University of Toledo
Computer Science & Engineering Technology
Master Syllabus

Course Title: Object Oriented Programming and Data Structures
Course Code & Number: CSET-1200

Credit Hour Total: 3   **Weekly Contact Hours Lecture:** 3   **Lab Hours:** 0

Prerequisite(s): CSET 1100

Text: Introduction to Java Programming, 10ᵗʰ Edition, Daniel Liang, 2014
                    ISBN: 10: 0133761312

Software: None

Course Coordinator: Jared Oluoch (Jared.Oluoch@utoledo.edu)   CSET Required

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Current Catalog Description:
> Introduction to Windows-based programming for engineering technology applications.
> Topics include Windows Application Program Interface (API), message processing,
> Windows Procedures, using Windows resources, modal and modeless dialog boxes and the
> graphics device interface.

Related Program Outcomes:
CSET Program Outcomes are (b, c, i and j)
IT Program Outcomes are (b, c and i)

b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
c) An ability to design, implement, and evaluate a computer--based system, process, component, or program to meet desired needs. Specifically, an ability to apply design and development principles in the construction of software systems of varying complexity. [CAC---k]
i) An ability to select and apply current techniques, skills, and tools necessary for computing practice.
j) An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.

Course Objectives:
After successful completion of this course, given a problem, students will:
- Understand the OO Programming concept
- Be able to build Java OO classes using appropriate design principles
- Be able to write Java programs that properly use inheritance polymorphism, abstract classes, exception handling and template classes and functions
- be able to compare and contrast these basic data structures: linked lists, stacks, queues, tree. Be able to write classes implementing these data structures.

Major Topics Covered in the Course:

Topic	Lecture Hours
Introduction	3
Decision, looping, function, array	3
Events	3
String class	3
File operations	3
Classes	6
Inheritance, Polymorphism and Virtual	9
Exceptions	3
Template	3
List, stack and queue	6
Binary trees	3
Total:	45

Laboratory Projects/Assignments (specify weeks):

1. Several Object oriented design programming assignments (6 weeks)
2. Linked list (2 weeks)
3. Stacks and Exceptions (1 week)
4. Queues (1 week)
5. Binary Search Trees (2 weeks)

Oral and Written Communications:

Every student is required to submit at least 1 written reports (not including exams, tests, quizzes, or commented programs) of an appropriate length (normally 3 pages) and to make oral presentations (typically 10 minutes duration) as part of design team progress reports. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues:

Not part of the course syllabus

Theoretical Content:

OO concepts:
> Class
> Inheritance (Dynamic binding, constructors/destructors)
> Polymorphism
> Exceptions
> Templates

Basic data structures:
> Vector and list
> Stack and Queue
> Binary Tree, Binary searching tree
> Heap
> Binary Heap
> Insertion Sort
> Shell Sort, Heap Sort
> Merge Sort, Quick Sort

Problem Analysis

Students need to analyze project/homework problems using the theories learned in class.

Solution Design

Students need to solve project/homework problems using object oriented design. They have to choose appropriate data structures to solve a given problem