Birla Institute of Technology and Science, Pilani, Hyderabad Campus
First Semester 2020-21
Course Handout (Part-II)
SS G514 (Object Oriented Analysis and Design)

Date: 13.08.2020

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 Number : **SS G514**
Course Title : **Object Oriented Analysis and Design**
Instructor-In-Charge : **Dr. Rajib Ranjan Maiti**

Description : Object orientation concepts, theories and principles; fundamental concepts of the object model: classes, objects, methods and messages, encapsulation and inheritance, interface and implementation, reuse and extension of classes, inheritance and polymorphism; process of object-oriented requirements specification, analysis and design; notations for object-oriented analysis and design; case studies and applications using some object oriented programming languages

1. Scope of the Course

This course covers- (i) Object Orientation concepts, theories and principles; Fundamental concepts of the object model; classes, objects, methods and messages, encapsulation etc., (ii) Study of UML modelling concepts and notations, (iii) System design and the use of UML in Object SW design, and (iv) Case studies to understand the Object Oriented Design Concepts and Principles. Object Oriented System development methodologies.

2. Course Objectives

- To impart a good understanding of Object Oriented Analysis and Design concepts.
- To gain knowledge on UML modeling concepts with hands on experience.
- To impart an ability to apply the Object Oriented concepts and methodology to typical cases.
- To model a mini OO Software application using open-source UML tool, and implement the project with Java.

3. Text Book

T1: Object-Oriented Analysis and Design using UML, Simon Bennett, Steve McRobb and Ray Farmer, TATA McGraw-Hill, 2nd Edition, 2004.

4. Reference Book

R1: The Unified Modeling Language User Guide, the ultimate tutorial to the UML from the Original Designers, G Booch, J Rumbaugh, I Jacobson, Pearson Education, 2006.

5. Course Plan

Lecture #	Learning Objective	Topics	Chapter Reference
1 -2	To introduce students to Object Oriented approach to SW Development	Overview- Object Orientation	T1- Ch. 4 ; Class notes
3-5	To learn modeling and requirement specification aspects of OO Systems	Modelling, UML, Diagrams, Notations.	T1- Ch. 5 ; R1.Ch. 2
6-7		Capturing User Requirements. Use cases	T1- Ch. 6
8-9		Use case realization, Class diagrams, Refining Requirements	T1-Ch. 7 & 8; R1-Ch. 4 &5; Case study
10-12	To understand the dynamic aspects of Objects in OO systems.	Interaction and Collaboration diagrams.	T1- Ch. 9,10; R1-Ch. 15 & 18
13-15		State and Events, State charts, Concurrent behavior of objects	T1- Ch. 11; R1-Ch. 24
16-17	O understand the basics of Object Oriented Design aspects.	Basics and Concepts of design	T1-Ch. 12
18-19		System Arch., System Partitioning, MVC, Process allocation.	T1- Ch. 13
20		Object Association, Integration	T1- Ch. 14
21		Intro, Types, applications, Benefits. Persistence, Data Mgmt. objects	T1- Ch. 15 T1- Ch. 18
22	To reuse concepts and patterns	Introduction to Design Patterns	Class notes
23	To learn Implementation related concepts of OO systems.	Components, Deployment diagrams	T1- Ch. 19; R1- Ch. 29 & 30
24		Importance, problems, solutions	T1- Ch. 20
25-26	To understand important aspects of Management of OO projects And OO system development methodologies	Planning, metrics, Monitoring	T1- Ch. 21
27		Why, features, methodologies	T1- Ch. 22
28	To learn continuous development and testing	Introduction to agile development	Class notes

6. Lab exercises

Week #	Learning Objective	Topics
1 -2	Develop problem statement for a project	Problem of road transportation a smart city
3-4	Learn Use Case Diagram	Usecase diagram for a set of problems
5-6	Learn implementation of class and object diagram	Develop class and object diagram form usercase diagram and implement them

7-8	Learn implementation of sequence diagram	Draw and improve sequence diagram
9-10	Learn implementation of object Relationships	Implement association, aggregation, dependency, etc.
11-12	Develop code for design patterns	Implement patterns like singleton, factory, façade, decorator, etc.
13-14	Learn reverse engineering	Identify objects from a large software and develop test cases
15-16	Learn coding for MVC pattern	Implement a simple gaming software using MVC patterns

Evaluation Scheme

Component	Weightage	Duration	Mode	Date & Time
Test I	15%	30 Mins.	Open Book	September 10 –September 20 (During scheduled class hour
Test II	15%	30 Mins.	Open Book	October 09 –October 20 (During scheduled class hour)
Test III	15%	30 Mins.	Open Book	November 10 – November 20 (During scheduled class hour)
programming assignments	30%	--	Open Book	Every alternate Week (To be completed by November 20)
Comprehensive Exam	25%	2 Hrs.	Open Book	05/12 AN

7. **Make-up Policy**

For genuine reasons other than medical, prior approval from the IC is mandatory. Requests coming after the test will not be honored. No make-up will be given for just producing some medical prescription.

8. **Course Notices**

All notices pertaining to this course will be displayed on the CMS.

9. **Chamber Consultation** To be announced.

10. **Academic Honesty and Integrity Policy**: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-In-Charge
(CS G514)