**TEACHING PLAN**

**(July- November 2025)**

**Name: Dr Sapna Nagpal**

**Department: Computer Science**

**Subject: Java Programming**

**Class: M. Sc III Sem (C.Sc.)**

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| Month |  |
| July | **Introduction to Java:** History and Evolution of Java, Its Features, Java Development Kit (JDK) andJava Runtime Environment (JRE), Understanding JVM and Bytecode.**Basic Language Elements:** Java Syntax and Structure, Identifiers, Keywords, Literals, Comments,Operators Assignments, Data Types, Variables and its types, Constants, Expressions, Control FlowStatements: if-else, switch, loops (for, while, do-while). |
| August | **Class Fundamentals:** Object & Object reference, Object Life time & Garbage Collection, Creating andOperating Objects, Constructor & initialization code block, Access Control, Modifiers, methods Nested,Inner Class &Anonymous Classes, Abstract Class & Interfaces Defining Methods, Argument PassingMechanism, Method Overloading, Recursion, Dealing with Static Members, Finalize() Method, NativeMethod. Use of Access Modifiers with Classes & Methods, Design of Accessors.**Array:** Initializing & Accessing Array, Multi –Dimensional Array, Operation on String, Mutable &Immutable String, Using Collection, Bases Loop for String, Creating Strings using StringBuffer.**Introduction to Inheritance:** Use and Benefits of Inheritance in OOPs, Types of Inheritance in Java,Inheriting Data members and Methods, Role of Constructors in inheritance, Overriding Super ClassMethods, Use of “super”, Polymorphism in Java. |
| September  | **Interface:** Purpose of interface, defining an interface, implementing interfaces, Interface referencevariables, Interface with variables, Extending interfaces.**Exception Handling:** Types of Errors in Java, Try-Catch Blocks and Finally Clause, Throw and ThrowsKeywords, Creating Custom Exceptions.**Packages:** Package as Access Protection, Defining Package, CLASSPATH Setting for Packages, Importand Naming Convention for Packages.**Class Test 1** |
| October | **Multithreading and Concurrency:** Introduction to Threads and Processes, Creating and ManagingThreads, Thread Synchronization and Inter-thread Communication.**File Handling in Java:** Working with Files and Directories, I/O Basic, Byte and Character Structures,I/O Classes, Reading Console Input Writing Console Output, BufferedReader and BufferedWriter,Serialization and Deserialization, Random Access Files, Storing and Retrieving Objects from File,Stream Benefits.**Collection API:** ArrayList, Vector, LinkedList, Stack.**Class Test 2** |
| November  | **Applet Programming:** How Applets differs from Java Application, Applet Life Cycle, APPLET Tag,Running an Applet, Passing Parameters to Applet. Event Handling: Mechanism, The Delegation EventModel, Event Classes, Event Listener Interfaces, Adapter and inner classes.**GUI Programming:** Designing Graphical User Interfaces in Java, Components and Containers, Basicsof Components, Using Containers, Layout Managers, AWT Components, adding a Menu to Window,Working with Buttons, TextFields, and Labels.**Revision and Doubts sessions** |

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**Department: Computer Science**

**Subject: Computer Networks**

**Class: M. Sc I Sem (C.Sc.)**

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| Month |  |
| July |  **Introduction to Computer Network:** Types of Networks, Network Topologies, OSI and TCP/IP ReferenceModels;**Data Communications Concepts:** Digital Vs. Analog communication; Parallel and Serial Communication;Synchronous, Asynchronous and Isochronous Communication; Communication modes: simplex, half duplex,full duplex; Multiplexing; |
| August | **Transmission media:** Wired-Twisted pair, Coaxial cable, Optical Fibre, Wireless transmission: Terrestrial,Microwave, Satellite, and Infrared.**Communication Switching Techniques:** Circuit Switching, Message Switching, Packet Switching. |
| September  | **Data Link Layer Fundamentals:** Framing, Basics of Error Detection, Forward Error Correction, CyclicRedundancy Check codes for Error Detection, Flow Control. Media Access Protocols: ALOHA, Carrier SenseMultiple Access (CSMA), CSMA with Collision Detection (CSMA/CD), Token Ring, Token Bus.**High-Speed LAN:** Standard Ethernet, Fast Ethernet, Gigabit Ethernet, 10G; Wireless LANs: IEEE 802.11,Bluetooth.Class Test 1 |
| October |  **Network Layer:** IP Addressing and Routing, Network Layer Protocols: IPv4 (Header Format and Services),ARP, ICMP (Error Reporting and Query message); IPv6 (Header Format and Addressing).**Transport Layer:** Process-to-Process Delivery: UDP, TCP; Application Layer: Domain Name System (DNS);SMTP; HTTP; WWW.Class Test 2 |
| November  |  **Network Security:** Security Requirements and attacks; Cryptography: Symmetric Key (DES, AES), Public KeyCryptography (RSA); Firewall.Revision and Doubts |