GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	:	**DIPLOMA IN IT/CM**
LEVEL NAME	:	**PROFESSIONAL COURSES**
COURSE CODE	:	**IT402E^{S}**
COURSE TITLE	:	**JAVA PROGRAMMING**
PREREQUISITE	:	**NIL**
TEACHING SCHEME	:	**TH:03; TU:00; PR:04 (CLOCK HRs.)**
TOTAL CREDITS	:	**05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)**
TH. TEE	:	**03 HRs**
PR. TEE	:	**02 HRs (External)**
PT.	:	**01 HR**

❖ RATIONALE:

Java language enhances and refines the object oriented paradigm. With the enormous growth-taking place in Internet and World Wide Web, Java is rapidly becoming the dominant application development language and system programming language. Java is most appropriate language for integrating Internet into the information system. The course introduces students to the design of Java language, syntax of Java, programming applets and applications that can perform multiple actions in parallels.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Comprehend Java SDK environment to create, debug and run simple Java programs
2. Comprehend building blocks of Object Oriented Programming language.
3. Summarize different Object Oriented features of Java.
4. Develop program in java using Classes, Inheritance, Interfaces and Packages.
5. Develop, debug and execute java programs on Exception handling, Multithreaded programming and Files.
6. Design and implement Applet, GUIs and event handling mechanisms with java programs

❖ **COURSE DETAILS:**

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Java Basics	1. Describe the history, features and advantages of Java 2. Describe the data types and its scope. 3. List types of operator 4. Describe the Precedence and associativity of operator. 5. State the steps to implement small programs using Decision making, Branching & Looping 6. State the steps to implement programs for Arrays, String Handling and Command line argument 7. Develop programs based on Java basics	1.1 Java Evolution: History, Features, Java and the Internet, Advantages of Java, JVM, Byte code 1.2 Data types, Unicode, variables, Scope of variables, Type casting, constant, literal, 1.3 Types of Operators, Operator Precedence & Associativity and Arrays 1.4 Decision making & Branching: If…else statement, switch statement, ? : operator 1.5 Decision making & Looping : for, while, do while, Jumps in Loop, labeled Loops 1.6 Use of : String class, StringBuffer class, Command line argument, Wrapper Classes, Vector Class	08
2. Classes, Objects And Methods In Java	1. Describe the General form of a class 2. State effects of Access Control 3. Describe the use of reference variable 4. Describe constructor and its types. 5. Apply static, this and final keywords 6. Describe Garbage collection in java. 7. State the steps to implement programs for nested and inner classes 8. Develop programs based on Classes, Objects And Methods.	2.1 Class Fundamentals: General form of a class , A simple class 2.2 Access Control: public, private, protected, default 2.3 Declaring objects, new keyword, reference variable 2.4 Introducing Methods: Adding a method, returning a value, parameterized method, overloading methods, object as parameter 2.5 Constructors : Types of constructor, overloading constructors, returning object 2.6 keywords : static, this, final 2.7 Garbage collection 2.8 Nested and inner classes	06
3. Inheritance, Interfaces and Packages	1. Describe inheritance and method overriding 2. List types of inheritance 3. Describe abstract classes and methods 4. State the steps to define	3.1 Inheritance: Introduction, Types of Inheritance, Member access and inheritance, Super class variable can	08

	and implement interfaces 5. Define packages, importing packages and access protection. 6. Develop programs based on Inheritance, Interfaces and Packages	reference the subclass object, uses of super keyword, method overriding, Using final keyword with inheritance, Abstract classes and Methods 3.2 Interfaces : Introduction to interfaces Defining an interface Implementing interfaces Accessing Interface Variables Extending interfaces 3.3 Packages : Introduction to packages Defining package finding packages and CLASSPATH Access protection Importing packages Java API Packages	
4. Exception Handling, Multithreaded Programming	1. Differentiate between Error and Exception 2. Describe Exception handling concept 3. List types of Exception. 4. Describe and apply try, catch, finally, throw and throws clauses 5. State the steps to Create own exception 6. Describe the life cycle of Thread 7. State the steps to create Thread 8. List the advantages of multiple Threads 9. Describe and apply inter-Thread communication 10. Develop programs based on Exception Handling, Multithreading.	4.1 Exception Handling : Fundamentals types of exceptions, Uncaught Exceptions Using try and catch, Multiple catch clauses, Nested try statements throw, throws, finally Java's built-in Exceptions Creating own exceptions 4.2 Multithreaded Programming : Java thread model, Life cycle of thread Thread priorities, Thread Synchronization, Creating a Thread - implementing Runnable, extending Thread Main thread, Creating multiple threads, Using isAlive() and join() Inter-thread Communication	10
5. Applet Programming	1. Describe difference between Applet and application 2. Describe Applet life cycle 3. State the steps to Create simple Applet 4. Apply various methods of Graphics Class 5. State the steps to	5.1 Applet fundamentals 5.2 How Applets differ from Applications 5.3 Writing and Building Applet Code 5.4 Applet Life Cycle 5.5 Creating simple applets 5.6 Applet and AWT package 5.7 Moving banner applet using	10

	implement AWT Event Handler 6. List advantages of Swing package 7. Develop programs based on Applet Programming.	thread 5.8 Parameterized applet 5.9 Graphics class and use of various shapes and colors 5.10 Mouse clicks, movements, keyboard events 5.11 The AWT event handler 5.12 Introduction to Swing package	
6. Input And Output Stream Classes	1. Describe the concept of Streams 2. Compare Byte Stream and Character Stream Classes 3. Describe the input/output Exception 4. Apply primitive data type with files 5. State the steps to implement input and output Stream classes 6. Describe object serialization. 7. Develop programs based on Input And Output Stream Classes.	6.1 Introduction: Concept of Stream 6.2 Stream classes 6.3 Byte stream classes 6.4 character stream classes 6.5 Use of File class: reading/writing characters/bytes in a file 6.6 Input/ Output Exceptions 6.7 reading and writing primitive data type 6.8 concatenating and buffering files 6.9 Other Stream Classes 6.10 Object serialization	06
		Total Hrs.	**48**

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS: -

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Create, debug and run java programs based on constants, variables and operators	Java Basics	2
2.	Create, debug and run java programs based on decision making and branching		2
3.	Create, debug and run java programs based on decision making and Looping		2
4.	Create, debug and run java programs based on String, StringBuffer		2
5.	Create, debug and run java programs based on Wrapper class and Vectors		2
6.	Create, debug and run java programs based on classes with objects	Classes, Objects And Methods In Java	2
7.	Create, debug and run java programs based on method overloading		2
8.	Create, debug and run java programs based on constructor overloading		2
9.	Create, debug and run java programs based on Nested and inner classes		2
10.	Create, debug and run java programs based on inheritance	Inheritance, Interfaces and Packages	2
11.	Create, debug and run java programs based on Interfaces		2
12.	Create, debug and run java programs based on Package		2
13.	Create, debug and run java programs based on exception handling.	Exception Handling, Multithreaded Programming	2
14.	Create, debug and run java programs based on user defined Exception		4
15.	Create, debug and run java programs based on Threads by implementing Runnable interface		4
16.	Create, debug and run java programs based on Threads by extending Thread class		4
17.	Create, debug and run java programs based on Applets.	Applet Programming	2
18.	Create, debug and run java programs based on graphics to draw, fill, different shapes		4
19.	Create, debug and run java programs based on mouse events and keyboard events		4
20.	Create, debug and run java programs based on read & write characters from a file using input/output stream	Input And Output Stream Classes	2
21.	Create, debug and run java programs based on object Serialization		2
22.	Mini Project		10
		Skill Assessment	**2**
		Total Hrs	**64**

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Java Basics	02(02)	04(04)	04(00)	10(06)
02	Classes, Objects And Methods In Java	02(02)	04(04)	06(00)	12(06)
03	Inheritance, Interfaces and Packages	02(00)	04(06)	06(00)	12(06)
04	Exception Handling, Multithreaded Programming 2	02(00)	06(02)	06(04)	14(06)
05	Applet Programming	02(00)	04(04)	06(04)	12(08)
06	Input And Output Stream Classes	02(02)	08(00)	00(06)	10(08)
	Total	**12(06)**	**30(20)**	**28 (14)**	**70 (40)**

R – Remember U – Understand A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	4	R	2	5	R	2	1	R	2	5/7
	2	R	2																
02	6	R	4	1	U	4	2	U	4	5	A	4	2	U	4				3/5
03	6	U	4	5	U	4	3	U	4	4	A	4	1	U	4				3/5
04	4	U	4	6	U	4	1	A	4	5	U	4	4	U	4				3/5
05	4	A	6	2	A	6	3	U	6										2/3
06	3	A	6	5	A	6	6	A	6										2/3

T= Unit/Topic Number L= Level of Question M= Marks

R-Remember U-Understand A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	**70**	**28**	Theory Answer Sheets	1, 2, 3
				Total	**100**	**40**		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	**25**	**10**		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	**50**	**20**	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Writing program, Logic of the program	10
2	Debug the program	10
3	Execution of program, Program Output, Complexity of program	20
4	Viva voce	10
	TOTAL	**50**

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

1. Information Technology:

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	-	3
2	-	3	-	-	-	-	-	-	-	-	-	3
3	-	3	-	-	-	-	-	-	-	-	-	3
4	-	3	3	3	-	-	-	3	3	3	-	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Computer Engineering:

Course Outcomes (COs)	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	-	3	3
2	-	3	-	-	-	-	-	-	-	-	3	3
3	-	3	-	-	-	-	-	-	-	-	3	3
4	-	3	3	3	-	-	-	3	3	3	3	3
5	-	3	3	3	-	-	-	3	3	3	3	3
6	-	3	3	3	-	-	-	3	3	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Java 2: The Complete reference	Patrick Naughton, McGraw Hill Edu, Fifth Edition, reprint 2015	13:9780072119763
2.	Programming with Java A Primer	E Balagurusamy, Tata McGraw Hill Edu, Forth Edition, reprint 2011	13:9780070141698
3	Core Java: An Integrated Approach, New:Includes All Versions upto Java 8	Dr. Nageshwara Rao, Imprint Wiley Publication, Dreamtech Press, 2016	13:9789351199250

❖ E-REFERENCES:

- http://www.oracle.com/technetwork/java/javase/downloads/index.html , assessed on 16th September 2016
- http://docs.oracle.com/javase/specs/jls/se8/html/index.html, assessed on 16th September 2016
- http://docs.oracle.com/javase/tutorial/java/index.html , assessed on 16th September 2016
- http://www.tutorialspoint.com/java/ , assessed on 16th September 2016
- http://www.tutorialspoint.com/javaexamples, assessed on 16th September 2016
- http://www.learnjavaonline.org/ , assessed on 16th September 2016
- http://www.c4learn.com/javaprogramming/ , assessed on 16th September 2016
- https://www.webucator.com/tutorial/learn-java/index.cfm , assessed on 16th September 2016

❖ LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION

1. Computer System with latest configuration
2. Java Development Kit 1.8 and above
3. Editors : Notepad, NetBeans (Freeware)

❖ LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
3.	Mr. R. L. Meshram	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Mr. L. D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
5.	Mrs. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.

6	Mrs. S. Choudhari	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
7	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
8	Mr. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
9	Mr. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS) **(Chairman PBOS)**