FACULTY OF COMPUTER APPLICATIONS
Master of Computer Applications

- **Sem.** :1
- **Subject Code** :05MC0103
- **Subject** : Object Oriented Programming using JAVA
- **Course Objectives** :
    1. To understand the fundamentals of Java Programming Language
    2. To implement the concepts of Object-Oriented Programming and learn interface
    3. To develop proficiency in java using the concepts of Package and Exception Handling
    4. To interpret the concepts of Generics, Collections and Lambda in Java
    5. To develop Java based Applications using the concepts of Multithreading and Files

- **Prerequisites** : Knowledge of C, C++ Programming Language

Unit No	Topics Covered	No of lectures required
1	**Basics of Java:** • History of Java • Features of OOP • Java Buzzwords • Installing Java • Programming Structure of Java • Java data-types • Keywords and Identifiers • Java Operators • Type Casting • Looping Control (for, while, do-while etc) • Control Statements (if, nested if, else-if ladder, switch etc) • Escape Sequences • Operator precedence in java	**10**

	• Arrays • Initializer block • Class-Initializer block	
2	**Class Fundamentals, Inheritance and Interface:** • Defining class and methods • Working with class and methods • Members of Class • Method Overloading • Method Overriding • this keyword • Inheritance Basics • Types of Inheritance • Abstract Class • super keyword • Interface Basics • Use of Interface • final keyword • static keyword	**10**

3	**Package and Exception Handling:**
	• Access modifiers in java
	• Introduction to Packages
	• Built-In packages
	• User-Defined Packages
	• String Class
	• StringBuffer and StringBuilder
	• Wrapper Class
	• Exception Handling
	  ○ Exception Hierarchy
	  ○ Use of try, catch and finally keywords
	  ○ Checked and Unchecked exceptions
	  ○ U9se of throw and throws
	  ○ Custom Exceptions
	• Nested classes in java
	• Use of varargs
	• Scanner class
		10

4	**Collection Framework, Generics and Lambda:** • Introduction of Collection Framework • Collection interface • List interface • Set interface • Map interface • ArrayList and LinkedList classes • List iterator interface • HashSet and TreeSet classes	**10**

	• Generics Fundamentals • Generics class • Generics methods • A Generic class with type parameters • Bounded types with Generics in java • Rules for Generic types • Introduction to Lambda Expression • Why Lambdas? • Syntax of Lambda Expression • Functional interfaces, method reference • Constructor reference, variable scope • Processing Lambda expression and inner classes	
5	**Files, Thread and Multithreading:** • Introduction to Files • File Class • Byte Stream classes and Character Stream classes • Working with files • Paths • reading and writing files, • creating files and directories • copying, moving and deleting files • getting file information • Random Access File • Reading and writing files using Byte Streams • Reading and Writing files using Character Streams • Introduction to Thread • Thread Life-Cycle • Runnable Interface • Thread Class • Thread Priorities • Synchronization in thread • Daemon Thread • Multithreading concept with example	**10**

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Course Outcomes:

1. Design console-based applications using basics of Java.
2. Demonstrate how to implement features of OOP and interface
3. Determine how to use Package and Exception Handling in Java
4. Develop a Java application using Generics, Collections and Lambda
5. Build their ability to develop java-based applications using Files and Multithreading concepts

Course Outcomes – Program Outcomes Mapping Table :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	H	H	M		H			L	H		H
CO2					H			H		L	
CO3					H			H			M
CO4	H					L	M				H
CO5			H	H		H			M		

Text Book:

1. **Java: A Beginner's Guide,Herbert Schildt,McGraw-Hill Education, SixthEdition**
2. **Core Java, Volume I – Fundamentals, Cay S. Horstmann, Pearson Education, SeventhEdition**

Reference Books:

1. **The Complete Reference Java, Herbert Schildt, McGraw-Hill Education, Sixth Edition**
2. **Programming with Java, E Balagurusamy- McGraw-Hill, Fifth Edition**
3. **Java Programming, Hari Mohan Pandey, Pearson Education, First Edition**

Web References:

1. **https://docs.oracle.com/en/java**
2. **https://www.tutorialspoint.com/java/index.htm**

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App References:

1. **Learn Java Programming Tutorial**
2. **Java Programming**

Syllabus Coverage from text /reference book & web/app reference:

Unit #	Text Book	Chapter Numbers
1	1	1,2,3,5
2	1	4,6,7,8
3	1	8,9
4	1	13,14
5	1	10,11

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PRACTICALS

Unit No	List of Practicals
1	1.Writeasimplejavaprogramtodisplaymessage. 2.Writeajavaprogramtogetanamefromuseranddisplayonscreen. 3.Writeajavaprogramtogetpersonalinformationfromuseranddisplayonscreen. 4.Writeajavaprogramtoperformdifferentarithmeticoperations.(UsingCommandLineargs) 5.WriteajavaprogramtogetdifferentvaluesfromuseratruntimeusingScanner. 6.Writeajavaprogramtogetthenamefromuserandprint10timesusingloop. 7.WriteajavaprogramtouseIFCondition 8.WriteajavaprogramtofindODDorEVENnumberusingcommandlineargument 9.Writeajavaprogramtofindoutstudentsresult/gradeusingIFcondition. 10.Writeajavaprogramof1Darray
2	11.WriteajavaprogramtouseInterfaceinjava 12.Writeajavaprogramtoextendoneinterfaceintoanotherinterface 13.Writeajavaprogramtoperformsimpleinheritance. 14.Writeajavaprogramtousemultilevelinheritance. 15.WriteajavaprogramtouseHierarchicalinheritance 16.WriteajavaprogramtouseAbstractclass 17.Writeajavaprogramtouseinterface 18.WriteajavaprogramtouseMultipleinheritanceusinginterface. 19.Writeajavaprogramtousemethodoverriding 20.Writeajavaprogramtoperformoverridingofabstractclass 21.Writeajavaprogramtodemonstrateencapsulation
3	22Writeajavaprogramtoimplementsimpleexceptionhandling 23WriteajavaprogramtoimplementArithmeticException 24WriteajavaprogramtouseFinallyblockinExceptionHandling 25WriteajavaprogramtouseMultipleCatchBlock 26WriteajavaprogramtouseThrowKeyword 27WriteajavaprogramtouseThrowsKeyword 28Writeajavaprogramtoimplementcustomexception 29WriteajavaprogramtoimplementExceptionPropagation 30WriteajavaprogramtoimplementExceptionChaining 31Writeajavaprogramtousesimpleinnerclassinyourprogram 32WriteajavaprogramtouseStaticInnerClass 33WriteajavaprogramtouseLocalInnerClass 34WriteajavaprogramtouseNestedInterface 35Writeajavaprogramtodisplaydateindifferentformat 36Writeajavaprogramtodisplaydifferentcalendarinformationusingcalendarclass 37Writeajavaprogramtoadd,subtractadays/monthintocurrentdateand

	time 38Writeajavaprogramtouse Gregoriancalendartodisplaycalendarinformation
4	39.Writeajavaprogramtostoremultipleelementsusinganarray List 40.Writeajavaprogramtoaddmultipleelementsintolinked List 41.Writeajavaprogramtostoremultiplevaluesinavectorandfetchitusingan Enumeration 42.Writeajavaprogramtostoremultiplevaluesinaqueueandperformdifferentoperationonit. 43.WriteajavaprogramtoaddbookIDsandBookNames(Pairs)usingaHashSet. 44.Writeajavaprogramtodemonstratepriorityqueue 45.Writeajavaprogramtostoredifferentmappedvalues(Key-Value)usingaTreeMapClass 46.WriteajavaprogramtoaddmultipleelementsusingasortedSetofcollection 47.Writeajavaprogramtoaddmultipleelementsandperformoperation basedonLIFOmethodusingaStackClassofcollectioninterface. 48.Writeajavaprogramtoadddifferentvaluesinapair(key-value)intoa TreeMapandperformdifferentoperationsonit.
5	49.Writeajavaprogramtowriteasimplemessageintoafileusinga FileOutputStream 50.Writeajavaprogramtoreadamessage(data)fromafilebyusing FileInputStream. 51.Writeajavaprogramtowriteadataintoafilecharacterisebyusinga FileWriterclassofIO 52.Writeajavaprogramtoreadadatacharacterwisefromafilebyusinga FileReaderclass. 53.Writeajavaprogramtocreateathreadusing ThreadClass 54.Writeajavaprogramtocreateathreadusing Runnableclass 55.Writeajavaprogramtosetthreadnameandpriority&testit. 56.Writeajavaprogramtocreatetwothreadsandmakethemsynchronized (ThreadSafe) 57.Writeajavaprogramtojointwothreadswhichperformloopoperations.

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