SAMRAT VIKRAMADITYA VISHWAVIDYALAYA, UJJAIN MP
(Session -2024-2025 onwards)
B.Sc. (Hon's) Computer science FOUR YEARS (EIGHT SEMESTERS), CBCS SCHEME (NEP)

S.No.	Paper code	Course Component and Name of Course	Credits			Marks		Total
			T	P	Total	Max Marks CCE Internals	Max Marks Theory Externals	
1.	BSCH 401 Major-1	Object Oriented Programming with Java	4	0	4	30	45	100
	BSCH P	Object Oriented Programming with Java	0	1	1	10	15	
2.	BSCH 402 Major-2	Computer Graphics	5	0	5	40	60	100
3.	BSCH 403 Minor-1	Software Engineering	4	0	4	40	60	100
4.	BSCH 403 Ability Enhancement	English	2		2	40	60	100
6.	Vocational/Skill Enhancement-Course from any faculty/Mooc Course	Web Development using PHP	4	0	4	40	60	100
Total Credits and marks			19	1	20	200	300	500

PART A: Introduction			
Program: Diploma	Class: IV SEM	Year: II	Session: 2024-25
Subject: Computer Science			
1.	Course Code	**BSCH 401**	
2.	Course Title	**Object-Oriented Programming with Java**	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major -I**	
4.	Pre-Requisite (if any)	Basic knowledge of computer and C, C++ language	
5.	Course Learning Outcomes(CLO)	1. To learn why Java is useful for the design of desktop and web applications. 2. To learn how to implement object-oriented designs with Java. 3. To identify Java language components and how they work together in applications. 4. To design and program stand-alone Java applications. 5. To learn how to design a graphical user interface (GUI) with Java Swing.	
6.	Credit Value	4 +1 Practical	
7.	Total Marks	Max. Marks : 75(45+30)	Min. Passing Marks:28

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 1 Hours per Day		
Total Lectures: 60 Hours		
Unit	Topics	No. of Lectures
I	Java Evolution, Overview of Java Language : Java Program Structure, Java Tokens, Java Statements, Java Virtual Machine, Command Line Arguments. Constants, Variables and Data Types : Constants, Variables, Data Types, Scope of Variables, Symbolic Constants, Type Casting. Operators : Arithmetic, Relational, Logical, Assignment, Increment & Decrement, Conditional, Bitwise, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions.	12
II	Control Statements : Java's Selection Statements : If, Switch. Iterative Statements : While, Do-while, For, Some for loop variations, Nested Loops. Jump Statements : Using breaks, Using continue, return. Classes, Objects and Methods : Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, Visibility Control, The *this* Keyword, Garbage Collection, Overloading Methods, Recursion. Arrays, Strings and Vectors.	12
III	Inheritance : Inheritance basics, Using super, Creating Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using *final* with Inheritance, The Object Class. Packages and Interfaces : Java API	12

	Packages, Using System Packages, Creating & Accessing Packages, Hiding Classes, Access Protection, Importing Packages, Interfaces : Defining, Implementing, Applying Interfaces, Variables in Interfaces. Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exception, Using try and catch, Multiple catch Clause, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions. Multithreaded Programming: Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread.	
IV	Applet Programming : Preparing to write Applets, Building Applet Code, Applet Life Cycle, Creating and Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing parameters to Applet, Aligning the Display, Displaying Numerical values, Getting input from the User.	12
V	Introductory Graphics Programming : class, Lines , Rectangle, Circles, Ellipes, Arcs, Polygons, Line Graphs. I/O in Java : Streams, stream classes, Byte and Character stream classes. I/O exceptions, Interactive I/O. JDBC Connection and Implementation, Server side programming using Servlet and JSP.	12

PART C: Learning Resources
Textbooks, Reference Books, Other Resources

Suggested Readings:
1. 1. JAVA: The Complete Reference, Third Edition, P. Naughton & H. Schildt, Tata McGraw Hill.
2. Programming with Java, Second Edition, E. Balagurusamy, Tata McGraw-Hill
3. Teach Yourself JAVA, Joseph O'Neil & Herb Schildt, McGraw-Hill.

Suggestive digital platform web links:

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **75** Continuous Comprehensive Evaluation (CCE): **30** Marks University Exam (UE): **45** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	15 15 **Total Marks: 30**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (B): Five Short Questions Section (C): Five Long Questio	$03 \times 05 = 15$ $06 \times 05 = 30$ **Total Marks: 45**

PART A: Introduction				
Program: **Diploma**		Class: IV SEM	Year: **II Year**	Session: **2024-25**
Subject: Computer Science				
1.	Course Code		BSCH 401P	
2.	Course Title		**Object-Oriented Programming with Java**	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational		**Core Course**	
4.	Pre-Requisite (if any)		To study this course, a student must have basic logical and analytical skills..	
5.	Course Learning Outcomes(CLO)		After the completion of this course, a successful student will be able to do the following: 1. Develop simple applications of java. 2. Implementation and use of conditional statement. 3. Learn to formulate iterative solutions and array processing algorithms for problems. 4. Learn to implement method Overloading and Overriding. 5. Implementation of inheritance and interface in java. 6. Develop a small applet program using awt.	
6.	Credit Value		**Practical – 1 Credits**	
7.	Total Marks		Max. Marks : **10+15**	Min. Passing Marks: **10**

PART B: Content of the Course		
No. of Lab Practicals (in hours per week): **2 hours per week**		
Total No. of Lab.: **60 Hrs.**		
	Suggestive list of Practicals	**No. of Labs.**
	Given the problem statement, students are required to write code in Java, execute and test it. Students should be given assignments on following: 1. Write a Java program to print Hello World. 2. Write a Java program to illustrates a Java application with two classes. 3. Write a Java program to demonstrate the use of command line arguments. 4. Write a Java program to demonstrate how to read different types of data from the keyboard 5. Write a Java program to perform arithmetic operations on two numbers. 6. Write a Java program to check whether a number is even or odd. 7. Write a Java program to find largest of three numbers. 8. Write a Java program to demonstrate the use of if…else ladder in analyzing mark list. 9. Write a Java program to find factorial of a number using loop. 10. Write a Java program to display multiplication table. 11. Write a Java program to display patterns using nested loops. 12. Write a Java program to demonstrate class and object. 13. Write a Java program to demonstrate constructor. 14. Write a Java program to demonstrate method overloading.s 15. Write a Java program to demonstrate static data member.	60

	16. Write a Java program to demonstrate nesting of methods
	17. Write a Java program to demonstrate single inheritance.
	18. Write a Java program to demonstrate method overriding.
	19. Write a Java program to sort an array.
	20. Write a Java program to demonstrate the use of string methods.
	21. Write a Java program to demonstrate the use of vectors.
	22. Write a Java program to demonstrate the use of wrapper class methods.
	23. Write a Java program to define and implement an interface.
	24. Write a Java program to define and implement an interface to demonstrate multiple inheritance.
	25. Write a Java program to demonstrate package creation and usage.
	26. Write a Java program to demonstrate multithreading using Thread class.
	27. Write a Java program to demonstrate thread priority.
	28. Write a Java program to demonstrate multithreading using Runnable interface.
	29. Write a Java applet program to display "Hello Java".
	30. Write a Java program to demonstrate passing parameters to applet.

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Naughton & Schildt "The Complete Reference Java 2", Tata McGraw Hill
Java EE 6 for Beginners, Sharanam Shah, Vaishali Shah, Shroff Publishers and Distributors
Reference Books:
Java EE Project using EJB 3, JPA and struts 2 for beginners, Shah, SPD
 Java Programming A practical Approach, C Xavier, McGraw Hill
 Java Server Faces A practical Approach for beginners, B M Harwani, Eastern Economy Edition (PHI).
 Advanced Java Technology, Savaliya, Dreamtech.

Suggestive digital platform web links

Suggestive digital platform web links
 https://www.youtube.com/watch?v=CFD9EFcNZTQ
 https://www.youtube.com/watch?v=7WhnYwoBY24
 Suggested equivalent online courses

PART D: Assessment and Evaluation

Internal Assessment : Continuous Comprehensive Evaluation (CCE) : **10Marks**		**External Assessment**: University Exam (UE) : **15 Marks** Time : **02.00 Hours**	
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Hands-on Lab Practice	2 Marks	Practical record file	5 Marks
Viva	3 Marks	Viva voce practical	5 Marks
Lab Test from practical list	2 Marks	Table works/ Exercise Assigned (02) in practical exam	2 Marks
Assignments (Charts/	3 Marks	Reports of excursion/ Lab	3 Marks

Model)/ Technology Dissemination/ Excursion/ Lab visit/ Industrial Training		visits/ Industrial training/ Survey/ Collection/ Models	
Total ***Excursion/ Lab visits/ Industrial Training is compulsory***	**10 Marks**	**Total**	**15 Marks**

Program: Diploma	Class: IV SEM		Year: II Year	Session: 2024-25

Subject: Computer Science

1.	Course Code	**BSCH 402**
2.	Course Title	**Computer Graphics**
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major II**
4.	Pre-Requisite (if any)	To study this course, a student must have the basic knowledge of Computer and C Language .
5.	Course Learning Outcomes(CLO)	- List out and Describe the Basic Concepts and terminologies Used in Computer Graphics - Discuss Issues Related to Emerging Electronic Technologies in concern of Graphic Design - Apply and Analyze different Approaches/ Algorithms for Drawing various graphics objects - Identify and Apply Various Geometrical Transformations Approaches - Implement Various Algorithms to Polygon Fill - Describe the Importance of Viewing and Projections - Identify Various Software systems Used in design, the Creation and Implementation of Multi-Media projects
6.	Credit Value	5 credits
7.	Total Marks	Max. Marks : 100(60+40) Min. Passing Marks: 35

PART B: Content of the Course

Total No. of Lectures (in hours per week): 01 Hour per day

Total Lectures:90 Hours

Unit	Topics	No. of Lectures
I	Overview of Graphic Systems: Display Devices, Refresh Cathode-Ray Tubes, Random-Scan and Raster-Scan Monitors, Color CRT Monitors, Direct-View Storages Tubes, Plasma-Panel Displays, LED and LCD Monitors. Hard-Copy Devices: Printers, Plotters. Interactive Input Devices.	12
II	Output Primitives: Points and Lines, Line-Drawing Algorithms, DDA Algorithm, Bresenham's Line Algorithm, Antialiasing Lines, Circle-Generating Algorithms, Circle Equations, Bresenham's Circle Algorithm, Character Generation. Attribute of Output Primitives: Line Styles, Line Types, Line Width, Line Color. Color and Intensity: Color Tables, Gray Scale. Area Filling: Scan-Line Algorithm.	12
III	Two Dimensional Transformations: Basic Transformations, Translation, Scaling, Rotation. Matrix Representations and Homogeneous Coordinates. Composite Transformations: Translations, Scalings, Rotations, Scaling Relative to a Fixed Point, Rotation about a Pivot Point, General Transformation Equation. Windowing and Clipping: Windowing Concepts, Cliping Algorithms, Line Clipping, Polygon	12

	Clipping, Area Clipping, Text Clipping, Window to Viewport Transformation.	
IV	Viewing in 3D: Three dimensional transformations, Translation, Scaling, Rotation. Matrix Representations projections: Parallel, prospective, viewpoints . Colour Model.	12
V	Introduction to Multimedia, Multimedia Components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia Data and File Formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation Tools, Authoring Tools. Computer Aided Design. Graphs Charts and Models. Computer Art, Computer Animation, Graphical User Interface, Graphics for Home use, Image Processing.	12

PART C: Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Readings:

1. Computer Graphics, Donald Hearn and M.Pauline Baker, PHI 2nd Edition
2. Multimedia Making it Works, Third Edition: Tay Vaughan, Tata-McGraw-Hill
3. Procedural Elements of Computer Graphics, Rogers, McGraw Hill
4. Principles of Interactive Computer Graphics, Newman and Sproull, McGraw Hill
5. Mathematical Elements of Computer Graphics, Rogers, McGraw Hill

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: **100**		
Continuous Comprehensive Evaluation (CCE): **40** Marks		
University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test	20
	Assignment/Presentation	20
		Total Marks: 40
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A):Short Answer type questions	$04 \times 05 = 20$
	Section (B): Long Answer Type Questions	$08 \times 05 = 40$
		Total Marks: 60

	PART A: Introduction			
Program: Diploma		Class: IV Sem	Year: II Year	Session: 2024-25
Subject: Computer Science				
1.	Course Code	**BSCH 403**		
2.	Course Title	**Software Engineering**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Minor I**		
4.	Pre-Requisite (if any)	To study this course, a student must have the basic knowledge of Computers.		
5.	Course Learning Outcomes(CLO)	- Study a body of knowledge relating to Software Engineering, Software reengineering, and maintenance; - Understand the principles of large scale software systems, and the processes that are used to build them; - Programming, OO testing and maintenance; - Use tools and techniques for producing application software solutions from informal and semi-formal problem specifications; - Acquire and develop many valuable skills such as the ability to use computer aided software - Engineering tools to analyze, evaluate, select and synthesize information sources for the purpose of developing a software system; - Develop an appreciation of the cost, quality, and management issues involved in software construction; - Develop an awareness of the role and responsibilities of the professional software engineer; - Acquire skills to think about problems and their solutions using appropriate methods of analysis and design;		
6.	Credit Value	4		
7.	Total Marks	Max. Marks : 100(60+40)		Min. Passing Marks: 35

	PART B: Content of the Course	
Total No. of Lectures (in hours per week): 1 Hours per Day		
Total Lectures: 60Hours		
Unit	Topics	No. of Lectures
I	Introduction to Software Engineering : Software development, and life cycle; Project size and its categories; Planning a software project.	12
II	Project control & Project team standards; Design of solution strategies; Software cost estimation and evaluation techniques.	12
III	Software Design : Various Design concepts and notations; Modern design techniques; Verification and validation methods; Documentation & implementation procedures; Performance of software systems; Software metrics and models. Documentation of Project-systems, manuals and implementation.	12

IV	Software Reliability : Definition and concept of software reliability; software errors, faults, repair and availability; Reavailability & availability models; Use of database as a study tool.	12
V	Modern Programming Language Features Relevant to Software Engineering: data abstraction, exception handling, concurrency mechanism, etc; Software development environments.	12

PART C: Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Readings: 1. Fairley, B.E. : Software Engineering concepts, Mcgraw- Hill 1985.   2. Lewis, T.G. : Software Engineering concepts, Mcgraw Hill,1982.   3. Kernighan,B., Plauger, P. : software tools, Addison Wesley ,1976.   4. Meyers,G. : The Art of software testing, Wiley-inter- science,1979.   5. Gehani,N : Introduction of ADA, Mcgraw Hill, 1983.   6. Chatree : Software engineering concepts.   7. Hiborard : Constructing Quality software.
Suggestive digital platform web links: 1. https://onlinecourses.nptel.ac.in/noc21_cs42/preview   2. https://nptel.ac.in/courses/106/105/106105077/   3. https://nptel.ac.in/courses/106/105/106105078/

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40** Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A): Five Short Questions Section (B): Five Long Questions	$04 \times 05 = 20$ $08 \times 05 = 40$ **Total Marks: 60**