UC San Diego Extension, 0176S **Effective Start Term: _Spring 2016_**
La Jolla, CA 92093-0176

COURSE OVERVIEW

Course Title: **Level 1: Object-Oriented Programming** **Course Number**:

Number of Units: 5.0 units

Total Hours of Instruction: 54

Course Description

During this course, students learn to understand and use Object Oriented Programming (OOP). We learn Java's Swing libraries which gives you the ability to create elegant Graphical User Interfaces (GUIs) from scratch, while becoming familiar with the patterns and paradigms of OOP. Understanding OOP is challenging because it requires you to think in an abstract way about technical concepts, but mastering this mindset gives you a powerful tool for breaking complex problems into more manageable ones, which is a paramount skill for any software engineer. This course is designed for beginning programmers aged 10-15 years old.

Content and Evaluation

The curriculum for this course is a proprietary set of "recipes" that use the intentional method to guide students in creating their first object oriented programs. A recipe is a set of instructions that students convert into code to create an application (e.g. Binary Convertor, Twitter Searcher) or a game (e.g. Pong, Whack-a-Mole, Typing Tutor). We use Java Swing to familiarize students with object instantiation and connecting objects with each other. This also gives students the ability to make complex user interfaces for their own purposes such as school projects. Students write a substantial amount of code during this course which is published online as part of their growing GitHub portfolio.

This course has been designed by professional software engineers who have incorporated industry best practices into the curriculum.

The 1.5 hour exam that completes this course includes a written portion, and a coding exercise that must be completed without external help.

Extra Credit

n/a

Methods of Instruction

X	Class Discussion/Discussion Boards	X	Lectures
☐	Field Trips	☐	Case Studies
X	Group Work	X	Other: Programming Assignments

Out of Class Assignments

Total hours expected to complete assignments: n/a

☐	Textbook Exercises	☐	Readings
☐	Group Work	☐	Written Assignment/Essay(s)
☐	Student Project	X	Other: Exploration of concepts by programming at home

Evaluation/ Grading

X	Exam(s)	☐	Class Participation/Discussion Boards
☐	Written Assignment/Essay(s)	☐	Class Project(s)
X	Other: Two programming exercises		

Topical Outline

Rather than follow a traditional lecture-style/textbook form of teaching, this course is driven by a set of practical learning objectives that are practiced until the student gains mastery over that skill. In the same way a shoemaker might make a lot of shoes before becoming a master, our students continually write code to solve a particular challenge in the theme of the skill they are learning. As a shoemaker would not learn to make shoes by spending time listening to someone describe the theory of lasting and hammering, a young programmer does not learn by listening to an adult explain the theory of computer science.

At the end of Level 1, students have mastered these skills;

1. **Reading & Understanding Code**
   - identify the member variables, constructors and methods in a class
   - able to use existing classes and methods in new code
   - explain what will happen when a piece of code is executed

2. **Objects/Classes**
   - how to declare and initialize an object
   - how to break out of the static context
   - understand the scope of member variables Vs local variables
   - write and use constructors
   - create user-defined types (classes)

3. **Methods**
   - understand how parameters (data) are passed into a method
   - be able to use data that is returned from a method
   - write a method signature based on a requirement
   - implement a method

4. **Java Swing API**
   - create user-interactive applications from scratch
   - respond to user input from the keyboard, mouse or when a button is pressed

5. **Converting from binary into text and vice versa**