Teaching Learning Centre of Excellence (TLCE)

in association with

School of Computer Science Engineering and Information Systems [SCORE]

2-week Certificate Course on JAVA for Research Scholars
[April – June 2025]

Day	Name and Affiliation of the Expert	Topic
1	Dr. Chemmalar Selvi G, Assistant Professor Senior Grade 2, SCORE, VIT Vellore	**Java Fundamentals & Setup** **History and features of Java** **JVM, JRE, JDK – Deep dive** **Setting up Java (CLI & IDE)** **Data types, variables, operators** **Type casting and wrapper classes** **Hands-on: Write a Java program to benchmark primitive vs wrapper performance**
2	Dr. Shynu Professor, SCORE, VIT Vellore	**Control Structures & Arrays** **If-else, switch-case** **Loops (for, while, do-while)** **Arrays (1D, 2D)** **Enhanced for-loop and Arrays class methods** **Hands-on: Create a matrix operation tool (addition, transpose, etc.)**
3	Dr. Chemmalar Selvi G, Assistant Professor Senior Grade 2, SCORE, VIT Vellore	**Object-Oriented Programming – Part 1** **Classes and Objects** **Constructors, Overloading** **this keyword**

		Access modifiers Hands-on: Simulate a research article with metadata using a class
4	Dr. Shynu Professor, SCORE, VIT Vellore	Object-Oriented Programming – Part 2 Inheritance Method Overriding, super keyword final, static, and abstract keywords instanceof operator Hands-on: Build a class hierarchy for a publication system (Journal → Conference → Book)
5	Dr. Chemmalar Selvi G, Assistant Professor Senior Grade 2, SCORE, VIT Vellore	Interfaces, Packages, and Enums Interfaces vs abstract classes Default and static methods in interfaces (Java 8+) Creating and using packages Enums in Java Hands-on: Create a plugin-style research tool using interfaces and packages
6	Dr. Shynu Professor, SCORE, VIT Vellore	Exception Handling & Assertions Try, Catch, Finally, Throw, Throws Custom exceptions Exception hierarchy Using assert for research validation/testing Hands-on: Build a citation data parser with custom error handling
7	Dr. Chemmalar Selvi G, Assistant Professor Senior Grade 2, SCORE, VIT Vellore	Java Collections Framework List, Set, Map, Queue (and implementations)

		Generics in Collections
		Iterator and Enhanced for-loop
		Sorting with Comparator and Comparable
		Hands-on: Manage a collection of research papers with metadata sorting/search
8	Dr. Shynu Professor, SCORE, VIT Vellore	File I/O and Serialization File, FileReader, FileWriter
		Buffered streams
		Object Serialization/Deserialization
		Reading and writing CSV/JSON/XML files
		Hands-on: Serialize a research object and store it in a file
9	Dr. Chemmalar Selvi G, Assistant Professor Senior Grade 2, SCORE, VIT Vellore	Multithreading and Concurrency Thread creation (Thread, Runnable)
		Lifecycle of a thread
		Synchronization, wait(), notify()
		Executor framework (intro)
		Hands-on: Simulate parallel citation downloads using threads
10	Dr. Shynu Professor, SCORE, VIT Vellore	Mini Project & Research Integration Project guidance: Implement a Java-based research assistant tool
		Integrate external libraries (Apache Commons, Google Gson)
		Best practices: Javadoc, Unit Testing (JUnit), logging

		Project Ideas:
		Reference management system
		Research article scraper (simulated)
		Simple NLP-based keyword extractor
		Custom search and sort engine for local research database

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