Course Code BTCS302	Course Name Object Oriented Programming With Java	Semester III

Teaching Scheme (Hours)				Teaching Credit			
Lecture	Practical	Tutorial	Total	Lecture	Practical	Tutorial	Credits
3	0	2	45	3	0	2	4

Course Prerequisites	Basic Java Programming
Course Category	Professional Subjects - Core (PC)
Course focus	Employability
Rationale	The Java programming syllabus aims to provide students with a strong foundation in programming using the Java language. It covers topics such as variables, data types, control structures, functions, arrays, pointers, and file handling. This equips students with the skills to develop efficient and reliable software solutions in Java for various applications. Java's strong OOP design helps students grasp core concepts like encapsulation, inheritance, and polymorphism, while its structured syntax encourages good coding habits. Java's widespread industry use, extensive libraries, strong error handling, and rich community support make it practical for real-world applications. Java lays a solid foundation for learning advanced topics and transitioning to other languages, preparing students for both academic and professional success.
Course Revision / Approval Date	30/5/2025
Course Objectives (As per Blooms' Taxonomy)	To enable the student to: **1.** To make students familiar with the basics of java programming. **2.** To give brief knowledge about constructor and inbuilt function. **3.** To make students understand about inheritance and different packages. **4.** To inculcate students about To make students understand about inheritance and different packages layout handling and other GUI based commands. **5.** To aware students about advanced technologies of Java Programming.

Course Content	Weightage	Contact Hours
Unit 1: Basics of Java Basics of JAVA & Introduction to OOP Paradigm, Features of Java- Byte Code and Java Virtual Machine, JDK, Data types- Integers, Floating point, characters, Boolean, Type conversion, and casting, Operators- Arithmetic operators, Bit wise operators, Relational Operators, Boolean Logical operators, Assignment Operator, Operator Precedence, Control Statements – If , else, nested if, if- else ladders, Switch, Looping Statements -while, do-while, for, for- each Jump Statements- break, continue. Scope and Life Time of Variables OOP Paradigm– 6 features of OOP, Class, fields, methods, declaring objects, new operator, Assigning object reference variables. The main class, Command line arguments, finalize method A Stack Class	20%	09
Unit 2: Polymorphism, Inheritance & Interfaces Polymorphism, Inheritance & Interfaces Polymorphism- Method overloading, Constructors and its overloading Uses of this keyword and static keyword Nested classes and Inner classes Inheritance- Types of Inheritance, Constructors in Inheritance Uses of super keyword Access modifiers –public, private, protected and no access modifier Runtime Polymorphism-Method Overriding, dynamic method dispatch, abstract classes Uses of final keyword Interfaces– defining an interface, implementing interfaces, features of interfaces, difference between classes, interfaces and abstract classes 10.A Stack Interface		09
Unit 3: Package, Exception handling, Multithreaded	20%	09

Programming Packages- Defining a package, Access protection importing packages Exception handling- defining exceptions, errors, Hierarchy of Exception class & Builtin Exceptions Keywords used for Exception Handling- try, catch, finally, throw, throws try with multiple catch & Nested try-catch User-defined/Custom Exceptions Multithreading - Defining thread & multi-threading in Java, Java Thread lifecycle, Java Thread Model Creation of Threads- thread class, Runnable interface, main thread, creating single Multithreading Methods -start(),run(),stop(), Isalive ( ) and join ( ) Thread – Priorities, Synchronization Interthread communications, Deadlock.		
Unit 4: I/O Programming & Collection Classes I/O Programming- Introduction to Stream, Byte Stream, Character Stream, Readers and Writers String handling- String class, StringBuffer, Use of Wrapper Class File Handling-File Class, File InputStream, File Output Stream, InputStreamReader, inputStreamWriter, FileReader, FileWriter, Bufferedreader Network Programming- Introduction to Java Networking, Java Networking classes, Socket API & Programming Collection Framework- Collection Interfaces& Classes, List, AbstractList, ArrayList, LinkedList, Enumeration, Vector, Properties Understanding Singleton Classes and Java Reflection API 7. Lambda Expressions- Functional Interfaces, Lambda Expression Fundamentals, Passing Lambda Expressions as Arguments, Block Lambda Expressions	20%	09
Unit 5: Introducing GUI Programming with JavaFX Event Handling- Event Handling Mechanisms, The Delegation Event Model, Event Classes, Event Classes, Anonymous Inner Classes AWT- Windows fundamentals, AWT Classes,Working with Frame Window, Introduction to Graphics, creating a windowed program Swings- Two key features of swing, MVC ,Components and Containers, A simple swing application 4. JavaFX- FX Basics, the FX Skeleton, FX- controls, menus, events	20%	09

Creating a Main Menu Application in JavaFX.		

List Of Practical	Weightage	Contact Hours
Practical 1: Write Program on **A.** Working of control structures. **B.** Loop execution with array and string. **C.** Demonstrate working of overloading. **D.** Usage of Math class	**08%**	**02**
Practical 2: Write Program on **A.** Different array operations. **B.** Use string class for various string manipulations.	**08%**	**02**
Practical 3: Write Program on **A.** Demonstrate working of class and objects. **B.** Working with different types of constructors.	**10%**	**02**
Practical 4: Write Program on **A.** Show the importance of modifiers with different classes.	**08%**	**02**
Practical 5: Write Program on **A.** Usage of this keyword. **B.** Demonstrate simple inheritance.	**08%**	**02**
Practical 6: Write Program on **A.** Working of overriding. **B.** Polymorphism execution with dynamic binding.	**08%**	**02**
Practical 7: Write Program on **A.** Usage of abstract class. **B.** Working of casting objects.	**08%**	**02**
Practical 8: Write Program on	**10%**	**02**

A. Show use of interface. **B.** Demonstrate try catch finally.		
Practical 9: Write Program on **A.** Working of Input output. **B.** Demonstrate file handling.	**8%**	**02**
Practical 10: Write Program on **A.** Usage of thread. **B.** Create a JavaFx application to display "Hello World" messages.	**08%**	**02**
Practical 11: Create a tic-tac-toe board in which a cell may be X, O, or empty. Randomly decide what to display at each cell. The X and O are images in the files X.gif & O.gif.	**08%**	**02**
Practical 12: Create a GUI application to move a circle up, down, left or right using arrow keys.	**08%**	**02**

Instructional Method and Pedagogy

Lecture - based instruction, Project based learning, Flipped Classroom, Case Studies, Problem based learning, Collaborative Learning.