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| **CS23312** | **OBJECT ORIENTED PROGRAMMING** | **L** | **T** | **P** | **C** |
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# COURSE OBJECTIVES:

 To introduce the foundational concepts of object-oriented programming including classes, objects, and inheritance in Java.

 To expose exception handling, Java streams, and Java-Doc comments for code documentation.

 To emphasize the concepts of generics and multi-threading in Java, including synchronization techniques and the use of executors and synchronizers.

 To give insight into Java networking and JDBC, including socket programming, RMI, and database connectivity.

 To train in GUI programming using Swing and JavaFX, including the implementation of the Model-View-Controller design pattern.

# UNIT I PARADIGMS & BASIC CONSTRUCTS 9

Object oriented programming concepts  objects  classes  methods and messages  abstraction and encapsulation  inheritance  abstract classes  polymorphism.- Objects and classes in Java  defining classes  methods - access specifiers  static members  constructors  finalize method

# UNIT II EXCEPTION HANDLING & STREAMS 9

Arrays  Strings - Packages  Java-Doc comments - Inheritance  class hierarchy  polymorphism  dynamic binding  final keyword  abstract classes-Exception handling  exception hierarchy  throwing and catching exceptions-The Object class  Reflection  interfaces  object cloning  inner classes  proxies - I/OStreams

**UNIT III GENERICS & MULTI THREADING**

**9**

Motivation for generic programming  generic classes  generic methods  generic code and virtual machine  inheritance and generics  reflection and generics - Multi- threaded programming  interrupting threads  thread states  thread properties  thread synchronization  Executors  synchronizers.

# UNIT IV JAVA NETWORKING & JDBC

**9**

Socket programming in Java-InetAddress and URL classes-TCP and UDP protocols in Java-ServerSocket and Socket classes-Multi-threaded servers-Handling multiple client connections-Introduction to RMI-Creating RMI servers and clients-RMI registry-RMI and object serialization-Overview of JDBC-JDBC drivers-Connecting to databases- Executing SQL queries

# UNIT V GUI PROGRAMMING

**9**

Introduction to Swing  Model-View-Controller design pattern  layout management  Swing Components -Introduction to JavaFX - JavaFX components.

# TOTAL : 45 PERIODS

**COURSE OUTCOMES :**

At the end of the course, students will be able to

**CO1 :** Implement Java classes and objects, abstraction, encapsulation, inheritance, and polymorphism by applying object-oriented programming principles.

**CO2 :** Handle exceptions effectively in Java programs, Java streams, and Java-Doc comments for effective documentation.

**CO3 :** Execute generic programming techniques, multi-threaded programming, and synchronization mechanisms in Java applications.

**CO4 :** Develop Java applications for network communication using socket programming, RMI, and JDBC, including the execution of SQL queries for database operations.

**CO5 :** Establish interactive graphical user interfaces using Swing and JavaFX, separation of concerns, and efficient layout management by applying the Model-View-Controller design pattern.

# TEXT BOOKS :

1. Java: The Complete Reference, Thirteenth Edition, Herbert Schildt, Danny Coward, 2024, Mc Graw-Hill Companies, ISBN: 9781265058432 (Unit 1,2,3)
2. Java for Dummies, Barry Burd,2022, For Dummies, ISBN: 9781119861645 (Unit 4,5)

# REFERENCES:

1. Java Cookbook: Problems and Solutions for Java Developers, Ian Darwin,2020,O'Reilly Media, ISBN: 9781492072584
2. [www.javatpoint.com](http://www.javatpoint.com/)
3. [www.w3schools.com](http://www.w3schools.com/)

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| **1** | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| **2** | 3 | 3 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 2 | 1 |
| **3** | 1 | 2 | 3 | 2 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 1 |
| **4** | 2 | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 2 |
| **5** | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 3 |

**1 - low, 2 - medium, 3 - high, - no correlation**