



BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus

First Semester 2018-2019
Instruction Division
Course Handout (Part II)

Date: 27/07/2018

In addition to Part I (General Handout for all courses appended to the Time Table), this portion gives further specific details regarding the course.

Course No. : CS F213
Course Title : Object Oriented Programming
Instructor In-charge : Dr. J. Jennifer Ranjani (Chamber# 6121-B)
Email : jennifer.ranjani@pilani.bits.pilani.ac.in
Instructor(s) : Dr. Avinash Gautam (avinash@pilani.bits-pilani.ac.in)

Scope and Course Objectives:

The main objective of this course is to provide in-depth understanding of object-oriented programming using JAVA and to get an insight on object oriented analysis and design, and design patterns. On completion of the course, the students will be able to understand the basic model of object oriented programming such as: abstract types, encapsulation, inheritance and polymorphism. The students will be able to utilize the fundamental features like object classes, interfaces, exceptions and collections libraries. The students will be able to develop graphical user interfaces and connect it with the database. The students will be able to comprehend class diagrams and design patterns.

Prescribed Text Books:

- T1. Java: The Complete Reference, Herbert Schildt, McGraw Hill Education, Tenth Edition, 2017.
- T2. Object Oriented Design & Patterns, Cay Horstmann, John Wiley & Sons, Second Edition, 2005.

Reference Book:

- R1. Java™ Design Patterns – A Tutorial, James W. Cooper, Addison-Wesley, 2000.

Course Plan :

Module Number	Lecture session	Reference	Learning Outcome
1. Object-Oriented and Java Basics	L1.1. Object-Oriented Basics	T1, Ch. 2	<ul style="list-style-type: none">- Object and Class Basics- Basic Pillars of Object-Oriented Programming<ul style="list-style-type: none">o Abstractiono Encapsulationo Inheritanceo Polymorphism
	L1.2. Java Programming Syntax	T1, Ch. 2,3	<ul style="list-style-type: none">- Java Program Structure- Compiling and Executing a Simple Java Application



Please Consider Your Environmental Responsibilities

Do Not Print Unless Necessary



BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani

Pilani Campus

			<ul style="list-style-type: none"> - Types of Variables in Java - Primitive Types in Java - Type Promotion and Type Casting Rules
	L1.3. – 1.4. Defining Classes and Object Creation	T1, Ch. 6, Ch. 7	<ul style="list-style-type: none"> - Defining Classes and Access Modifiers - Creating Objects - Role of Constructors - Accessing Instance Fields and Methods - Local Variables vs. Instance Variables - Mutable and Immutable Objects - Command-Line Arguments - Reading Input from console using Scanner class
	L1.5. Use of static final keywords in Java, Method Overloading	T1, Ch. 7	<ul style="list-style-type: none"> - Use of static and final keywords - Method Overloading - Constructor Overloading
	L1.6. Objects as Parameters	T1, Ch. 6, Ch. 8	<ul style="list-style-type: none"> - Objects as Parameters to Methods
2. Arrays and String in Java	L2.1. Arrays in Java	T1, Ch.3, Ch. 7, Ch. 19	<ul style="list-style-type: none"> - Implementing 1-D and 2-D Arrays - Role of Arrays class
	L2.2. Strings in Java	T1, Ch. 17	<ul style="list-style-type: none"> - String class and methods - StringBuffer and StringTokenizer
3. Polymorphism and Inheritance in Java	L3.1. Inheritance in Java	T1, Ch. 8	<ul style="list-style-type: none"> - Extending classes and role of super keyword - Method Overriding [Super Type vs Sub-Type Relationships]
	L3.2. – 3.3. Abstract Classes, Abstract Methods and Interfaces	T1, Ch. 8, Ch. 9	<ul style="list-style-type: none"> - Abstract methods and classes - Interfaces in Java [class vs interface] - Comparable and Comparator Interfaces - Nested and Inner Classes - Anonymous class and objects - Serialization
	L3.4. Generic Programming	T1, Ch. 14	<ul style="list-style-type: none"> - Generic Form of a class - Generic Interfaces and Bounded Types
4. Collections Framework of Java	L4.1. – 4.2. Collections in Java	T1, Ch. 19	<ul style="list-style-type: none"> - Introduction to Collection Framework in Java



Please Consider Your Environmental Responsibilities

Do Not Print Unless Necessary



BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus

			<ul style="list-style-type: none"> - Important Collection Interfaces and their methods - ArrayList and LinkedList classes - Set and Map interfaces - Iterators and ListIterators - Wrapper classes and Autoboxing
5. Exception Handling Mechanism	L5.1. – 5.2. Exceptions in Java	T1, Ch. 10	<ul style="list-style-type: none"> - Exception basics and types - Catching Exceptions - Writing your own Exceptions
6. Input/ Output in Java	L6.1. – 6.2. File handling in Java	T1, Ch. 13	<ul style="list-style-type: none"> - Create a file in java - Read a file in java using BufferedInputStream - Read a file in using BufferedReader - Write to a file in using FileOutputStream - Write to file in using BufferedWriter - Append to a file in java using BufferedWriter, PrintWriter, FileWriter - Delete file in using delete() method. - Rename file in Java using renameTo() method
7. Object Model	L7.1. – 7.2. Java Object Model	T2, Ch. 7	<ul style="list-style-type: none"> - The Java Type System - Type Inquiry - Object Class - Shallow and Deep Copy - Object Relationships and their representation in UML
8. Multithreading	L8.1. – 8.6. Multithreaded Programming in Java	T1, Ch. 11	<ul style="list-style-type: none"> - Multithreading vs. Multitasking - Thread Class and methods - Creating your own Threads and Runnable Interface - Thread Synchronization - Inter Thread Communication
9. Application Programming	L9.1. – 9.2. Event Handling	T1, Ch. 24	<ul style="list-style-type: none"> - Event Handling Mechanism - Event Delegation Model - Event Classes - KeyEvent Class - Event Listener Interfaces - Adapter Classes



Please Consider Your Environmental Responsibilities

Do Not Print Unless Necessary



BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani

Pilani Campus

	L9.3. – 9.6. AWT Programming	T1, Ch. 25, 26	<ul style="list-style-type: none"> - Working with Windows, Graphics and Text - AWT Controls - Layout Managers - Menus - Database programming using JDBC
	L9.7. Networking	T1, Ch. 23	<ul style="list-style-type: none"> - Networking Basics - Socket Programming
10. Object-Oriented Patterns	L10.1. – 10.6. Object-Oriented Design Patterns	Class notes Derived from reference book R1 and other online resources	Design Patterns (a) Creational Patterns <ul style="list-style-type: none"> - Singleton - Abstract Factory and Factory Method - Builder (b) Structural Patterns <ul style="list-style-type: none"> - Adapter - Composite - Decorator - Proxy (c) Behavioral Patterns <ul style="list-style-type: none"> - Iterator - State - Strategy - Observer - Command - Chain of Responsibility

Lab Plan:

Lab #	Topics to be Covered
1	Introduction to Eclipse IDE
2	Reading user input, Designing Simple Classes
3	Static variables, methods, and blocks, Object as Parameter, Wrapper Classes
4	Inheritance, Polymorphism, Abstract Classes
5	Arrays, Passing arrays, Multi-dimensional arrays, Strings, StringBuffer, StringTokenizer
6	Interfaces [Comparable, Comparator], Inner classes and anonymous classes
7	Anonymous inner classes, Collections [List, ArrayList, Iterator, ListIterator, LinkedList]
8	Exception Handling and Text File I/O
9	Multi-threaded Programming in Java
10	Application development using GUI, Event Handling and JDBC



Please Consider Your Environmental Responsibilities

Do Not Print Unless Necessary



BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani Pilani Campus

Evaluation Scheme:

Evaluation Component	Weightage (Marks)	Date & Time	Duration	Remarks
Mid-Sem. Test	30 % (60)	13/10 2:00 - 3:30 PM	90 min	Closed Book
Online Test	30 % (60)	11/11/18	120 min	Open Book
Comprehensive	40 % (80)	12/12 FN	180 min	Partly Open Book

Important Course Policies

- Labs falling on holidays will not be cancelled or rescheduled. They will be conducted on the very same date and time.
- Makeup requests will be considered only in case of hospitalization. Makeup requests should be made 24 hrs. before the Mid-Sem. Test.
- Strictly no makeup for Online Test.
- Under any circumstances, make up request for Comprehensive exam can only be made to Dean, Instruction Division.

After Completing this Course

- Understand Object Orientation and apply those concepts in software system design.
- Fluently write code using Java programming language.
- Write multi-threaded and concurrent programs in Java.
- Understand the applicability of design patterns and their use in the construction of scalable real world software system.

Chamber consultation: Send an email to take an appointment.

Closed Book Test: No reference material of any kind will be permitted inside the exam hall.

Open Book Test: Only the prescribed text and reference books will be permitted inside the exam hall. Class notes or Xerox copy of class notes will not be entertained inside the exam hall.

Notices: All notices will be displayed on the **CSIS notice board** or **course webpage (Nalanda)**.

Note: It shall be the responsibility of the individual student to be regular in maintaining the study schedule as given in the course handout, attend lectures and the lab components as per the schedule announced on Nalanda.

(J. Jennifer Ranjani)
Instructor In-charge (CS F213)



Please Consider Your Environmental Responsibilities

Do Not Print Unless Necessary