|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course Code:BCSE2333 | Java Programming | **L** | **T** | **P** | **C** |
| **Version No**. | **Date of Approval:** | 0 | 0 | 4 | 2 |
| Prerequisite/Exposure | Computer Programming and Problem Solving Using C, Fundamentals of Object Oriented Programming | | | | |
| Co-requisites |  | | | | |

**Course Objectives**

1. Study the syntax, semantics and features of Java Programming Language
2. Learn the method of creating Multi-threaded programs and handle exceptions
3. Learn Collections to implement data structure.

**Course Outcomes**

At the end of the course student will be able to:

1. Understand the java platform ,structure of java class and java packages.
2. Understand object oriented concepts and implement the same using java operators,control statements,arrays .
3. Apply inheritance and exception handling concepts in solving problems.
4. Apply java IO stream concepts to solve problems efficiently.
5. Implement multithreading ,collections and Java database connectivity concepts to solve problems in advance level.
6. Course Content

**Unit I: Introduction 6 hours**

Declare and initialize variables (including casting of primitive data types),Define the scope of variables, Define the structure of a Java class, Create executable Java applications with a main method; run a Java program from the command line; including console output. Import other Java packages to make them accessible in your code. Compare and contrast the features and components of Java such as: platform independence, object orientation, encapsulation, etc. Differentiate between object reference variables and primitive variables. Read or write to object fields, Object’s Lifecycle (creation, “dereference by reassignment” and garbage collection), JAR files.

**Unit II: Operators and Object oriented Concepts 10 hours**

Java operators; including parentheses to override operator precedence, Test equality between Strings and other objects using == and equals (),

Control Statements : Create if and if/else and ternary constructs, Use a switch statement, Create and use for loops including the enhanced for loop, Create and use do/while loops, Compare loop constructs, Use break and continue. Create and use while loops,

Arrays : Declare, instantiate, initialize and use a one-dimensional array, Declare, instantiate, initialize and use multi-dimensional array,

Methods and OOPs: Create methods with arguments and return values; including overloaded methods, Apply the static keyword to methods and fields, Create and overload constructors; including impact on default constructors, Apply access modifiers, Apply encapsulation principles to a class, Determine the effect upon object references and primitive values when they are passed into methods that change the values,

Wrapper class, Develop code that uses wrapper classes such as Boolean, Double, and Integer.

**Unit III: Inheritance and Exception Handling 8 hours**

Inheritance and its benefits, Develop code that demonstrates the use of polymorphism; including overriding and object type versus reference type. Determine when casting is necessary. Use super and this to access objects and constructors, Use abstract classes and interfaces.

Exception Handling: Differentiate among checked exceptions, unchecked exceptions, and Errors. Create a try-catch block and determine how exceptions alter normal program flow, Describe the advantages of Exception handling, Create and invoke a method that throws an exception, Recognize common exception classes (like NullPointerException, ArithmeticException, ArrayIndexOutOfBoundsException, ClassCastException). Manipulate data using the StringBuilder class and its methods, Creating and manipulating Strings, Create and manipulate calendar data using classes from java.time package.

**Unit IV: I/O Stream 4 hours**

Java input and output, Streams, byte streams and character streams, InputStream, OutputStream, Reader, Writer, File, FileInputStream, BufferedInputStream, FileOutputStream, BufferedOutputStream, FileReader, BufferedReader, FileWriter, BufferedWriter, InputStreamReader, OutputStreamWriter

**Unit V: Threads and Collections 6 hours**

Multithreading - Multithreaded programs, Thread class and Runnable interface, Synchronization

Collection - Collection framework and collection interfaces List, Queue, Set and Map

List classes- ArrayList, LinkedList, For-each method for collection and iterators

Map – HashMap, LinkedHashMap, Set classes- TreeSet, HashSet

**Unit VI: JDBC Connectivity 6 hours**

Introduction to JDBC API,Types of drivers Statement, Prepared Statement and Callable Statement, ResultSet, Performing insert, update and delete operatio/ns,Transaction management - commit and rollback

**Text Books:**

1.      Kathy Sierra, and Bates Bert. Head First Java: A Brain-Friendly Guide. " O'Reilly Media, Inc.", Second Edition, 2009.

2.   James Rumbaugh et. al, “Object Oriented Modeling and Design”, Prentice-Hall; 1st edition, 1990.

**Reference Books:**

1.      Naughton, Schildt, “The Complete Reference JAVA2”, TMH, 3rd Edition, 1999.

2.   Kathy Sierra, and Bates Bert. Sun Certified Programmer for Java. McGraw Hill Publications, 2008.

3.   Pandey, Tiwari, “ Object Oriented Programming with JAVA” , Acme Learning Private Limited; First Edition, 2009.

4.   Horstmann, Cay S., and Gary Cornell. Core Java 2: Volume I, Fundamentals. Pearson Education, 9th Edition, 2013.