

	Programme: ND Computer Technology	Course Code: CPT 212		Credit Hours: 4
	Subject/Course: Programming Principles I			Theoretical: 1 hours/week
	Year: Two	Semester: One	Pre-requisite: CPT 122	Practical: 3 hours /week

General Objectives

The course is designed to enable the student to develop efficiently, reliable object oriented program in Object-Oriented Programming Languages such as Java, C++, C#

- 1 – Overview of Java Programming Language
- 2 – Understand Concept of Classes in Java Programming Language
- 3- Understand Methods (Functions and Sub-Routines) in Java Programming Language
- 4- Understand Concept of Inheritance, Polymorphism and Interface in Java Programming Language.
- 5- Understand Java Collections Framework
- 6- Understand Generic (Template) classes in Java Programming Language.
- 7- Understand the Concept of Multithreading in Java Programming Language
- 8- Understand Graphics Contexts and Graphics Objects in Java Programming Language

	Course: Programming Principles II		Course Code: CPT 212			Theoretical: 1 hours /week
	Year: Two	Semester: One	Pre-requisite: CPT 122			Practical: 3 hours /week
	Theoretical Content				Practical Content	
	General Objective 1: Overview of Java Programming Language.					
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
1	<ul style="list-style-type: none"> Understand Object Oriented Programming concept. Know the History of Java Programming Language. Know the Primitive data types of Java Programming Language. 	<ul style="list-style-type: none"> Explain Object Oriented Programming Concepts. Give the History of Java Programming Language. Explain the Primitive Data Types of the Java Programming Language 	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming. 	Write a simple Program that declares variables of the different Java Programming Language Primitive Data types.	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming.
2	<ul style="list-style-type: none"> Know how Inheritance, Polymorphism, Abstraction and Interface are implemented in Java Programming Language. Know the Syntax and Reserved Words of the Java Programming Language. 	<ul style="list-style-type: none"> Explain the Implementation of Inheritance, Polymorphism, Abstraction and interface in Java Programming Language. Explain the Syntax of Java Programming Language. State and Explain 	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A 	<ul style="list-style-type: none"> Open the Java Programming Language API documentation and identify the application and use of the different Object Oriented Programming Concepts. Write in a computer note pad some of the Java Programming 	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A

		Java Programming Language Reserve Words.	comprehensive workbook of Object Oriented Programming.	Language Reserve Words.		comprehensive workbook of Object Oriented Programming.
General Objective 2: Understand Concept of Classes in Java Programming Language.						
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
3	<ul style="list-style-type: none"> Know how to define and construct Classes in Java Programming Language. Understand Java Access Modifiers: Private and Public. Understand the use of static keyword in the Java Programming Language Know the importance and Declaration in of Constructors in Java Classes Know Garbage Collection 	<ul style="list-style-type: none"> Explain how to define and construct Classes in Java Programming Language. Explain the use of Java Access Modifiers: Private and Public. Explain the use of the keyword Static in Java Programs. Explain the declaration, construction and use of Constructors in Java Programming Language. Explain Java Garbage Collection and 	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming. 	<ul style="list-style-type: none"> Write a simple Java Program that defined a class with a single default constructor which uses the access modifiers: public and private 	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit(SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming.

		the use of the “finalize” method.				
4	<ul style="list-style-type: none"> Know Constructor Overloading in Java Programming Language. Know how to instantiate objects from classes. Know how to instantiate objects differently from the same class using the overloaded constructor. 	<ul style="list-style-type: none"> Explain Constructor Overloading in Java Programming Language. Explain how to instantiate objects from classes. Explain how to instantiate objects differently from the same class using the overloaded constructor. 	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming. 	<ul style="list-style-type: none"> Write a simple Java Program that defined a class with overloaded constructor. Write a simple Java program that instantiate and use objects of the class defined above. 	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming.
General Objective 3: Understand Methods (Functions and Sub-Routines) in Java Programming Language.						
Week	Specific Learning Outcomes	Teacher’s activities	Resources	Specific Learning Outcomes	Teacher’s activities	Resources
5	<ul style="list-style-type: none"> Know how to define methods in Java Programming Language. Know the use and application of common Maths Method available in the Java API. Know how the visibility of declaration is limited to specific regions of 	<ul style="list-style-type: none"> Explain how to define methods in Java Programming Language. Explain the use and application of common Maths Method available in the Java API. 	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A 	<ul style="list-style-type: none"> Write a Java program with user defined methods, which also uses methods from Maths class of the Java API. The program should include the use of the keyword “static” in both class data (attributes) and class methods (behaviours) 	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A

	<ul style="list-style-type: none"> programs. Know how static methods and fields are associated with an entire class rather than specific instance of the class. 	<ul style="list-style-type: none"> Explain how the visibility of declaration is limited to specific regions of programs. Know how static methods and fields are associated with an entire class rather than specific instance of the class. 	comprehensive workbook of Object Oriented Programming.			comprehensive workbook of Object Oriented Programming.
6	<ul style="list-style-type: none"> Know how to define recursive methods in Java. Know direct and indirect recursion. Know recursion with backtracking. Know method overloading and method overriding and their use and application in Java Programming Language. 	<ul style="list-style-type: none"> Explain how to define recursive methods in Java. Explain direct and indirect recursion. Explain recursion with backtracking. Explain method overloading and method overriding and their use and application in Java Programming Language. 	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming. 	<ul style="list-style-type: none"> Write a simple Java program which has overloaded methods. Write a simple Java program that uses simple recursive methods e.g. factorial, Fibonacci series etc. 	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit(SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming.
General Objective 4: Understand Concept of Inheritance, Polymorphism and Interface in Java Programming Language.						

Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
7	<ul style="list-style-type: none"> • Know how inheritance promotes software reusability. • Know the notions of super classes (base classes) and subclasses (derived classes) • Know how to create a class that inherits attributes and behaviours from another class. • Know how constructors are used in inheritance hierarchies. 	<ul style="list-style-type: none"> • Explain how inheritance promotes software reusability. • Explain the notions of super classes and sub classes. • Explain how to create a class that inherits attributes and behaviours from another class. • Explain how constructors are used in inheritance hierarchies. 	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. • A comprehensive workbook of Object Oriented Programming. 	Write a simple Java Program that inherits from existing class in the Java API and overload the constructor.	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. • A comprehensive workbook of Object Oriented Programming.
8	<ul style="list-style-type: none"> • Understand the concept of polymorphism. • Know how to use overridden methods to effect polymorphism. • Know the difference between abstract and concrete classes. • Know how to declare abstract methods to create abstract classes. • Know how polymorphism makes 	<ul style="list-style-type: none"> • Explain the concept of polymorphism. • Explain the use of overridden methods to effect polymorphism. • Explain the difference between abstract and concrete classes. • Explain how polymorphism makes systems 	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. • A comprehensive workbook of 	Write a simple Java Program that show polymorphism in action.	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit(SDK) and the Java Programming Language API Documentation. • A comprehensive workbook of

	<p>systems extensible and maintainable.</p> <ul style="list-style-type: none"> • Know declare and implement interfaces. 	<p>extensible and maintainable.</p> <ul style="list-style-type: none"> • Explain how to declare and implement interfaces. 	Object Oriented Programming.			Object Oriented Programming.
General Objective 5: Understand Java Collections Framework						
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
9	<ul style="list-style-type: none"> • Understand the concepts of Java Collections framework. • Know how to use Java Collections Framework implementations. • Know how to use Java Collections Framework methods to manipulate collections. 	<ul style="list-style-type: none"> • Explain the concepts of Java Collections Framework. • Explain how to use Java Collections Framework implementation • Explain how to use Java Collections Framework methods (such as search, sort and fill) to manipulate collections. 	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. • A comprehensive workbook of Object Oriented Programming. 	Write a simple Java Program that shows the use of classes such as LinkedList, ArrayList, Vector, Map from the Java Collections Framework.	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. • A comprehensive workbook of Object Oriented Programming.
10	<ul style="list-style-type: none"> • Know how to use Java Collections Framework interfaces to program with collections polymorphically. • Know how to use class Arrays of the Java Collections Framework for array manipulations. 	<ul style="list-style-type: none"> • Explain how to use Java Collections Framework Interfaces to program with Collections polymorphically. • Explain how to use class Arrays 	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming 	Write a simple Java Program that utilizes interfaces from the Java Collections Framework polymorphically.	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit(SDK) and the Java Programming

	<ul style="list-style-type: none"> Know how to use iterators to walk through a collection. 	<p>of the Java Collections Framework for array manipulations.</p> <ul style="list-style-type: none"> Explain the use of iterators to walk through a collection. 	<p>Language API Documentation.</p> <ul style="list-style-type: none"> A comprehensive workbook of Object Oriented Programming. 			<p>Language API Documentation.</p> <ul style="list-style-type: none"> A comprehensive workbook of Object Oriented Programming.
General Objective 6: Understand Generic (Template) classes in Java Programming Language.						
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
11	<ul style="list-style-type: none"> Know how to create generic methods that perform identical tasks on arguments of different types. Understand how to overload generic methods with non-generic methods or with other generic methods. Understand raw types and how they help backward compatibility. 	<ul style="list-style-type: none"> Explain how to create generic methods that perform identical tasks on arguments of different types. Explain how to overload generic methods with non-generic methods or with other generic methods. Explain raw types and how they help backward compatibility. 	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming. 	Write a simple Java program that shows Generic classes and methods in action.	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming.
12	<ul style="list-style-type: none"> Know how to use wildcards when precise type information about 	<ul style="list-style-type: none"> Explain how to use wildcards when precise type information about 		Write a simple Java program that shows the use of wildcats in Generic	Supervise the laboratory and	<ul style="list-style-type: none"> Computer System Loaded with Java Programming

	<p>a parameter is not required in the method.</p> <ul style="list-style-type: none"> Know the relationship between generics and inheritance. 	<p>a parameter is not required in the method.</p> <ul style="list-style-type: none"> Explain the relationship between generics and inheritance. 		classes and methods.	support students in writing java programs.	<p>Language Standard Development Kit(SDK) and the Java Programming Language API Documentation.</p> <ul style="list-style-type: none"> A comprehensive workbook of Object Oriented Programming.
General Objective 7: Understand the Concept of Multithreading in Java Programming Language.						
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
13	<ul style="list-style-type: none"> Know threads and why they are useful in Java Programming. Know how threads enable the management of concurrent activities. Understand the Life Cycle of a thread. Know Thread Priorities and scheduling. Know how to create and execute Runnable's. Know thread synchronization. 	<ul style="list-style-type: none"> Explain threads and their usefulness in Java Programming. Explain the management of concurrent activities using threads. Explain the life cycle of a thread. Explain how to create and execute Runnable's for concurrent 	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming. 	Write a simple Java program that uses thread and shows the concurrent execution of such threads.	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. A comprehensive workbook of Object Oriented Programming.

		<ul style="list-style-type: none"> execution. • Explain thread synchronization 				
General Objective 8: Understand Graphics Contexts and Graphics Objects in Java Programming Language						
Week	Specific Learning Outcomes	Teacher's activities	Resources	Specific Learning Outcomes	Teacher's activities	Resources
14	<ul style="list-style-type: none"> • Know Java Graphics and Java 2D. • Know how to manipulate colours. • Know how to manipulate fonts. • Know how use methods of Graphics class to draw lines, rectangles, ovals, arcs, polygons etc. • 	<ul style="list-style-type: none"> • Explain Java Graphics and Java 2D. • Explain how to manipulate colours. • Explain how to use methods of Graphics class to draw Lines, Rectangles, Ovals, Arcs, Polygons etc. 	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. • A comprehensive workbook of Object Oriented Programming. 	Write a simple Java Program that uses methods from the Java Graphics class to draw Line, Rectangle, Oval, Arc, Polygon.	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. • A comprehensive workbook of Object Oriented Programming.
15	<ul style="list-style-type: none"> • Know how to use Java Graphics2D class. • Know how to use Java Graphics2D class to draw and manipulate shapes from the java.geom package of the Java API. • Know how use the class GeneralPath to draw different shapes. 	<ul style="list-style-type: none"> • Explain how to use Java Graphics2D class. • Explain how to use Java Graphics2D class to draw and manipulate shapes form the java.geom 	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. • A 	Write a simple Java Program that draws different shapes from the java.geom package, which include shapes defined using the class GeneralPath.	Supervise the laboratory and support students in writing java programs.	<ul style="list-style-type: none"> • Computer System Loaded with Java Programming Language Standard Development Kit (SDK) and the Java Programming Language API Documentation. • A

		package of the Java API. <ul style="list-style-type: none"> Explain how to use the class GeneralPath to draw different shapes. 	comprehensive workbook of Object Oriented Programming.			comprehensive workbook of Object Oriented Programming.
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Assessment: Give details of assignments to be used:
 Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Recommended Textbooks & References: