**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) and  Java 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 Flow  Statements: if-else, switch, loops (for, while, do-while). |
| August | **Class Fundamentals:** Object & Object reference, Object Life time & Garbage Collection, Creating and  Operating Objects, Constructor & initialization code block, Access Control, Modifiers, methods Nested,  Inner Class &Anonymous Classes, Abstract Class & Interfaces Defining Methods, Argument Passing  Mechanism, Method Overloading, Recursion, Dealing with Static Members, Finalize() Method, Native  Method. 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 Class  Methods, Use of “super”, Polymorphism in Java. |
| September | **Interface:** Purpose of interface, defining an interface, implementing interfaces, Interface reference  variables, Interface with variables, Extending interfaces.  **Exception Handling:** Types of Errors in Java, Try-Catch Blocks and Finally Clause, Throw and Throws  Keywords, Creating Custom Exceptions.  **Packages:** Package as Access Protection, Defining Package, CLASSPATH Setting for Packages, Import  and Naming Convention for Packages.  **Class Test 1** |
| October | **Multithreading and Concurrency:** Introduction to Threads and Processes, Creating and Managing  Threads, 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 Event  Model, Event Classes, Event Listener Interfaces, Adapter and inner classes.  **GUI Programming:** Designing Graphical User Interfaces in Java, Components and Containers, Basics  of 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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**(July- November 2025)**

**Name: Dr Sapna Nagpal**

**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 Reference  Models;  **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, Cyclic  Redundancy Check codes for Error Detection, Flow Control. Media Access Protocols: ALOHA, Carrier Sense  Multiple 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 Key  Cryptography (RSA); Firewall.  Revision and Doubts |