PSN College of Engineering and Technology (Autonomous)

Tirunelveli – 627152

COURSE PLAN

Academic year (2023-24)

(Regulation- 2018)

Subject Name	Java Programming
Course Type	Core Paper
Programme	B. E , Computer Science and Engineering
Year/ Semester/ Section	II / IV
Nature of Course / Credit	Theory / 3
Course Coordinator	Ms.G.Booma
Course Code	503008

Course File Verification and Auditing

Part-I

(At the beginning of the semester)

Submission Date	Check List									Verified by HOD	Verified by Academic Auditor
	Vision and Mission	Course Description, Objective and Outcomes	CO-PO mapping	Course Plan and Target	Syllabus and Content beyond Syllabus	Assignments & additional resources	Course Delivery Plan	University Question Papers			

Part-II (After CAT - I)

Submission Date	Check List					Verified by HOD	Verified by Academic Auditor
	Syllabus Coverage	Notes and Other Materials	Performance Analysis	Feedback	Proof for Participatory Learning		

Part-III (After CAT - II)

Submission Date	Check List					Verified by HOD	Verified by Academic Auditor
	Syllabus Coverage	Notes and Other Materials	Performance Analysis	Question Papers and Keys	Proof for Participatory Learning		

Part-IV (After Model examination)

Submission Date	Check List					Verified by HOD	Verified by Academic Auditor
	Syllabus Coverage	Notes and Other Materials	Performance Analysis	Question Papers and Keys	Proof for Participatory Learning		

Semester Academic Audit

Audit Remarks:

Signature of the Auditor(s):

Signature of Director (Academics)   Signature of Principal

Contents

VISION AND MISSION OF THE INSTITUTE:

Institution Vision		Emerge as a pioneer institute inculcating engineering education and skills, research, values and ethics.
Institution Mission	IM-1	To achieve greater heights of excellence in technical knowledge and skill development through innovative teaching and learning practices.
	IM-2	To develop the state of art infrastructure to meet the demands of technological revolution.
	IM-3	To improve and foster research in all dimensions for betterment of society.
	IM-4	To develop individual competencies to enhance innovation, employability and entrepreneurship among students.
	IM-5	To instill higher standards of discipline among students, inculcating ethical and moral values for societal harmony and peace.

VISION AND MISSION OF THE DEPARTMENT:

Department Vision		To emerge as a preeminence program to produce quality Computer Science and Engineering graduates.
Department Mission	DM-1	To enhance professional and entrepreneurial skills through industry institute interaction to enable them in getting better placement.
	DM-2	To promote research and continuing education.
	DM-3	To train the students according to their discipline to meet dynamic needs of the society.

1. **Pre-requisite (if any):**

Basic programming Concepts such as C, C++.

2. **Course Description: (not exceeding 100 words)**

This course introduces computer programming using the JAVA programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger, interfaces, packages, multithreading and error handling.

3. **Career Opportunities: (one or two)**
   - Software Developer

4. **Syllabus**

503008	JAVA PROGRAMMING			L	T	P	C
Programme:	B.E (CSE)		**Sem:**	**4**	**Category:**		**CS**
Aim:							
Course Objectives:							
1							
2							
3							
4							
5							

UNIT - I	INTRODUCTION	Hrs
Fundamentals of Object-Oriented Programming - Java Features - Difference between Java and C - Java Environment - Overview of Java Language: Introduction - Simple Java Program - Java Program Structure - Java Tokens - Java statements - Implementing a Java program - Java Virtual Machine - Command line arguments - Constants, variables and Data Types - Operators and Expressions - Branching and Looping	9
UNIT - II	BASIC CONSTRUCTS	Hrs
Class: Introduction - Defining a Class - Fields Declaration - Methods Declaration - Creating Objects - Accessing Class Members - Constructors - Method Overloading - Static Members - Nesting of Methods - Arrays, Strings and Vectors: Introduction - One-Dimensional Arrays - Creating an Array - Two-Dimensional Arrays - Strings	9
UNIT - III	INHERITANCE AND INTERFACES	Hrs
Inheritance: Extending a class - Overriding methods - Final Variables and Methods - Final Classes - Finalizer Methods - Abstract Methods and Classes - Visibility Control - Interfaces: Multiple Inheritance: Introduction - Defining Interfaces - Extending Interfaces - Implementing Interfaces - Accessing Interface Variables	9
UNIT - IV	PACKAGES AND MULTITHREADING	Hrs
Packages: - Java API Packages - Using System Packages - Naming Conventions - Creating Packages - Accessing a Package - Using a Package - Adding a Class to a Package - Hiding Classes - Multithreaded Programming: Introduction - Life Cycle of a Thread - - Creating Threads - Extending the Thread Class - Implementing the 'Runnable' Interface - Stopping and	9

Blocking a Thread -- Using Thread Methods		
UNIT - V	**EXCEPTION AND I/O HANDLING**	**Hrs**
Exception Handling: Introduction - Types of Errors - Exceptions - Syntax of Exception Handling Code - Multiple Catch Statements - Using Finally Statement - Throwing Our Own Exceptions - Input/output: Introduction - Concept of Streams - Stream Classes - Byte Stream Classes - Character Stream Classes - Handling Primitive Data Types - Simple input and output		9

5. **Course Outcome (COs):** CO1.CO5 (should follow Bloom's taxonomy) After successful completion of the course, the students should be able to

COs	CO - STATEMENTS	Blooms level	PO's
CO 1	Able to implement, compile, test and run Java program	K1	2,1,1
CO 2	Develop Java programs using OOP principles	K3	1,1,1
CO 3	Develop Java programs implementing the concepts of inheritance and interfaces	K4	1,2
CO 4	Develop multi-threaded and package Java applications	K1	1,1,1
CO 5	Build Java applications with exception handling and using I/O streams	K1	1,1

6. **Instructional Learning outcomes (unit wise/assignments/tutorials)**

Unit	Assessment Procedure
I	The outcome will be assessed through Attendance, Assignment-1, Class test -1, MCQ Test-1, Continuous Assessment Test-I.
II	The outcome will be assessed through Attendance, Assignment-2, Class test -2, MCQ Test-2, Continuous Assessment Test-I & II
III	The outcome will be assessed through Attendance, Assignment-3, Class test -3, MCQ Test-3, Continuous Assessment Test- II
IV	The outcome will be assessed through Attendance, Assignment-4, Class test -4, MCQ Test-4, Continuous Assessment Test-III
V	The outcome will be assessed through Attendance, Assignment-5, Class test -5, MCQ Test-5, Continuous Assessment Test-III

7. **Program Educational Objectives (PEOs) (max. 4)**

S.No	Topic	PEOs
PEO1	**Fundamental Knowledge**	Graduates will be able to perform in technical and managerial roles ranging from design, development and problem solving to suit to the industrial needs
PEO2	**Career Development**	Graduates will be able to successfully pursue higher education and also Graduates will have the ability to adapt, contribute and innovate new technologies in different domains of computer science & Engineering
PEO3	**Social Identity**	Graduates will be ethically and socially responsible engineers in computer science & Engineering disciplines

8. Program Outcomes (POs) (12 attributes)

PO's No	KNOWLEDGE	STATEMENTS
1	Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	Problem Analysis	Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	Design / Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	Conduct Investigations of Complex Problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern Tool usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	The Engineer and Society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	Environment and Sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and Team Work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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 and receive clear instructions.
11	Project Management and Finance	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.
12	Life-long Learning:	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

9. Program Specific Outcomes (PSOs) (max.3)

PSO1	Proficient and Innovative with a strong cognizance in the IOT, through the application of acquired knowledge and skills.
PSO2	Design and Implement IOT based solutions for improving operational efficiency by investigating existing industrial environment.

10. CO ,PO and PSO mapping (3 point scale)

Course Outcomes	Program Outcomes												Program Specific Outcomes	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	2	1	2							2		
CO 2	2	1		1								2		
CO 3	2	2		2	2							2		
CO 4	3	2	1	1								2		
CO 5	3	1	2	2	2							2		

1- Low   2- Medium   3- High

11.   Text Book s & Reference Books

S.No.	Name of the Book	Author/Publisher/Year/Edition	TextBook/Reference Book
1.	Programming with Java: A Primer	E. Balagurusamy ,Fourth Edition, First reprint, Tata McGraw Hill, Reprint 2011	Text Book
2.	Java: A Beginner's Guide	Herbert Schildt,4thEdition, Tata McGraw Hill, 2007	Reference Book
3.	Java Programming: A Practical Approach	C. Xavier ,Tata McGraw Hill, 2011	Reference Book
4.	Java How to Program	Paul Deitel & Harvey Deitel, Eleventh Edition, Pearson Education Ltd. 2017	Reference Book

12.   Web Resources:

Sl. No	Topic	Web link
1.	Programming in JAVA	https://onlinecourses.nptel.ac.in/noc22_cs47/preview

13.   E – learning videos/NPTEL/ SWAYAM and other universities related to syllabus:

Video	https://nptel.ac.in/courses/106105151
Lecture Notes	https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-092-introduction-to-programming-in-java-january-iap-2010/lecture-notes/

14.   Magazines & Journals (one or two)

Magazine	https://blogs.oracle.com/javamagazine/

	Journals	https://ieeexplore.ieee.org/document/714612,*IEEE Potentials (Volume: 17, Issue: 3, Aug/Sep 1998)*

15. **Lesson Plan & Content Delivery Methodologies**

S. No.	Unit	Topic to be covered	Hours Needed	Mode of Teaching (BB/PPT / Others)	Text/ Ref. Book	Page No.
		Introduction	**9**			
1		Fundamentals of Object-Oriented Programming	1	**BB**	Text Book	2
2		Java Features - Difference between Java and C	1	**BB**	Text Book	11
3		Java Environment - Overview of Java Language: Introduction - Simple Java Program	1	**BB**	Text Book	19
4		Java Program Structure		**BB**	Text Book	28
5	I	Java Tokens - Java statements	1	**BB**	Text Book	29
6		Implementing a Java program - Java Virtual Machine		**BB**	Text Book	38
7		Command line arguments	1	**BB**	Text Book	41
8		Constants, Variables & Datatypes	1	**BB**	Text Book	45
9		Operators and Expressions	1	**BB**	Text Book	60
10		Branching	1	**BB**	Text Book	80
11		Looping	1	**BB**	Text Book	103
		BASIC CONSTRUCTS	**9**			
12		Class: Introduction - Defining a Class - Fields Declaration - Methods Declaration - Creating Objects - Accessing Class Members	2	**BB**	Text Book	123
13		Constructors - Method Overloading	1	**BB**	Text Book	129
14	II	Static Members - Nesting of Methods	2	**BB**	Text Book	132
15		Arrays, Strings and Vectors: Introduction - One Dimensional Arrays - Creating an Array	1	**BB**	Text Book	148
16		Two Dimensional Arrays	1	**BB**	Text Book	153
17		Strings	1	**BB**	Text Book	156
18		Vectors	1	**BB**	Text Book	159
		INHERITANCE AND INTERFACES	**9**			

19	III	Inheritance: Extending a class	**2**	**BB**	Text Book	134
20		Overriding methods	1	**BB**	Text Book	138
21		Final Variables and Methods - Final Classes - Finalizer Methods – Abstract Methods and Classes	2	**BB**	Text Book	139
22		Visibility Control	1	**BB**	Text Book	142
23		Interfaces: Multiple Inheritance: Introduction - Defining Interfaces	1	**BB**	Text Book	174
24		-Extending Interfaces - Implementing Interfaces - Accessing Interface Variables	2	**BB**	Text Book	176
		PACKAGES AND MULTITHREADING	**9**			
25	IV	Packages: - Java API Packages	1	**BB**	Text Book	184
26		Using System Packages - Naming Conventions - Creating Packages	2	**BB**	Text Book	185
27		Accessing a Package - Using a Package		**BB**	Text Book	188
28		Adding a Class to a Package - Hiding Classes	2	**BB**	Text Book	192
29		Multithreaded Programming: Introduction - Life Cycle of a Thread	1	**BB**	Text Book	198
30		Creating Threads - Extending the Thread Class - Implementing the 'Runnable' Interface -	2	**BB**	Text Book	200
31		Stopping and Blocking a Thread -- Using Thread Methods	1	**BB**	Text Book	204
		EXCEPTION AND I/O HANDLING	**9**			
32	V	Exception Handling: Introduction - Types of Errors - Exceptions	1	**BB**	Text Book	220
33		Syntax of Exception Handling Code	1	**BB**	Text Book	223
34		Multiple Catch Statements - Using Finally Statement	1	**BB**	Text Book	226
35		Throwing Our Own Exceptions	1	**BB**	Text Book	229
36		Input/output: Introduction - Concept of Streams - Stream Classes	1	**BB**	Text Book	278
37		Byte Stream Classes	1	**BB**	Text Book	281
38		Character Stream Classes	1	**BB**	Text Book	285
39		Handling Primitive Data Types	1	**BB**	Text Book	295
40		Simple input and output	1	**BB**	Text Book	303
41		How to write & run Applet Program *	2	**BB**	Text Book	234
Total Hours Needed = 45Hours + 2 Hours (* Content beyond syllabus) = 47 Hours						

*Content beyond syllabus

16. **Assignments**

1. Tokens and Operators in Java
2. Constructor Overloading in Java
3. Interface in Java
4. Java API Packages
5. Concept of Stream

17. **Assignment Rubrics:**

Quality	Marks
Submission on Date	2
Understanding	3
Solving skill/ Presentation	3
End results with correct units conversions / Conclusion	2

18. **Mapping of CO to Assignment:**

CO's	CO – STATEMENTS	A1	A2	A3	A4	A5
CO1	Able to implement, compile, test and run Java program	2				
CO2	Develop Java programs using OOP principles		2			
CO3	Develop Java programs implementing the concepts of inheritance and interfaces			2		
CO4	Develop multi-threaded and package Java applications				2	
CO5	Build Java applications with exception handling and using I/O streams					2

19. **Assessment Methodologies**:

Assessment Tool			Description
Direct Assessment (80%)	**Internal Test**	**40%**	CAT - I, CAT - II, CAT -III average will be considered for 15 marks, MCQ 10 marks, Assignments-5 marks, Attendance 5 marks. Class test 5 marks-
	Assignments		
	End semester Examination	**60%**	100 % for End semester Examination-

Indirect Assessment (20%)	**Course End Survey (80%)**	At the end of Course completion will be evaluated Enclosed separately
	Exit Survey (20 %)	At the end of the degree completion will be evaluated

20 .Distribution of portions for assessment tests

Assessments	Portion Covering Unit	% of weightage
CAT – I	Unit I & unit II (50%)	12.5
CAT – II	Unit II (50%) & Unit III	12.5
CAT - III	Unit IV & V	12.5
Assignments	Unit - I to Unit-V	12.5
Class Test	Unit - I to Unit-V	12.5
MCQ	Unit - I to Unit-V	25.0
Attendance		12.5
End Semester	Unit - I to V	100

21. Mark Allotment for CO Assessment:

Cos	CAT-I	CAT-II	CAT-III	Assignment	MCQ	Attendance	Class Test	End Semester
CO1	30			5	10	5	5	20
CO2	20	20		5	10	5	5	20
CO3		30		5	10	5	5	20
CO4			30	5	10	5	5	20
CO5			20	5	10	5	5	20
AVG	5	5	5	5	10	5	5	100

22. Content beyond syllabus

UNIT	TOPICS TO BE COVERED	Hrs Taken
Unit 2	How to write & run Applet Program	2

	Prepared by	Approved by	
Signature			
Name :	**G.Booma**	**Dr. M. Vargheese**	**Dr. V. Manikandan**
Designation:	AP / CSE	HOD / CSE	Principal