



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari College of Computer Science
Semester-3 (BSC IT)

Subject: Object Oriented Programming in Java- BSCIT13309

Type of course: Major Core

Prerequisite: Basic knowledge of C programming

Rationale:

This course is designed to teach object-oriented programming concepts, techniques, and applications using the Java programming language. Object-oriented programming emphasizes on the fundamentals of the structured design with classes, including development, testing, implementation and documentation also includes object-oriented programming techniques, classes and objects.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	SEE		CCE			
				Theory	Practical	MSE	LWA	ALA	
3	0	2	4	75	25	30	20	50	200

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voce; CCE-Continuous and Comprehensive Evaluation; ALA- Active Learning Activities.

Course Content:

Sr. No	Course content	Hrs	% Weightage
1	Introduction to Java Programming Language • Introduction to Java and Brief history, java features, java Applications • Java components: Java Virtual Machine (JVM), Java Runtime Environment (JRE), JDK (Java Development Kit). Importance of byte code • Java environment setup; Structure of java program; Compilation and execution of java program, Comment Syntax. • Primitive Data Types : byte, short, int, long, float, double,	10	25%



	char, Boolean • Identifiers, Declarations of constants & variables Scope of variables, Type Conversion and Type Casting,		
2	Decision & Control Statements and Array • Different Operators: Arithmetic, Bitwise, Rational, Logical, Assignment, Conditional, Ternary, Increment and Decrement. • Decision & Control Statements: Selection Statement (if, if...else, switch), Loops (while, do-while, for) • Jump Statements : break, continue, return • Arrays, Types of Arrays : one-dimensional and two-dimensional array.	10	20%
3	Object Oriented Programming Concepts • Procedure-Oriented vs. Object Oriented Programming concept. • Basics of OOP: Class, Object, Encapsulation, Polymorphism Abstraction, Inheritance • Defining classes, fields and methods, creating objects. • User Input: Scanner class and Command Line Arguments. • Accessing rules : public, private, protected, default • this keyword, static keyword, final keyword • Constructors: Default constructors, Parameterized constructors, Copy constructors, • Method overloading, constructor overloading • String Class and its methods: charAt(), contains(), format(), length(), split()	10	25%
4	Inheritance & Interfaces • Basics of Inheritance, Types of inheritance: single, multiple, multilevel, hierarchical and hybrid inheritance. • Polymorphism and Types of Polymorphism, Method overriding, Difference Between: Method Overloading and Method overriding • Defining interface, implementing interface, multiple inheritance using interface. • Abstract class and final class.	10	20%
5	Exception Handling & Package • Types of errors, exceptions, try...catch statement, multiple catch blocks, throw and throws keywords, finally clause, user defined exceptions • Creating package, importing package, access rules for packages	5	10%



(For each activity maximum-minimum range is 5 to 10 marks)

Sr. No	Active Learning Activities	Marks
1	Object Oriented Proficiency Test: Subject Faculty Provide questions to students based on OOP concept which may helpful for job interview and students have to answer it on GMIU Web Portal.	10
2	Bug Detectives: Students will be assigned a code containing intentional errors, students need to identify errors, correct and upload on GMIU Web Portal.	10
3	Skill-Building Task: Mini project definition will be given Students have to upload the task on GMIU Web Portal.	10
4	Code Refactoring: Provide students with code snippets and challenge them to refactor for better readability and performance and upload on GMIU Web Portal.	10
5	Attendance	10
Total		50

Suggested Specification table with Marks (Theory):75

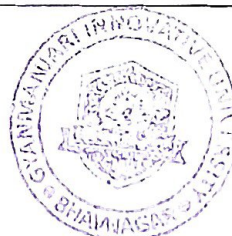
Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	25%	45%	15%	15%	0	0

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	understand the fundamentals java language, including features, components and libraries of java.
CO2	demonstrate how to define and use Array, Loop, how to use Decision Making Statement in programs.
CO3	demonstrate how to define and use classes, interfaces, create objects and methods, how to override and overload methods, compile and execute programs.
CO4	create Inheritance & interfaces.
CO5	understand use of exception handling and Package.

List of Practical



Sr. No	Descriptions	Unit No	Hrs
1	Install JDK, write a simple "Hello World" or similar java program, compilation, debugging, executing using java compiler and interpreter.	1	2
2	Write a program in Java to find maximum of three numbers using conditional operator.	1	2
3	Write a program in Java to reverse the digits of a number using while loop.	1	2
4	Write a program in Java to add two 3*3 matrices.	1	1
5	Write a program in Java to generate first n prime numbers.	2	1
6	Write a program in Java which has a class Student having two instance variables enrollment No and name. Create 3 objects of Student class in main method and display student's name.	2	2
7	Write a program in Java which has a class Rectangle having two instance variables height and weight. Initialize the class using constructor.	2	2
8	Write a program in Java demonstrate the use of "this" keyword.	2	2
9	Write a program in Java to demonstrate the use of "static" keyword.	2	2
10	Write a program in Java to demonstrate the use of "final" keyword.	2	2
11	Write a program in Java which has a class Shape having 2 overloaded methods area (float radius) and area (float length, float width). Display the area of circle and rectangle using overloaded methods.	3	2
12	Write a java program to demonstrate use of "String" class methods: charAt (), contains(), format(), length(), split()	3	2
13	Write a program in Java to demonstrate single inheritance	4	2
14	Write a program in Java to demonstrate multi-level inheritance	4	2
15	Write a program in Java to demonstrate hierarchical inheritance.	4	2
16	Write a program in Java to demonstrate method overriding	4	2
		Total	30

Instructional Method:

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The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

- [1] Complete Reference Java 2: Herbert Schildt
- [2] Introduction to Java Programming: Y. Daniel Liang
- [3] Web Technology with Advanced Java: Soumadip Ghosh
- [4] Core Java Volume-I Fundamentals: Cay S. Horstmann Gary Cornell

