FIRST SEMESTER 2016-17

In addition to the Part-1 (general Handout for all courses appended to the timetable), this portion gives further specific information regarding the course.

Course Number	**:**	**CS F213**
Course Title	**:**	**Object-Oriented Programming**
Instructor In-Charge	**:**	**Dr. PANKAJ VYAS (Chamber No: 6120-G)**
E-mail	**:**	**pankajv@pilani.bits-pilani.ac.in**
Course-Webpage	**:**	**http://csis.bits-pilani.ac.in/faculty/pankajv**
Team of Instructors	**:**	**AVINASH GAUTAM (avinash@pilani.bits-pilani.ac.in)**
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Scope and Objective:

This course gives an in-depth understanding of object-oriented programming using the java programming language, object oriented design, and design patterns. The course will be taught with live demonstrations, running and debugging several examples on tools like Eclipse. The later part of the course focuses on designing object-oriented software. After the completion of this course a student should be able to effectively realize and implement real world problems using object oriented principles and techniques.

Text Book

T1: Java: The Complete Reference, Herbert Schildt, McGraw Hill Education, Ninth Edition, 2014
T2: Object Oriented Design & Patterns, Cay Horstmann, John Wiley & Sons, 2004

References

R1: JavaTM Design Patterns – A Tutorial, James W. Cooper, Addison-Wesley, 2000

Lecture Schedule

Lecture#	Topics to be Covered
Module I : Object-Oriented and Java Basics	
Lecture 1: Object-Oriented Basics	• Object and Class Basics • Basic Pillars of Object-Oriented Programming (Abstraction, Encapsulation, Inheritance and Polymorphism]
Lecture 2-3: Java Programming Syntax	• Java Program Structure, Compiling and Executing a Simple Java Application • Types of Variables in Java • Primitive Types in Java • Type Promotion and Type Casting
Lecture 4-5 : Defining Classes and Object Creation	• Defining Classes and Access Modifiers, Creating Objects, Role of Constructors • Accessing Instance Fields and Methods • Local Variables vs Instance Fields , Mutable and Immutable Objects • Command-Line Arguments, Reading Input from console Using Scanner class
Lecture 6: Use of static final keywords in Java Method Overloading	• Use of static and final keywords in Java • Method Overloading
Lecture 7: Objects as Parameters	Objects as Parameters to Methods and Object class in Java
Module II : Arrays and String in Java	

Lecture 8-9 : Arrays in Java	• Implementing 1-D and 2-D Arrays in Java, Role of Arrays class • Implementing Dynamic Arrays Using Vector class
Lecture 10-11: Strings in Java	• String class, Important String Methods • StringBuffer and StringTokennizer class in Java
Module III : Polymorphism and Inheritance in Java	
Lecture 12-13 : Inheritance in Java	• Extending classes and Role of super keyword • Method Overriding [Super Type vs Sub-Type Relationships]
Lecture 14-15: Abstract Classes, Abstract Methods and Interfaces	• Abstract Methods and Classes • Interfaces in Java [class vs interface] • Comparable and Comparator Interfaces in Java • Nested and Inner Classes
Lecture 16: Generic Programming	• Generic Form of a Class • Generic Interfaces and Bounded Types
Module IV: Exception Handling Mechanism	
Lecture 17-18 : Exceptions in Java	• Exception Basics and Types • Catching Exceptions • Writing Your Own Exceptions
Module V: Collections Framework of Java	
Lecture 19-21 : Collections in Java	• Introduction to Collection Framework in Java, Important Collection Interfaces and Their Methods • ArrayList and LinkedList Classes in Java • Iterators and ListIterators • Wrapper classes and Autoboxing
Module VI: Multithreaded Programming in Java	
Lecture 22-24: Multithreading	• Multithreading vs Multitasking • Thread Class in Java and its Important Methods • Creating Your own Threads and Runnable Interface • Thread Synchronization, Inter Thread Communication • Suspending and Resuming Threads
Module VII: GUI Programming	
Lecture 25-27: GUI Programming with Swing	• Introduction to swing package • Containers and Components and Layouts and LayoutManager Interface • JLabel class, JTextField class • Swing Buttons, JButton, JToggleButton • Check Boxes, Radio Buttons • JScrollPane , JMenu, JMenuBar and JMenuItem • Designing Frames and Adding Components, Timer Class in Java
Module VIII: Event Handling in Java	
Lecture 28-30: Event Handling	• Delegation Event Model • Event Classes, Listener Interfaces ➢ ActionEvent and AdjustmentEvent Classes ➢ ComponentEvent and ContainerEvent Classes ➢ FocusEvent and InputEvent Classes ➢ MouseEvent and ItemEvent Classes • Listener Interfaces ➢ ActionListener and AdjustmentListener Interfaces ➢ ComponentListener and ContainerListener Interfaces ➢ FocusListener and ItemListener Interfaces ➢ MouseListener and MouseMotionListener
Module IX: Object-Oriented Analysis and Design	
Lecture 31-33 : Object-Oriented Analysis	• Object Relationships and their representation in UML • What are Use-Case Models and Use-Case Realization Templates • UML Activity Charts • Identifying Classes Using Noun-Phrase Analysis
Lecture 34-35: Object-Oriented Design	• Goals of Object-Oriented Design Phase ➢ Identifying Attributes and Methods of Each class ➢ Class Diagram, Sequence Diagrams, State Diagrams

Module X: Object-Oriented Patterns	
Lecture 36-40: Object-Oriented Design Patterns	• Design Pattern Basics ➢ Creational Patterns (Singleton Pattern , Factory Pattern , Factory Method Pattern) ➢ Structural Patterns (Adapter Pattern, Composite Pattern, Decorator Patterns, Proxy Pattern) ➢ Behavioral Patterns (Iterator Pattern, Chain of Responsibility, Strategy Pattern, Proxy Pattern, Visitor Pattern, Command Pattern)

LAB PLAN

There will be 12 Lab Sessions. Each Lab Carries 1.5 Marks. [Total : 15 Marks]

Lab #	Topics to be Covered
1	Moving from C to Java [Java Basics]
2	Class Design Basics I
3	Class Design Basics II
4	Packages, Inheritance and Polymorphism
5	Arrays and Strings
6	Interfaces, Inner classes and anonymous inner classes
7	Exception Handling and Collections
8	JAVA GUI and Event Handling
9	File Handling
10	Multi-Threading-1
11	Class Design Lab
12	Design Pattern Lab

Evaluation Scheme

Component	Duration	Date & Time	Weight	Nature
Mid Semester Test	90 Minutes	TBA	25% [75 Marks]	CB
Lab Attendance	-	-	5% [15 Marks]	-
Online Test	120 Minutes	13th Nov, 2016 (Sunday) Time: 3:00 PM – 6:00 PM	30% [90 Marks]	OB
Comprehensive	180 Minutes	1st December, 2016	40% [120 Marks]	CB-OB

Chamber Consultation: **Will be announced in class.**
Mid Semester Grading: **Will be announced in class**

STRICTLY NO MAKEUP

Instructor-in-Charge
CS F213