Syllabus

Course Title: Object Oriented Language and Theory
Course Code: 06-01
Product Code: A1

First Creation (Date - Version No.) : 080201-01

* Sample: 070606-01

Revision History (Date - Version No.)			
1	080309-01	16	
2	161506-02	17	
3		18	
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Final Version (Date - Version No.) :

Official Approval	Date of Report to PIU

Course Title <Japan-side>	Semester	Day of the week, Period	Credit	Instructor
Object-Oriented Language and Theory	6	45 minutes x 4 x 15 weeks	3	

Course Description
Object-orientation is an essential, fundamental technology to develop modern flexible and reliable software. This course will provide the common knowledge of object-oriented programming languages using a popular programming language Java. This course will also introduce the basic and elementary concepts and notations of object-oriented theory using Unified Modeling Language (UML).

Focus and Goal
After completing this course, student will be able to: ○ Describe some fundamental object-oriented techniques using Java programming language ○ Explain notations of some popular UML diagrams

Courses which students are recommended to enroll in, but not required to
Software Engineering

Schedule <Japan-side>	
1st	Theme: **Introduction to Object-Oriented Methodology and Java**
	Keywords: Object-orientation, Object, Class, Java, Java Virtual Machine (JVM), Byte-code *Lab: Install Java, set up environment parameters, compile and run Java programs by command line*
2nd	Theme: **Java basics and UML Overview**
	Keywords: Java syntax, naming convention, data types, array, modeling, UML, class notation *Lab: Install and use IDE (Eclipse/Netbean), Practice with Java data types (include array), following the naming convention, draw classes in UML*
3rd	Theme: **Encapsulation and Class Building**
	Keywords: Encapsulation, Attribute, Operations, Methods, Method Signature, Constant Member *Lab: Write a class with attributes and methods, constant members (i.e. final in Java). Create objects from classes, send message to objects.*
4th	Theme: Constructor, Method Overloading and Message Sending
	Keywords: Constructor, Initialization, Instance, Message Sending, Parameter Passing, Classifier Member *Lab: Write constructors for classes, practice with method/constructor overloading, different types of parameter passing, create classifier members (i.e. static in Java) and compare to instance members*
5th	Theme: **Class Organization with Package - Memory Management**
	Keywords: Package, import, Heap, Stack, Garbage Collector *Lab: Create package and use package, create "garbage" observe and solve the problem (e.g. String and StringBuffer)*

6th	Theme: **Association, Aggregation and Composition**
	Keywords: Reusability, Relationship, Association, Aggregation, Composition Lab: Draw relationships between classes in UML, i.e. association – aggregation and composition. Implement these relationships in Java.
7th	Theme: **Inheritance**
	Keywords: Reusability, Inheritance, Base class (superclass), Derived class (subclass), extends, super, Method Overriding, Hierarchical Initialization. *Lab: Create a subclass extends an existing class, reuse attributes and methods from superclass, override some methods. Checking the hierarchical initialization. Exercise: Refactor the source code to create super classes.*
8th	Theme: **Abstract Class and Interface**
	Keywords: Abstract Method, Abstract Class, Multiple Inheritance, Single Inheritance, implements *Lab: Create an abstract class with abstract method(s) and interface, and then create their subclasses. Implements abstract methods. Exercise: Working with thread.*
9th	Theme: **Polymorphism**
	Keywords: Static Binding, Dynamic Binding, Up casting, Down casting Lab: *Create several subclasses with same overridden methods. Test the polymorphism. Implement a stack with up casting and Object.*
10th	Theme: **Generic Programming**
	Keywords: Template, Java Generic Data Structure, Stack, Set, List, Map Lab: *Implement a stack with template to compare. Using Java generic data structure for a problem, e.g. count the word frequencies from an input text.*
11th	Theme: **Exception Handling**
	Keywords: exception, error, exception handling, exception delegating, user-defined exceptions, try, catch, throw, throws, finally *Lab: Try and catch some runtime and non-runtime exceptions. Create a user-defined exception, delegate and catch it.*
12th	Theme: **Use case diagram, Activity diagram**
	Keywords: Functional Requirement, Use case, Actor, Activity/Action, flow chart *Lab: Draw use case diagrams and activity diagrams for mini-projects*
13th	Theme: **Class diagrams**
	Keywords: Static view, Class relationships: Association, Composition, Aggregation and Generalization, Multiplicity, Package *Lab: Draw class diagrams for mini-projects*
14th	Theme: **Interaction diagrams**
	Keywords: Object Interaction with Message, Lifeline, Execution Occurrence, Event Occurrence, Links and

	Messages *Lab: Present mini-projects (1/2)*
15th	Theme: **Introduction to other UML diagrams**
	Keywords: State machine diagram, Component diagram, Deployment diagram *Lab: Present mini-projects (2/2)*

Out of class assignment
Exercises and Mini-projects

Grading Criteria and Method of Evaluation		
Kind	Percentage	Evaluation Criteria
Examination	60%	Lecture Section
Lab and Mini-Project	40%	Lab Section: Students are divided into groups for mini-projects
Continuous Assessment	0%	
Others	%	
Note		

Educational advice for enrolled students

Textbooks				
Title	Author	Publisher	ISBN code	Comment
Object-Oriented Programming and Java	Danny Poo, Derek Kiong and Swarnalatha Ashok	Springer	978-1-84628-962-0 (ISBN-10: 1846289629)	2nd Edition, 2008
UML Distilled Third Edition: A Brief Guide to the Standard Object Modeling Language	Martin Fowler	Addison-Wesley Professional	0321193687	Notation of UML
UML 2 Toolkit	Hans-Erik Eriksson and Magnus Penker.	Wiley Publishing Inc.	URL: http://www.ges.dc.ufscar.br/posgraduacao/UML_2_Toolkit.pdf	
Note				

Reference books				
Title	Author	Publisher	ISBN code	Comment
Note:				

Internet Websites related to the Course

https://docs.oracle.com/javase/tutorial/java/concepts/index.html

Contact

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Others