CENTRE FOR DEVELOPMENT OF IMAGING TECHNOLOGY
TECHNOLOGY EXTENSION DIVISION

SYLLABUS

CERTIFICATE IN JAVA PROGRAMMING	
Duration: 3 Months	
Eligibility: Plus two or equivalent/3 year Diploma in Engineering	
SCHEME OF STUDY	
CJA 101	**Principles of Programming**
CJA 102	**Programming in Java**
CJA 103	**Lab I- Java Lab**

PAPER I - PRINCIPLES OF PROGRAMMING

Module – I- Programming Practice and Techniques (8 Hrs)

Introduction—steps in Programming Process— Understanding Program Specification— Design Program Model— Determine correctness of the program— code the program— Test and debug the program— document the program— Structured Programming- Sequence— Selection— Repetition—Criteria for a good program—Program Tools — Flowcharts — Pseudo codes— Algorithm checking Methods— Dry Run— Independent Inspection— Structured Walk-through—Algorithm Development- Decision— Decision symbol— selection Construct— guidelines for if statements— Algorithm Development- Iteration; While loop construct— for loop construct— repeat until construct—Arrays— What is an array— declaring an array— initialising an array— boundaries of an array— Single dimensional array— two dimensional array—multi dimensional array—Subroutines: modular programming— criteria for decomposing larger modules— recursion.

Module II -Programming Practice using C (12 Hrs)

Program structure —input and output statements— function definition— delimiters— statement terminator— comment lines —libraries— compiling and running—Variables — constants— identifiers— keywords— data types—Operators —Arithmetic operators- binary operators— unary operators —Arithmetic expressions— assignment operators— multiple assignment and short hand operators .Precedence of operators —type casting—Relational operators and expressions— logical operators and expression— if statement— nested if statement— switch case—Loop Structure- the for loop —while loop— do... while loop. Working of nested loops. Jump statements break and continue—Arrays- Array elements and indices— string/char arrays. Array searching –linear and binary search. Sorting techniques selection and bubble sort— multi dimension arrays and matrix examples— Functions- Function declaration— invoking a function— function body— function prototypes. Formal variables— actual variables—Call by value— call by reference—Global variables —local variables and static variables. Working of recursive functions.

Module –III- Object Oriented Programming Concepts (10 Hrs)

Structured programming and its drawbacks. Object oriented approach and its advantages. Define classes and objects—Properties and methods of a class— Access Modifiers —public and private sections —Classes and Objects: Implementing Data hiding— Data Abstraction and Encapsulation. Memory allocation for an object— The reference object 'this'. Static class members— Object Arrays—Functions— function overloading. Constructors— parameterised constructor— Destructors— Methods with default arguments— constructor overloading—Inheritance: Introduction— Advantages of inheritance— derived and base classes— types of inheritance— inheritance and access control— constructors in inheritance— super key word. Multiple inheritance —Polymorphism and overriding: Introduction— overriding methods— virtual— super key words. abstract classes— interfaces.

Module –IV - Database Concepts (8Hrs)

Database Management system introduction— purpose of database —Advantages of DBMS—Database Architecture—Data Models : Object Based Logical Model —Record based Logical Model—Object-based Logical Model :Entity Relationship Data Models— Types of Relationship : ER Diagram Symbols—Record-based Logical Model: Hierarchical Model— Network model— Relational model—Entity— Strong Entity— Weak entity— subtypes— Sub types— super types. Attribute— Keys:-Primary key— Foreign Key— candidate key— Alternate Ker— Composite Key. Relationship—cardinality of relationship— One-to-One— One-to-many— Many-to Many—Relational algebra :Restrict— Project— Product— Union— Intersect— difference— Join— divide—Normalization: Different forms of Normalization. First Normal Form— second Normal Form —Third Normal form and BCNF

Module –V- Practicing MySQL (12 Hrs)

Introduction—Mysql features— Data Types—Data Definition Commands : Create database— Drop database and select database. Create table— alter table —add constraints and drop table—Data Manipulation Commands : Insert records — delete records and update records—Querying Data : select command with options —Retrieving specific Attributes— retrieving selected Rows— where and order by clauses—Functions— aggregate functions— group by and having clause—Querying data by using Joins and sub queries— inner join— outer join— self join—Creating views — indexers— Stored procedure

PAPER II - PROGRAMMING IN JAVA

Module I (15 Hrs)

Introduction to Java— Java Overview— History of Java— Java Environment Setup— Comparison of Java and C++ — JVM—Basic Syntax of java program —**Object Oriented Programming** — OOPs features—Comparison between OOP and POP (procedure oriented programming)—Naming Conventions—   Datatypes—Constants—Tokens—identifiers—literals—keywords—operators—separators—variables—modifiers

Module II (20 Hrs)

Conditional and looping constructs —Selection Statement—Simple if— if else— nested if—else if ladder— Switch statement—Iterative Statements—for—while—do while loop—Nested looping— Breaking statement—break— continue statement—Class fundamentals—Object Creation— Methods— passing Object— Constructors— method overloading and method overriding— this keyword – Arrays— Strings— vectors

Module III (15 Hrs)

Inheritance and polymorphism—Inheritance—types—super keyword—Polymorphism—virtual methods— Abstract class— abstract methods— Interfaces— Packages— wrapper classes

Module IV (25 Hrs)

Exceptions and Multithreading—Exception handling—Threads—thread life cycle—Multithreading— Threads methods—**I/O packages and Applet **— Input Stream and Output Stream classes— Reader and Writer classes— The file class — File input stream — File output stream — File handling using File Input Stream and File Output Stream— Applet programming — Life cycle of Applet.

Module V (25 Hrs)

GUI Programming: Basics of AWT and Swing— Event handling —**Networking**—URL class methods— URL Connection class methods— Socket programming **Database Connectivity:** Database programming using JDBC