T.Y.B.Sc. Syllabus Under Autonomy
Mathematics Applied Component(Paper-I)

Course: **S.MAT. 5.03   COMPUTER PROGRAMMING AND SYSTEM ANALYSIS   (JAVA PROGRAMMING & SSAD)**

[25 Lectures]

Learning Objectives:-
To learn about OOP through java programming

Unit 1. Java Programming   (20 Lectures)

Introduction to JAVA Programming
What is java, history of java, different types of java programmes, java virtual machine, JDK tool.

Object oriented programming
Object oriented approach, Object oriented programming, objects and classes, behavior and attributes, fundamental principles of OOPs (encapsulation, inheritance – polymorphism. data abstraction).

Java Basics (Data Concepts)
Variables and data types, declaration variables, literals. numeric literals, Boolean literal, character literals, string literals, keywords, type conversion and casting ,shift operators.

Java Operators
Assignment operator, arithmetic operators ,relational operators, logical operators, bitwise operators , incrementing and decrementing operators , conditional operator, precedence and order of evaluation, statement and expressions

Exception handling
Command line arguments, Parsing , try – catch blocks , types of exception & how to handle them.

Loops and Controls
Control statement for decisions making: selection statements (if statement, if- else statement, if- else - if statement, switch statement), goto statement ,looping (while loop and do while loop and for loop), nested loops, breaking out of loops(break and continue statements), return statement.

Introduction to Classes and Methods
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.

Recommended Book:-
The complete reference - Java 2 :- Herbert schildt (TMH).
(Chapters 1 to 7,10)

Unit 2.SSAD (Structured System Analysis and Design)
(05 Lectures)
Introduction
What is a system, characteristics system, types of information system –
Transaction Processing System (TPS), Management Information System (MIS), Decision Support System (DSS).

System Development Strategies
System Development Life Cycle (SDLC) method. Structured analysis development method. Element of structured analysis – Data Flow Diagrams (DFD), data dictionary.

Tools for determining System Requirements
What is requirement determination. fact finding techniques tools for documenting procedures and decisions – decision tree, decision table.

Recommended Book:-
Analysis and Design of Information System – James A. Senn (McGraw – Hill International Editions)------ (Chapters –1 & 3)

Practicals:-

Java programs that illustrate
1) the different types of operators
2) the concept of casting and shift operators
3) the concept of selection statements
4) the concept of looping , nested loops, jumping statements
5) the concept of command line arguments ,parsing and try – catch
   blocks(exception handling)
6) 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.
7) the concept of java class that includes constructor with and
   without parameters.
8) the concept of java class that includes overloading methods

*** 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. 5.06   SQL and C-programming

Learning objectives: Intro. to DBMS & RDBMS, SQL Commands & Functions, and C-language
Two lectures per week and two periods of practicals per week per week

Unit 1. SQL Commands and Functions (16 Lectures)

Handling data
Selecting data using SELECT statement. FROM clause, WHERE clause, HAVING clause, ORDER BY, GROUP BY, DISTINCT and ALL predicates. Adding data with INSERT statement. Changing data with UPDATE statement. Removing data with DELETE statement.
Joining Tables
Inner joins, outer joins, cross joins, union.
Functions
Aggregate functions-AVG, SUM, MIN, MAX and COUNT. Date functions - DATEADD(), DATEDIFF(), GETDATE(), DATENAME(), YEAR, MONTH, WEEK, DAY. String functions
- LOWER(), UPPER(), TRIM(), RTRIM(), PATINDEX(), REPLICATE(), REVERSE(), RIGHT(), SPACE().
Creating and Altering tables
CREATE statement, ALTER statement, DROP statement.
Views
Simple views, complex views, creating and editing views.
Constraints
Types of constraints, KEY constraints, CHECK constraints, DEFAULT constraints, disabling constraints.
Indexes
Understanding indexes, creating and dropping indexes, maintaining indexes.

Recommended Books
1. Professional SQL Server 2000 Programming - Rob Vieira, Wrox Press Ltd, Shroff Publishers
& Distributors Pvt Ltd, NewDelhi.(Chapters 4-10).
2. SQL Server 2000 Black Book - Patrick Dalton & Paul Whitehead, Dreamtech Press.
Note: Use of ready-made databases like Northwind, Pubs, Foodmart etc is to be encouraged in the practical sessions for the effective demonstration of the commands.

Practicals in SQL:

1. Single table queries using operators with select columns and restricting rows of output.

(a) Choose a ready made database Northwind / Foodmart / Pubs.
(b) Supply queries using SELECT command.
(c) Supply queries using SELECT with FROM, WHERE and HAVING clauses and combinations of them.
(d) Supply queries using SELECT with ORDER BY, GROUP BY, DISTINCT, ALL and queries along with different clauses.
2. Multi-table queries using join operators.
(a) Choose a ready made database Northwind / Foodmart / Pubs.
(b) Supply queries using SELECT command with inner joins.
(c) Supply queries using SELECT command with outer joins.
(d) Supply queries using SELECT command with cross-joins.
(e) Supply queries using SELECT command with union.
3. Queries using aggregate functions, string functions, date functions.
(a) Choose a ready made database Northwind / Foodmart / Pubs.
(b) Supply queries using aggregate functions AVG, SUM, MIN, MAX and COUNT.
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(c) Supply queries using string functions LOWER(), UPPER(), TRIM(), RTRIM(), PATINDEX(), REPLICATE(), REVERSE(), RIGHT() and SPACE().
(d) Supply queries using date functions DATEADD(), DATEDIFF(), GETDATE(), DATENAME(), YEAR, MONTH, WEEK and DAY.
(e) Supply queries using combinations of aggregate, string and date functions.
4. Creating, updating, altering and deleting tables and views.
(a) Create a table based on the given schema.
(b) Enter specified number of records to the table.
(c) Update / delete records of the table.
(d) Alter the table based on the given guidelines.
(e) Create views using single table.
(f) Create views using more than one table.
(g) Alter views.
(h) Delete table.
5. Creating tables with defaults, integrity constraints, referential integrity constraints and check constraints both at the column and table levels.
(a) Create tables based on the given constraints.
(b) Supply primary keys and foreign keys.
(c) Supply a default value to a particular column.
(d) Supply a limit for a column using check constraint.
(e) Daw ER diagram for the given ER model.
6. Creating and managing indexes.
(a) Create a table based on the given schema.
(b) Enter specified number of records to the table.
(c) Create an index to the field specified.
(d) Maintain an index.
(e) Dop an index.

Unit 2. Basics in C- Language (9 Lectures)

Program Structure
Header and body, use of comments, construction of the program.
Data Concepts
Variables, constants, and data types, declaring variables.
Simple Input/Output Operations
Character strings: printf(), scanf(), single characters: getchar(), putchar()
Operators
Assignment operators, compound assignment operators, arithmetic operators, relational operators,
logical operators, increment and decrement operators, conditional operator, precedence and order of evaluation, statements and expressions.
Type conversions
Automatic and explicit type conversions.

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 V)

Examination	Contents	Duration	Marks
Paper - II	SQL and basics in C	3 Hrs	60

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

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.

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