENTS

1. Introduction :

1.1 Software Engineering evolution and impact
1.2 Software Crisis
1.3 Program and Software Products
1.4 Software Characteristics
1.5 Software metrics
1.6 Emergence of Software Engineering

2. Software Life Cycle Models :

2.1 Why use life cycle models?
2.2 Waterfall model
2.3 Prototyping Model
2.4 Evolutionary Model
2.5 Spiral Model
2.6 Comparison of different Life Cycle Model

3. Requirement Analysis and Specification

3.1 Requirement Gathering Methods and Analysis
3.2 Feasibility Study

3.3 Software Requirement Specification (SRS)

- 3.3.1 Contents of SRS document
- 3.3.2 Characteristics of good SRS documents
- 3.3.3 Organization of SRS document
- 3.3.4 Techniques for representing complex logic: Decision Tree, Decision Table

4. Software Design :

4.1 What is good Software design?
4.2 Cohesion and Coupling

- 4.2.1 Classification of cohesiveness
- 4.2.2 Classification of coupling

4.3 Software Design Approaches

- 4.3.1 Function Oriented Design
- 4.3.2 Object oriented design

5. Function Oriented Design

5.1 Overview of SA/SD Methodology
5.2 Structure analysis
5.3 Data Flow Diagram (DFD)

- 5.3.1 Primitive Symbols used for constructing DFD
- 5.3.2 Balancing DFD
- 5.3.3 Developing DFD Model of a system
  - 5.3.3.1 Context diagram
  - 5.3.3.2 Level 1 DFD
  - 5.3.3.3 Decomposition
  - 5.3.3.4 Numbering of Bubbles
  - 5.3.3.5 Common errors constructing DFD
- 5.3.4 Shortcomings of DFD model

5.4 Data Dictionary
5.5 Structure Design

- 5.5.1 Structure Chart
- 5.5.2 Transformation of DFD model into structure chart

5.6 Detailed design

6. Software Testing :

6.1 What is testing?
6.2 Verification v/s Validation
6.3 Design of Test Cases
6.4 Level of Testing
6.5 Unit Testing
6.6 Black Box Testing

- 6.6.1 Equivalence Class Partitioning
- 6.6.2 Boundary Value Analysis

6.7 White Box Testing

- 6.7.1 Statement, Branch coverage
- 6.7.2 Condition, Path coverage
- 6.7.3 McCabe`s Cyclomatic Complexity Metric

6.8 Integration Testing
6.9 System Testing

7. Software Reliability and Quality Management :

7.1 Software Reliability
7.1.1 Hardware v/s Software reliability
7.1.2 Reliability metrics

7.2 Software Quality
7.3 Software Quality System
7.4 ISO 9000
7.4.1 What is ISO 9000 for Software industries?
7.4.2 Why and How to get ISO 9000?
7.4.3 ISO 9000 Requirements
7.4.4 Shortcomings of ISO 9000 certification

7.5 SEI Capability Maturity Model (SEI CMM)
7.6 Six Sigma

REFERENCE BOOKS:

1. Fundamental of Software Engineering — Rajib Mall, PHI
2. Software Engineering — KK Aggarwal, Yogesh Singh New Age International Pub
3. Software Engineering — Ian Sommerville Addison Wesley
4. Fundamental of Software Engineering — Carlo Ghezzi et al. PHI
5. Software Engineering : A Practitioners approach — Roger Pressman, MH
6. An Integrated approach to Software Engineering — Pankaj Jalote, Springer

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DOT NET TECHNOLOGY

CODE CS 305 **L T P**
IT 305 2 -- 2

RATIONALE

NET has evolved as an important framework in the recent times for developing windows, web and enterprise applications. The objective of the subject is to introduce .NET technology which provides a multi-language environment to develop windows based software. The main focus is on .NET framework, development environment as VB.NET, ASP.NET.

CONTENTS

1. Introduction to NET Framework and Development Environment :

1.1 Introduction to .NET
1.2 Comparison between .NET and Java
1.3 Architecture and Advantages of .NET framework
1.4 Namespaces
1.5 Object Oriented Features
1.6 Visual Studio.NET Integrated Development
1.7 Elements of IDE
1.8 Writing a Simple Application using .NET

2. Visual Basic.NET :

2.1 Introduction to and Features of VB.NET
2.2 Similarities and Differences between Visual Basic and VB.NET
2.3 Data types supported in VB.NET
2.4 Variables, Scope of Variables

2.5 Access Control: Public, Private, Protected, Friend, Protected Friend
2.6 Various Operators: Arithmetic, Comparison, Assignment, Logical Operators, Concatenation Operators, Operator Precedence

3. Programming Concepts of VB.NET :

3.1 Control Structures: Decision Making Statements, Looping Statements, Other Statements
3.2 Arrays: Static, Dynamic Arrays, Array Functions
3.3 Procedures and Functions
3.4 Parameter Passing: Pass-by-Value, Pass-by-Reference, Optional and Named Agruments
3.5 Predefined Functions: MsgBox(), InputBox(), and other functions.

4. Object Oriented Features of VB.NET :

4.1 Introduction to OOP Features: Class, Objects, Overloading, Overriding, Structure
4.2 Structure: Similarities and Differences with Class
4.3 Overloading the Methods
4.4 Shared Members
4.5 Inheritance
4.6 Abstract Base Class
4.7 Interfaces: Differences between Interface and Class

5. Windows FORMS and Controls

5.1 Introduction
5.2 Windows Forms: Properties and Methods, Events, MDI Forms
5.3 Properties and Methods Controls: Label, TextBox, LinkLabel, Button, Radio Button, CheckBox, ListBox, ComboBox, Timer control, Scroll bars, Menus
5.4 Exception Handling

6. Database Connectivity using ADO.NET :

6.1 Evolution and Features of ADO.NET
6.2 ADO versus ADO.NET
6.3 ADO.NET Object Model
6.4 Overview of Data Provider, Provider Objects: Connection, Command, Data Adapter, Data Reader
6.5 Overview of DataSet, Types of DataSets
6.6 Data Object Model and Data Object Model
6.7 Namespaces in ADO.NET
6.8 Using Command Objects
6.9 Data Binding : Simple Binding, Complex Binding

7. ASP.NET :

7.1 Introduction
7.2 Differences and Similarities between ASP and ASP.NET
7.3 Characteristics of ASP.NET
7.4 Architecture of ASP.NET
7.5 Server Controls
7.6 HTML Server Controls
7.7 Types of Web Controls
7.8 Working with Web Controls & their Properties
7.9 Validation Web Server Control
7.10 ASP.NET Event Handling
7.11 User Controls
7.12 Data Access through ASP.NET
7.13 Session and Application Objects in ASP.NET
7.14 Cookies: properties and limitations

PRACTICAL'S

1. Practice programs on VB.NET using variables and operators.
2. Practice programs on VB.NET using conditional and control structures.
3. Practice programs on VB.NET using Arrays.
4. Practice programs on VB.NET using Inheritance property.
5. Practice programs on VB.NET using Forms and Controls.
6. Practice programs on Database connectivity using ADO.NET.
7. Practice programs on Data Access through ASP.NET
8. Practice programs on ASP.NET using web controls.
9. Practice programs on ASP.NET using Event-handling.
10. Practice programs on ASP.NET using Cookies.

REFERENCES BOOKS :

1. Essentials of .NET Programming, C. Komalavalli, Sanjib K Sahu, Ane Books Pvt. Ltd., New Delhi
2. Visual Basic.NET, Shirish Chavan, Pearson Education, New Delhi
3. Introduction to Visual Basic.NET, NIIT (PHI)
4. ASP.NET and VB.NET Web Programming, Matt J. Crouch , Pearson Education, New Delhi
5. Programming VB.NET, Cornell, Gary, IDG

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COMPUTER NETWORK

CODE CS 306 **L T P**
IT 306 2 1 --

RATIONALE

Computer networks have global utilities in certain fields. It is used in inter linking libraries, Air Lines, Railway Station for reservations. The knowledge of subject and related software will enable the students to work in organization having such types of facilities. Today most uses of computer network in Internet for transferring files, email, audio-video conferencing movies, chatting at remote places.

CONTENTS

1. Data Link Layer and Local Area Networks :
- 1.1 Data Link Layer Design Issues
  - 1.1.1 Framing,
  - 1.1.2 Error Detection and Correcting Code
  - 1.1.3 Error Control
- 1.2 LAN Protocols
  - 1.2.1 Ethernet and IEEE 802.3 Standard CSMA/CD
  - 1.2.2 IEEE 802.5 LAN Token Ring
- 1.3 PPP : Point to Point Protocol
- 1.4 FDDI : Fiber Distributed Data Interconnect

2 Network Layer and Routing :

- 2.1 Network Layer Design Issues
- 2.2 Routing Algorithms
  - 2.2.1 Shortest Path Routing
  - 2.2.2 Flooding
  - 2.2.3 Distance Vector Routing
  - 2.2.4 Hierarchical Routing
  - 2.2.5 Multicast Routing
- 2.3 Internet Protocol
  - 2.3.1 IPv4 Header
  - 2.3.2 IPv4 Address
  - 2.3.3 Subnetting
  - 2.3.4 Internet Control Protocols

2.4 IPv6
- 2.4.1 IPv6 Header
- 2.4.2 IPv6 Extension Headers
- 2.4.3 IPv6 Addresses

2.5 Routers

3. Transport Layer :

3.1 Transport Layer Services
3.2 Transport Protocol Mechanisms
- 3.2.1 Addressing
- 3.2.2 Multiplexing
- 3.2.3 Establishment a Connection
- 3.2.4 Releasing a Connection
- 3.2.5 Reliable Delivery
- 3.2.6 Flow Control and Buffering

3.3 Connectionless Transport Protocol : UDP
3.4 Connection - Oriented Transport Protocol : TCP
- 3.4.1 TCP Header format
- 3.4.2 TCP Connection Management
- 3.4.3 TCP Congestion Control
- 3.4.4 TCP Timer Management

4. Application Layer :

4.1 Principles of Application Layer Protocols
4.2 Domain Name System: DNS
4.3 The File transfer Protocol : FTP
4.4 Electronics Mail in the Internet : POP, HTTP, IMAP
4.5 WWW and HTTP
4.6 Network Management SNMP

5. Wireless Networking :

5.1 Wireless LANs
5.2 IEEE 802.11
5.3 BlueTooth
5.4 WiMAX IEEE 802.16
5.5 Building a Network

REFERENCES BOOKS :

1. Data Communication and Computer Networks — Sanjay Pahuja Standard Publishers
2. Data Communication and Computer Networks — B. Froujan TMH
3. Computer Networks — Andrew S. Tanenbaum, PHI
4. Computer Networks — Peterson & Davie
5. Wireless Communications — W. Stallings PHI
7. Computer Networks — Black, PH

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DATA WAREHOUSE AND MINING

CODE CS 307

L	T	P
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RATIONALE

This course objective is to expose the student's ability to generate and collect data has been increasing rapidly. Not only are all of our business, scientific, and government transactions now computerized, but the widespread use of digital cameras, publication tools, and bar codes also generate data. On the collection side, scanned text and image platforms, satellite remote sensing systems, and the World Wide Web have flooded us with a tremendous amount of data. This explosive growth has generated an even more urgent need for new techniques and automated tools that can help us transform this data into useful information and knowledge. The study of the subject provides the basic knowledge of various Data Mining, Warehousing and its techniques

CONTENTS

1 Data Mining :

- 1.1 Introduction to Data Mining
- 1.2 How Data Mining Works
- 1.3 Data Mining Tasks
- 1.4 Data Mining Elements
- 1.5 Data Mining Architecture
- 1.6 Advantages
- 1.7 Disadvantages

2. Data Pre-Processing :

- 2.1 Introduction
- 2.2 Task of Data Pre-processing
- 2.3 Data Cleaning
- 2.4 Data Integration
- 2.5 Transformation.
- 2.6 Data Reduction

3. Data Mining Techniques :

- 3.1 Introduction
- 3.2 Decision Tree
- 3.3 Clustering
- 3.4 Genetic Algorithms
- 3.5 Artificial Neural Networks

4. Data Warehouse :

- 4.1 Introduction
- 4.2 Definition
- 4.3 Characteristics
- 4.4 Difference between Data Warehouse and Database System
- 4.5 Advantage and Disadvantages
- 4.6 Relationship between Data Mining and Data Warehousing

5. Data Warehouse Architecture :

- 5.1 Data Warehouse Architectures
  - 5.1.1 Overall and Typical Architecture
  - 5.1.2 Three-Tier architecture
  - 5.1.3 Problem in Three-Tier architecture
- 5.2 Goal of Data Warehouse Architecture
- 5.3 Frameworks of Data Warehouse
- 5.4 Data Warehouse back-end Tools and Utilities

6. Components of Data Warehouse :

6.1 Components of Data Warehouse
6.2 Meta Data
  6.2.1 Introduction
  6.2.2 Definition
  6.2.3 Types of Meta data
  6.2.4 Use of Meta Data
6.3 Data Marts
6.4 Access Tools
6.5 Data Warehouse Database

7. On-Line Analytical Processing :

7.1 Introduction
7.2 Characteristics of OLAP System
7.3 Motivation for using OLAP
7.4 Multidimensional View and Operations
7.5 Guidelines for OLAP Implementation
7.6 Difference between OLAP & OLTP
7.7 Servers
  7.7.1 OLAP
  7.7.2 ROLAP
  7.7.3 MOLAP

REFERENCES BOOKS :

1. Data Mining and Data Warehousing, Bharat Bhushan Agarwal, Sumit Prakash Tayal, University Science Press Laxmi Publications
2. Data Mining Data Warehousing and OLAP, Gajendra Sharma, KATSON Books.
3. Data Warehousing & Data Mining & OLAP, Berson: TMH
4. Data Mining Concepts & Techniques, Jiawei Han and Micheline Kamber, Elsevier Pub.
5. Data Mining Techniques, University Press. Arun.K.Pujari,

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INTRODUCTION TO NETWORK SECURITY AND CRYPTOGRAPHY

CODE CS 308	**L**	**T**	**P**
IT 308	2	1	--

RATIONALE

The aim of this course is to provide adequate knowledge about cryptography and network security. In this course student are taught about need and principle of security, different types of attacks, cryptographic techniques, symmetric and asymmetric key cryptography, Internet Security Protocols, E-mail Security, Firewall and VPN.

By acquiring adequate knowledge of this subject student may be able to understand the importance of security in today's era when computer applications were developed to handle financial and personal data the real need for security was felt like never before now people realized data on computer are extremely important aspect of modern life. After completing this course, the student will be able to understand importance of security, cryptographic techniques and various concepts of security.

CONTENTS

1. Computer Security :

1.1 Introduction
1.2 Need of Security
1.3 Security approaches
1.4 Principle of Security

2. Attacks on Computer :

2.1 Attacks: A general and technical view
2.2 Active and passive attacks
2.3 Program that attacks:

2.3.1 Virus
2.3.2 Worm, Trojan horse
2.3.3 Applets, ActiveX controls
2.3.4 Cookies, Scripts

2.4 Preventing Virus
2.5 Specific attacks

2.5.1 Sniffing and Spoofing
2.5.2 Phishing
2.5.3 Pharming or DNS spoofing

3. Cryptographic : Concepts and Techniques

3.1 Plain and Cipher Text
3.2 Substitution techniques

3.2.1 Caesar Cipher
3.2.2 Mono-alphabetic Cipher
3.2.3 Polyalphabetic substitution Cipher
3.2.4 Playfair Cipher

3.3 Transposition Techniques
3.3.1 Rail Fence Technique
3.3.2 Simple Columnar Transposition Technique
3.3.3 Vernam Cipher (One time pad)

3.4 Encryption and Decryption

4. Symmetric and Asymmetric Key Cryptography

4.1 Block and stream cipher
4.2 Overview of Symmetric Key Cryptography
4.3 Overview of Asymmetric Key Cryptography
4.4 Digital signature
4.5 Concept of message digests

5. Internet Security Protocols

5.1 Basic concept
5.2 Introduction of TCP/IP
5.3 Brief Overview of

5.3.1 Secure socket layer (SSL)
5.3.2 Secure Hyper Text Transfer Protocol (SHTTP)
5.3.3 Time stamping Protocol (TSP)
5.3.4Secure Electronic Transaction (SET)

6. E-mail Security:

6.1 Introduction
6.2 SMTP

6.3 Brief Overview of

6.3.1 Privacy Enhanced Mail (PEM)
6.3.2 Pretty good privacy (PGP)
6.3.3 Secure multipurpose secure Internet mail Extensions (SMIME)

7. Firewall

7.1 Introduction
7.2 Types of firewall
7.3 Packet filter
7.4 Application gateways
7.5 Concepts of DMZ
7.6 Limitation of firewall
7.7 Virtual Private Network (VPN)
7.8 Intrusion

REFERENCE BOOKS :

1. Cryptography and Network Security — Atul Kahate, TMH
2. Cryptography and Network Security — Behrouz Forouzan, TMH / MH
3. Network Security Essentials — Stallings W Pearson Education Asia
4. Cryptography and Network Security — Stallings W Pearson Education Asia
5. Network Security — Kaufmann Charlie et al. Pearson Education Asia
6. Network and Internet Security — Vijay Ahuja A P Professional

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JAVA TOOLS

CODE CS 309

L	**T**	**P**
2	--	2

RATIONALE

The aim of this course is to provide basic interface with internet through Java tools. This course illustrate GUI interface on web. The Java tools covered from basic applet, graphics, awt and event handling, swing, servlets and JDBC

After completing this course student is able understand java tools and its application with web site development.

CONTENTS

1. Java Fundamentals :

1.1 Introduction
1.2 Features of Java
1.3 Types of Java programs
1.4 Application programs
1.5 Applets
1.6 Sevlets
1.7 Java architecture
1.8 JDK tools

2. Applet :

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PRACTICALS

1. Practice programs on applets
2. Practice programs on graphics
3. Practice programs on awt and event handling
4. Practice programs on swing
5. Practice programs on servlets

6. Practice programs on JDBC

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2. The Complete Reference Java 2 — Herbert Schildt, (TMH)
3. Thinking in Java — Bruce Eckel, President Mind View Inc
4. Java 2.0 Programming — E.Balaguruswami, (TMH)

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PHP AND MYSQL

CODE CS 310

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RATIONALE

PHP (Personal Home Page) is a simple yet powerful open-source scripting language for creating dynamic web content. The millions of web sites powered by PHP are testament to its popularity and ease of use. PHP is used by both programmers, who appreciate its flexibility and speed, and web designers, who value its accessibility and convenience. Programming in PHP covers everything needed to know to create effective web applications. MySQL is the World's most used RDBMS that runs as a server providing multi-user access to a number of database. It is the most popular open-source database system for the Web. It is fast, reliable and easy to use.

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PRACTICALS

1. Practice programs for Basic Scripting, Loop and Conditional Constructs.
2. Practice programs for Arrays in PHP.
3. Practice programs for Working with MS-Access Database and Forms.
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7. Practice programs in MySQL for Retrieving, Modifying, and Deleting Data
8. Practice programs in MySQL based on stored procedures and functions.
9. Practice programs in MySQL for creating triggers.

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2. Straight To the Point: MySQL, Dinesh Maidasani, Laxmi Publications (Firewall)
3. How to Do Everything with PHP & MySQL, Vikram Vaswani, McGraw Hills
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5. Web Database Application with PHP & MySQL, Beighley, SPD/O' Reilly

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