Programme	**Bachelor of Technology in Computer Science and Engineering**		Year of Regulation	**2019-20**
Department	**Computer Science and Engineering**		Semester	**IV**

Course Code	Course Name			Credit Structure				Marks Distribution			
			L	T	P	C	INT	MID	END	Total	
CS222	**Programming in Java**		**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**	

Course Objectives		Course Outcomes		
To introduce programming in the Java programming language, platform independence, bytecode, the concepts of JVM, JRE and JDK, and other basic features of Java.		CO1	**Able to explain and use the basic features and concepts of programming in Java.**	
To train in object-oriented programming concepts w. r. t. to Java.		CO2	**Able to write object-oriented programs in Java.**	
To train the students in using special programming features, collections, generics, exception handling, advanced I/O and multi-threading in Java.		CO3	**Able to use special programming features, collections and generics in Java.**	
To give knowledge of Java API class libraries and collections in designing standalone desktop and web applications.		CO4	**Able to do exception handling, advanced I/O and multi-threading in Java.**	
		CO5	**Able to write networking programs, database access programs and GUI programs in Java.**	

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	3	2	1	1	1	0	0	0	0	0	0	0	1	1	0
2	CO2	3	2	1	1	1	0	0	0	0	0	0	0	1	1	0
3	CO3	3	3	2	3	2	0	0	0	0	0	0	0	2	2	1
4	CO4	3	3	2	3	2	1	0	0	0	0	0	0	3	2	1
5	CO5	3	3	2	3	2	1	0	0	0	1	1	1	3	2	1

SYLLABUS			
No.	Content	Hours	COs
I	**Java fundamentals** Introduction; Structure of Java platform: JDK, JRE, JVM; Advantages of Java; All code in classes; Compiling source code into bytecode; Data types: primitive and reference types; Comments; Variables; Operators; Flow Control statements: if, else, switch, switch expressions, loops, enhanced for loop, labelled for loop, return, break and continue; Array declaration; Multidimensional arrays; Type conversion and Casting; Wrapper classes and Boxing; Enumerated types; Strings and utility string classes; Java Packages and Library	07	CO1, CO2
II	**Object-oriented programming in Java** Creating new data types: class, Local variables; Encapsulation; Java access specifiers; Abstraction; Method overloading; Constructors; Initialization and Cleanup; Cleanup: finalization and garbage collection; Member initialization; Array initialization; Reusing classes; Association; Aggregation; Composition; Delegation; Inheritance; Interfaces; Multiple inheritance; Upcasting; The final keyword; Method overriding; Constructors and Polymorphism; Abstract classes and methods; Nesting interfaces; Inner Classes; Using this and new; Anonymous inner classes	09	CO2, CO3
III	**Special features in Java** Collections: List, Set, Queue; Iterating collections; Maps; Generic collections in Java; Class Object; Class Class	06	CO3
IV	**Advanced topics** Arrays are first-class objects; Object serialization; Error handling with exceptions; Basic exceptions; Catching an exception; Creating user-defined exceptions; Performing cleanup with finally; Input and Output in Java; The File class; readers and writers; Typical uses of I/O streams; File reading and writing utilities; Basic threading: the Thread class; Creating, Starting and Stopping a thread; Sharing resources; Cooperation between tasks; Deadlocks	10	CO4
V	**Advanced programming in Core Java** Java networking fundamentals; Networking classes and interfaces; Java database connectivity (JDBC); Graphical user interfaces: AWT and Swing classes, Capturing events	08	CO5
	Total Hours	40	

Essential Readings

1. E. Balagurusamy, "Programming with Java", McGraw-Hill Education, 6th edition, 2019.

2. Herbert Schildt, "Java - A Beginner's Guide", McGraw-Hill Education, 7th edition, 2017.

3. Yashavant P. Kanetkar, "Let us Java", BPB Publications, 4th edition, 2019.

Supplementary Readings

1. Herbert Schildt, "Java: The Complete Reference", McGraw-Hill Education, 9th edition, 2017.

2. Cay S. Horstmann, "Core Java Volume II - Advanced Features", Pearson Education; 10th edition, 2017.

3. Barry A. Burd, "Beginning Programming with Java for Dummies", Wiley, 2017.