GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Integrated M.Sc. (Computer Science)
(With Specialization: AI and Data Science/IoT/ Cyber Security)

With effective from academic year 2022-23

Subject Code: 1330304
Semester- III
Subject Name: Object Oriented Programming with JAVA

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE(E)	PA (M)	PA (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Teaching Hours	Module Weightage (%)
1	**Introduction to java and elementary programming**: Java language specification API, JDK and IDE, Creating, compiling and Executing a simple java program, Programming style, documentation and errors, Reading input from console, identifiers and variables, Assignment statements, Named constants and naming conventions, Data Types (Numeric, Boolean, Character, String) its Operations and Literals, Evaluating Expressions and operator Precedence, Types of Operators (Augmented assignment, Increment and Decrement, Logical), operator precedence and associativity, numeric type conversions.	7	20
2	**Selections, Mathematical functions and loops**: If statements, Two way, Nested if and multi-way if statements, Switch statements, Conditional Expressions, Common mathematical functions ,While , do-while and for loop, nested loops, Keyword break and continue.	7	15
3	**Methods and Arrays**: Defining and calling method, Passing argument by values, Overloading methods and scope of variables, Method abstraction and stepwise refinement, Single Dimensional arrays, copying arrays ,Passing and returning array from method, Searching and sorting arrays and the Array class, Two-Dimensional array and its processing, Passing Two-dimensional Array to methods, Multidimensional Arrays.	7	20
4	**Objects and Classes**: Defining classes for objects, Constructors, accessing objects via reference variable, using classes from the java library, static variables, constants and methods, visibility modifiers and Data field encapsulation, passing objects to methods, array of objects, immutable objects and classes, scope of variable and the this reference.	7	15
5	**Object oriented Programing**: Class abstraction and Encapsulation, thinking in objects and class relationships, Primitive data type and wrapper class types, Big	7	15

	integer and Big decimal class, string class, String Builder and String Buffer class, super class and subclass, using super keyword, overriding and overloading methods, polymorphism and dynamic binding, casting objects and instance of operator, The Array List class and its methods, The protected data and methods.		
6	**Exception Handling, I/O, abstract classes and interfaces:** Exception types, finally clause, re-throwing Exceptions, chained exceptions, defining custom exception classes, file class and its input and output, Reading data from web, Abstract classes, interfaces, Comparable and Cloneable interface.	5	15

Reference Books:

1. Intro to Java Programming, 10th edition, Y.Daniel Liang, Pearson.
2. Object oriented programming with Java, Rajkumar Buyya, S Thamarai Selvi, Xingchen Chu, McGrawHill.
3. Programming in Java, Sachin Malhotra, Saurabh Choudhary, Oxford.
4. Programming with JAVA , E Balagurusamy, McGrawHill.
5. CORE JAVA volume -I Cay Horstmann, Pearson.

Course outcomes:

After learning the course, the students should be able to:

No.	CO statement
CO-1	Use various Java constructs, features and libraries for simple problems.
CO-2	Demonstrate how to define and use classes, interfaces, create objects and methods, how to override and overload methods, compile and execute programs.
CO-3	Write a program using exception handling, multithreading with synchronization.
CO-4	Write a program using Files, binary I/O, collection Frameworks for a given problem.
CO-5	Design and develop GUI based applications in a group using modern tools and frameworks.