Uka Tarsadia University

B. Tech.

Semester III

PROGRAMMING WITH JAVA

IT4016

Effective from July-2022

Syllabus version: 1.00

Subject Code	Subject Title	Teaching Scheme			
		Hours		Credits	
		Theory	Practical	Theory	Practical
IT4016	Programming with JAVA	3	2	3	1

Subject Code	Subject Title	Theory Examination Marks		Practical Examination Marks	Total Marks
		Internal	External	CIE	
IT4016	Programming with JAVA	40	60	50	150

Objectives of the course:

- To unfold concepts of object-oriented programming paradigms.
- To educate students about programming by developing an understanding about concepts of Java programming.

Course outcomes:

Upon completion of the course, the student shall be able to,

CO1: Use various Java constructs, features and describe the concepts of object-oriented paradigm with Java programming

CO2: Able to understand and applied basic programming concepts using Java

CO3: Demonstrate how to define and use classes, create objects and methods, how to override and overload methods with its elements to solve the basic problems

CO4: Illustrate concepts of object-oriented paradigm with Java programming

CO5: Understand and apply exception handling and multithreading in Java

CO6: Understand and apply I/O and Applets

Sr. No.	Topics	Hours
	Unit – I	
1	**Introduction to Object Oriented Programming and Concepts of Java:** Procedure oriented programming vs. Object oriented programming, Java history, Java features, Object oriented programming concepts – Classes, Objects, Data encapsulation and Abstraction, Inheritance, Polymorphism, Dynamic binding, Message passing, Control statements, Java Virtual Machine (JVM) and byte code, Java environment setup, Simple Java program, Java language specification API, Java Development Kit (JDK) and IDE, Programming style, Documentation and Errors, Command line argument, Data types and variables, Type conversion and casting, Scope of variables and default values of variable.	6
	Unit – II	
2	**Operators, Control Statements, Array and String:** Type of operators, Control statements – *if, else*, nested *if, if-else* ladders, *switch, while, do-while, for, for-each, break, continue, enum* data types, Single dimensional arrays, Multidimensional arrays, *String* class, *StringBuffer* class, Operations on string, Use of wrapper class.	8
	Unit – III	
3	**Class, Object and Methods:** Object, *Class* and Methods, Access modifier, Method overloading, Passing and returning object form method, Constructors, Constructor overloading, Nested classes, *this* keyword and *static* keyword, Garbage collector.	8
	Unit – IV	
4	**Inheritance, Packages and Interface:** Inheritance, Super and sub class, Overriding methods, Polymorphism, Dynamic binding, *super* keyword, *final* Keyword, *abstract* methods and classes, Introduction to *interface*, *interface* vs. *abstract* classes, Packages.	9
	Unit – V	
5	**Exception Handling and Multithreading:** Exception - *try…catch* statement, Multiple catch blocks, *throw and throws* keywords, *finally* clauses, User defined exception, Thread, Thread life cycle and methods, Creating threads, Thread priority, Multithreading and Thread synchronization.	8

Unit – VI		
6	**I/O and Applets:** I/O basics, Reading console input, Writing console output, The *PrintWriter* Class, Reading and writing Files, Applets fundamentals.	6

Sr. No.	Programming with JAVA (Practical)	Hours
1	Write a Program that displays Welcome to AMTICS.	2
2	Write a program for calculator.	2
3	Write a program that reads a number in meters, converts it to feet, and displays the result.	2
4	Write a program to print inputs given from command line arguments on the console.	2
5	Write a program that prompts the user to enter three integers and display the integers in decreasing order.	2
6	Write a program that prompts the user to enter a letter and check whether a letter is a vowel or constant.	2
7	Assume a vehicle plate number consists of three uppercase letters followed by four digits. Write a program to generate a plate number.	2
8	Write a test program that prompts the user to enter ten numbers, invoke a method to reverse the numbers, display the numbers.	2
9	Write a program that generate 6*6 two-dimensional matrix, filled with 0's and 1's , display the matrix, check every raw and column have an odd number's of 1's.	2
10	Write an application that illustrates method overriding in the same package and different packages.	2
11	Describe *abstract* class called Shape which has three subclasses say Triangle, Rectangle, Circle. Define one method area() in the *abstract* class and override this area() in these three subclasses to calculate for specific object i.e. area() of Triangle subclass should calculate area of triangle etc. Same for Rectangle and Circle.	2
12	Write a program in Java to demonstrate implementation of multiple inheritance using *interfaces*.	2
13	Write a program in Java to develop user defined exception for 'Divide by Zero' error.	2
14	Write a program in Java to demonstrate multiple *try* block and multiple *catch* exception.	2
15	Write a program that executes two threads. One thread displays "Thread1" every 2,000 milliseconds, and the other displays "Thread2" every 4,000 milliseconds. Create the threads by extending the Thread class.	2

Text book:

1. Herbert Schildt – "Java – Complete Reference"- Eleventh Edition, McGraw Hill.

Reference books:

1. Sachin Malhotra and Saurabh Chaudhary – "Programming in Java" - Second Edition, Oxford University Press.
2. E Balagurusamy - "Programming with JAVA" - Sixth Edition, McGraw-Hill.
3. Daniel Liang – "Introduction to Java Programming (Comprehensive version)", Pearson.

Course objectives and Course outcomes mapping:

- Understand fundamentals of object-oriented programming and basics of Java programming: CO1, CO2, CO3
- Create Java programs using sound OOP practices such as interfaces, exception handling and multithreading: CO4, CO5, CO6

Course units and Course outcomes mapping:

Unit No.	Unit Name	Course Outcomes					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Introduction to Object Oriented Programming and Concepts of Java	✓					
2	Operators, Control Statements, Array and String		✓				
3	Class, Object and Methods			✓			
4	Inheritance, Packages and Interface				✓		
5	Exception Handling and Multithreading					✓	
6	I/O and Applets						✓

Programme outcomes:

PO 1: Engineering knowledge: An ability to apply knowledge of mathematics, science, and engineering.

PO 2: Problem analysis: An ability to identify, formulates, and solves engineering problems.

PO 3: Design/development of solutions: An ability to design a system, component, or process to meet desired needs within realistic constraints.

PO 4: Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.

PO 5: Modern tool usage: The broad education and understanding of new engineering techniques necessary to solve engineering problems.

PO 6: The engineer and society: Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and diversity, both as individuals and in team environments.

PO 7: Environment and sustainability: Articulate a comprehensive world view that integrates diverse approaches to sustainability.

PO 8: Ethics: Identify and demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.

PO 9: Individual and team work: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.

PO 11: Project management and finance: An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: A recognition of the need for, and an ability to engage in life-long learning.

Programme outcomes and Course outcomes mapping:

Programme Outcomes	Course Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6
PO1	✓	✓	✓	✓	✓	✓
PO2		✓	✓	✓		✓
PO3		✓		✓		
PO4						
PO5			✓		✓	
PO6						
PO7						
PO8						
PO9						
PO10						
PO11				✓	✓	
PO12						