

Syllabus Under Autonomy

Mathematics

Semester VI

Course:

Applied Component(Paper-I)

[25 Lectures]

Computer Programming and System Analysis(**Java Programming & Networking**)

Learning Objectives:-

To learn about OOP through java programming, applets

Unit 1. Java Programming and applets

(16 Lectures)

Introduction to Classes and Methods(continued)

Defining classes, creating- instance and class variables, creating objects of a class, accessing instance variables of a class, Creating methods, naming methods, accessing methods of class, constructor methods, overloading methods.

Arrays

Arrays (one and two dimensional) declaring arrays, creating array objects, accessing array elements.

Inheritance, interfaces and Packages

Super and sub classes, keywords- “extends”, “super”, ‘final’, finalizer methods and overridden methods, abstract classes, concept of interfaces and packages.

Java Applets Basics

Difference of applets and application, creating applets, life cycle of applet, passing parameters to applets.

Graphics, Fonts and Color

The graphics classes, painting the applet, font class, draw graphical figures (oval, rectangle, square, circle, lines, polygons) and text using different fonts.

Recommended Book:-

The complete reference java2: Patrick maughton, Hebert schind (TMH).
(Chapters 1 – 6, 8-9, 12, 21)

Unit 2. Networking

(09 Lectures)

Introduction

What is networking, need for networking, networking components- nodes, links (point to point and broadcast), networking topologies – bus, star, mesh, network services (connection oriented and connectionless).

Network Design

What is network design, requirement and tasks of a network, LAN MAN, WAN, VAN.

Network Architectures

Layering principle, OSI Reference Model, TCP/ IP Reference Model. Comparison of OSI and TCP/P Reference Models.

Network Switching and Multiplexing

Bridges, interconnecting LANs with bridges spanning tree algorithm. What is multiplexing. Static multiplexing (FDM, TDM, WDM), dynamic multiplexing. What is switching, circuit switching, packet switching.

Routing and Addressing

Router, router table, routing (direct and indirect), routing characteristics, shortest path routing Dijkstra's algorithm. TCP/IP internetworking, IP addresses (class, classless), and sub netting and subnet mask, Domain names

Recommended Book:-

Computer Networks – Andrew S. Tanenbaum (PHI) (Chapter 1: 1.1-1.4, chapter 2:2.5.4.2.5.5 Chapter 5:P 5.2.1-5.2.4,5.5.1-5.5.2,5.6.1-5.6.2, Chapter 7:7.1.1. 7.1.3).

Practicals:-

Java programs that illustrate

1) the concept of java class

(i) with instance variable and methods

(ii) with instance variables and without methods

(iii) without instance variable and with methods

Create an object of this class that will invoke the instance variables and methods accordingly.

2) the concept of (one dimensional) arrays

3) the concept of (two dimensional) arrays

4) the concept of java class that includes inheritance

5) the concept of java class that includes overridden methods

6) the concept of java class that includes interfaces and packages

7) applets

***** Java programs on numerical methods.**

Remark:- 1)The student should have basic algorithmic approach

2) The student should have sense of system of linear equations, matrices and of numerical methods.

3) Maximum 2 batches(each batch of 16 students)

T.Y.B.Sc . Syllabus Under Autonomy
Mathematics Applied Component
Computer Programming and System analysis

Course: S.MAT. 6.06 SQL and C-programming –II

Learning Objectives: To learn C- Programming and SQL.

Unit 1. C Programming. (16 lectures)

Loops and Controls

Control statements for decision making: branching (if statement, if-else statement, else-if statement, switch statement), looping (while loop, do while loop and for loop), breaking out of loops (break and continue statements).

Storage Classes

Automatic variables, external variables, register variables, static variables - scope and functions.

Functions and Arguments

Global and local variables, function definition, return statement, calling a function (by value, by reference), recursion, recursive functions.

Strings and Arrays

Arrays (one and two dimensional), declaring array variables, initialization of arrays, accessing array elements, string functions (strcpy, strcat, strchr, strcmp, strlen, strstr, atoi, atof).Pointers

Fundamentals, pointer declarations, operators on pointers, passing pointers to functions, pointers and one dimensional array, pointers and two dimensional array.

Structures.Basics of structures, structures and functions.

Recommended Books

Programming in Ansi C - Ram Kumar and Rakesh Agarwal (Tata McGraw Hill)
(Chapters 2 - 8).

Unit 2. Introduction to DBMS and RDBMS (9 Lectures)

Introduction to Database Concepts

Database systems vs file systems, view of data, data models, data abstraction, data independence,

three level architecture, database design, database languages - data definition language(DDL), data manipulation language(DML).

E - R Model

Basic concepts, keys, E-R diagram, design of E-R diagram schema (simple example).

Relational structure

Tables (relations), rows (tuples), domains, attributes, candidate keys, primary key, entity integrity constraints, referential integrity constraints, query languages, normal forms 1,2,and 3 (statements only), translation of ER schemas to relational (database) schemas (logical design), physical design.

Recommended Book Database System Concepts - Silberschatz, Korth, Sudarshan (McGraw-Hill Int. Edition) -4th Edition (Chapter 1: 1.1 - 1.5, Chapter 2: 2.1 - 2.5, 2.8 - 2.9, Chapter 3: 3.1, Chapter 7: 7.1,7.2, 7.7)

List of the practicals.

1. Creating and printing frequency distribution.
2. (a) Sum of two matrices of order $m \times n$ and transpose of a matrix of order $m \times n$, where $m, n = 3$.
(b) Multiplication of two matrices of order m , where $m = 3$, finding square and cube of a square matrix using function.
3. Simple applications of recursive functions (like Factorial of a positive integer, Generating Fibonacci Sequence, Ackerman Function, univariate equation)
4. Sorting of Numbers (using bubble sort, selection sort), and strings.
5. Using arrays to represent a large integer (that cannot be stored in a single integer variable).
6. Counting number of specified characters (one or more) in a given character string.
7. Writing a function to illustrate pointer arithmetic.
8. Using structures to find and print the average marks of five subject along with the name of a student.
9. Program to find g.c.d. using Euclidean algorithm.
10. Numerical methods with C programs.
11. Program to decide whether given number is prime or not.
12. Finding roots of quadratic equation using C program.
13. Programs to find trace, determinant of a matrix.
14. Program to check given matrix is symmetric or not.

Scheme of Examination (Paper II)

The scheme of examination in the subject of Computer Programming and System Analysis will be as follows:

End Semester examination.(Semester VI)

Examination	Contents	Duration	Marks
Paper - II	RDBMS, SQL and C	3 Hrs	60

CIA - I Practical (40 marks.) Duration: 2 hrs.

Practical will be conducted as follows:

1 program in C	15 marks.
1 SQL problem	15 marks.
Journal	10 marks.

Admission criteria:

Students opting this paper as applied component should have knowledge of algorithms. Some basics of discrete mathematics are required. Also students should be familiar with Numerical analysis. Mathematics students will be given preference.