OBJECT ORIENTED PROGRAMMING THROUGH JAVA

IV Semester: IT | III Semester: CSE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACS003	Foundation	3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

OBJECTIVES:

The course should enable the students to:

I. Understand fundamentals of object-oriented terminology and programming concepts in java.
II. Acquire basics of how to translate solution problem into object oriented form.
III. Develop programs in java for solving simple applications.
IV. Design and implement simple program that use exceptions and multithreads.

CLOURSE LEARNING OUTCOMES (CLOs):

1 Use object oriented programming concepts to solve real world problems.
2 Explain the concept of class and objects with access control to represent real world entities.
3 Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
4 Use overloading methodology on methods and constructors to develop application programs.
5 Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords.
6 Describe the concept of interface and abstract classes to define generic classes.
7 Use dynamic and static polymorphism to process objects depending on their class.
8 Illustrate different techniques on creating and accessing packages (fully qualified name and import statements).
9 Understand the impact of exception handling to avoid abnormal termination of program using checked and unchecked exceptions.
10 Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally).
11 Use multithreading concepts to develop inter process communication.
12 Understand and implement concepts on file streams and operations in java programming for a given application programs.
13 Describe the backend connectivity process in java program by using JDBC drivers.
14 Develop java application to interact with database by using relevant software component (JDBC Driver).
15 Understand the process of graphical user interface design and implementation using AWT or swings.
16 Use different layouts (Flow Layout, Boarder Layout, Grid Layout, Card Layout) to position the controls for developing graphical user interface.
17 Build the internet-based dynamic applications using the concept of applets.
18 Develop applets that interact abundantly with client environment and deploy on the server.
19 Knowledge on usage of graphical IDE for design and implementation of real time applications in java.
20 Posses the knowledge and skills for employability and to succeed in national and international level competitive exams.

UNIT-I	OOP CONCEPTS AND JAVA PROGRAMMING	Classes: 10

OOP concepts: Classes and objects, data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, procedural and object oriented programming paradigm; Java programming: History of java, comments data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow statements, jump statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, exploring string class.

UNIT-II	INHERITANCE, INTERFACES AND PACKAGES	Classes: 10

Inheritance: Inheritance hierarchies, super and subclasses, member access rules, super keyword, preventing inheritance: final classes and methods, the object class and its methods; Polymorphism: Dynamic binding, method overriding, abstract classes and methods; Interface: Interfaces vs Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface; Packages: Defining, creating and accessing a package, understanding CLASSPATH, importing packages.

UNIT-III	EXCEPTION HANDLING AND MULTI THREADING	Classes: 08

Exception Handling: Benefits of exception handling, the classification of exceptions, exception hierarchy, checked and unchecked exceptions, usage of try, catch, throw, throws and finally, re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Multithreading: Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication.

UNIT-IV	FILES, AND CONNECTING TO DATABASE	Classes: 08

Files: Streams; byte streams, character stream, text input/output, binary input/output, random access file operations, file management using file class; Connecting to Database: Connecting to a database, querying a database and processing the results, updating data with JDBC.

UNIT-V	GUI PROGRAMMING AND APPLETS	Classes: 09

GUI programming with Java: The AWT class hierarchy, introduction to swing, swing Vs AWT, hierarchy for swing components, containers, JFrame, JApplet, JDialog, Jpanel, overview of some swing components – JButton, JLabel, JTextField, JTextArea, simple applications; Layout management: Layout manager types – border, grid and flow.
Applets: Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets.

Text Books:

1. Herbert Schildt, Dale Skrien, "Java Fundamentals – A Comprehensive Introduction", McGraw-Hill, 1st Edition, 2013.
2. Herbert Schildt, "Java the Complete Reference", McGraw-Hill - Osborne, 8thEditon, 2011.
3. T. Budd, "Understanding Object-Oriented Programming with Java", Pearson Education, Updated Edition (New Java 2 Coverage), 1999.

Reference Books:

1. P. J. Deitel, H. M. Deitel, "Java: How to Program", Prentice Hall, 6th Edition, 2005.
2. P. Radha Krishna, "Object Oriented Programming Through Java", Universities Press, CRC Press, 2007.

3. Bruce Eckel, “Thinking in Java”, Prentice Hall, 4th Edition, 2006.
4. Sachin Malhotra, Saurabh Chaudhary, “Programming in Java”, Oxford University Press, 2nd Edition, 2014.

Web References:

1. http://www.javatpoint.com/java-tutorial
2. http://www.javatutorialpoint.com/introduction-to-java/

E-Text Books:

1. http://bookboon.com/en/java-programming-language-ebooks
2. https://en.wikibooks.org/wiki/Java_Programming