Advanced JAVA Programming

Course Code	20CS6522	**Year**	III	**Semester**	I
Course Category	Honors	**Branch**	CSE	**Course Type**	Integrated
Credits	4	**L-T-P**	3-0-2	**Prerequisites**	Java Programming
Continuous Evaluation :	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Understand the advanced concepts of JAVA.	**L2**
CO2	Apply suitable generic classes for solving problems.	**L3**
CO3	Apply lambda expressions to provide the implementation of Functional interface for a given problem.	**L3**
CO4	Apply type hierarchy in collection framework of Java.	**L3**
CO5	Apply Regular expressions for pattern matching.	**L3**
CO6	Develop Java programs for a given problem	**L3**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3								3	3		3	2	2
CO2	3								3	3		3		
CO3	3								3	3		3		
CO4	3								3	3		3		
CO5	3								3	3		3		
CO6	3													

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Generics:** What are generics? A simple Generic Example, A generic class with two type parameters. The general form of a generic class, Bounded Types, Using wild card arguments, Creating generic method, Generic Interfaces, Some Generic Restrictions.	**CO1, CO2**
II	**Lambda Expressions:** Introducing Lambda Expressions, Block Lambda Expressions, Generic Functional Interfaces, Passing Lambda Expressions as Arguments, Lambda Expressions and Exceptions, Lambda Expressions and Variable Capture.	**CO1,CO3**
III	**Introduction To Collection Framework:** Collections Overview**,** **The Collection Interfaces**: The collection Interface, The List Interface, The Set Interface, The SortedSet Interface, The NavigableSet Interface, The Queue Interface, The Deque Interface. **The Collection Classes**: The ArrayList Class, The LinkedList class, The HashSet Class, The LinkedHashSet Class, The TreeSet Class, The PriorityQueue Class, The ArrayDeque Class, The EnumSet Class. Accessing a Collection Via an Iterator, Spliterators.	**CO1,CO4**
IV	**Developing Real World Applications Using Collections:** Storing user defined Classes in Collections, The Random Access Interface, Working with Maps, Comparators, The Collection Algorithms, and Arrays Class.	**CO1,CO4**
V	**More Utility Classe**s: Date, Calendar, Gregorian Calendar, TimeZone, SimpleTimeZone, Locale, Random. **Regular Expressions:** Regular Expression Processing: Pattern, Matcher, Regular Expression Syntax, Demonstrating Pattern Matching, Two Pattern - Matching Options, Exploring Regular Expressions, Reflection.	**CO1,CO5**

Unit No.	Experiment Details	Mapped CO's
1.	Demonstrate generic methods with suitable examples.	**CO1,CO2,CO3,CO4,CO5**
2.	Develop a generic class with suitable examples.	**CO1,CO2,CO3,CO4,CO5**
3.	Develop a generic program for ordered collection of elements.	**CO1,CO2,CO3,CO4,CO5**
4.	Implement an efficient data structure for storing and processing non-duplicate elements.	**CO1,CO2,CO3,CO4,CO5**
5.	Implement a Map-data structure that provides a quick look up to retrieve a value using a key.	**CO1,CO2,CO3,CO4,CO5**
6.	Use a data structure to prevent data corruption, when two or more threads running concurrently.	**CO1,CO2,CO3,CO4,CO5**
7.	Take a Java file that contains number of methods. Replace them with lambda expressions. How many lines did it save? Was the code easier to read? Were you able to use method references?	**CO1,CO2,CO3,CO4,CO5**
8.	Implement various applications using regular expressions.	**CO1,CO2,CO3,CO4,CO5**

Learning Resources	
Text Books	1. The Java Complete Reference, Herbert Scheldt, 10th edition, TMH Publications, 2018.
Reference Books	1. Introduction to java programming by Daniel Liang, 10th edition, Pearson. 2. Core Java: An Integrated Approach, New: Includes All Versions up-to Java 8, by R.Nageswara Rao, Dream-Tech Publishers. 3. Head First Java, Kathy Sierra, 2/e, Shroff Publishers, 2012.
e- Resources & other digital material	1. https://www.geeksforgeeks.org/data-structures/ 2. https://www.youtube.com/watch?v=0IAPZzGSbME 3. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html 4.https://www.youtube.com/watch?v=S47aSEqm_0I&list=PLgj_VZKxRKrxgFyOutPJpoLFBaQMOpK- 5. https://www.geeksforgeeks.org/fundamentals-of-algorithms/ 6. https://www.javatpoint.com/collections-in-java