Course number and name:	**CS 04113: Introduction to Object Oriented Programming**
Credits and contact hours:	4 credits. / 5 contact hours
Faculty Coordinator:	Chia Chien
Text book, title, author, and year:	Objects First with Java – A Practical Introduction Using BlueJ, David J. Barnes & Michael Kölling, 2017

Specific course information

Catalog description: This course introduces the fundamental concepts of programming from an object-oriented perspective. Topics are drawn from classes and objects, abstraction, encapsulation, data types, calling methods and passing parameters decisions, loops, arrays and collections, documentation, testing and debugging, exceptions, design issues, inheritance and polymorphic variables and methods. The course emphasizes modern software engineering and design. Students are expected to be sufficiently proficient in mathematics such that they are ready to take Calculus I (MATH 01.130).

Prerequisites: MATH 01122 Precalculus Mathematics or
MATH 01130 Calculus I

Type of Course: ☒ Required ☐ Elective ☐ Selected Elective

Specific goals for the course

1. **object-oriented principles.** Students have demonstrated mastery of object-orientation through examination assessments on such concepts.

    - ABET (a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
    - ABET (i) An ability to use current techniques, skills, and tools necessary for computing practice

2. **introductory Java programming.** Students have effectively applied Java programming structures to implement coding assignments and to complete test assessments.

    - ABET (a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
    - ABET (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
    - ABET (i) An ability to use current techniques, skills, and tools necessary for computing practice

- ABET (k) An ability to apply design and development principles in the construction of software systems of varying complexity

3. **fundamental project development**. Students have successfully utilized an integrated development environment to design, implement, document, test, and execute applications.

    - ABET (a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
    - ABET (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
    - ABET (i) An ability to use current techniques, skills, and tools necessary for computing practice
    - ABET (k) An ability to apply design and development principles in the construction of software systems of varying complexity

Required list of topics to be covered

1. Class structure and interactions
2. Primitive and object data types
3. Variables and assignments
4. Basic Boolean logic/operations. (AND/OR/XOR/NOT)
5. Conditional structures (i.e. if-else, switch)
6. Iterative loops (i.e. for-each, for, while, do-while)
7. Operators and expressions
8. Static and non-static methods
9. Class and object diagrams
10. Documentation and style
11. Testing and debugging
12. Integrated developing environment
13. Object-oriented principles (i.e. abstraction, encapsulation, coupling, cohesion)
14. Inheritance and polymorphic variables
15. Understand basic data structures and algorithms
16. Arrays, ArrayLists, HashMaps, HashSets
17. Basic security concepts including permissions, bounds checking, input validation, type checking and parameter validation
18. Regular expressions

Optional list of topics that could be covered

1. Streams
2. Functional Processing
3. Multi-dimensional arrays