Course number and name:	**CS 04114: Object Oriented Programming and Data Abstraction**
Credits and contact hours:	3 credits. / 3 contact hours
Instructor's or course coordinator's name:	Jack Myers
Text book, title, author, and year:	Core Java SE 9 for the Impatient Cay S Horstmann, 2018

Specific course information

Catalog description: Objects and data abstraction continues from Introduction to Object-Oriented Programming to the methodology of programming from an object-oriented perspective. Through the study of object design, this course introduces software engineering and focuses on file I/O, function prototypes, exception handling, decoupling strategies, and other advanced topics.

Prerequisites: CS 04113 Introduction To Object Oriented Programming **or**

(CS 04103 Computer Science & Programming and
CS 04112 Java For Object Oriented Programmers)

Type of Course: ☒ Required ☐ Elective ☐ Selected Elective

Specific goals for the course

1. **abstraction techniques.** Students have successfully utilized abstraction techniques to design abstract data models (e.g., abstract classes / interfaces and decoupling strategies) that model real world behavior in highly extensible ways.

    - 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

2. **advanced Java programming.** Students have demonstrated mastery of advanced Java programming (e.g., GUI development, exceptions and error handling, File I/O, lambda expressions) through coding assignments and tests 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

3. **uml diagramming**. Students have created UML class diagrams and sequence diagrams to document the design of their applications.

    - ABET (i) An ability to use current techniques, skills, and tools necessary for computing practice

Required list of topics to be covered

1. Abstract classes
2. Interfaces
3. Decoupling strategies
4. GUI development
5. Exception handling and use of related APIs
6. File access, buffered I/O, and use of related APIs
7. Lambda expressions, streams (sequential and parallel execution), and use of related APIs
8. Threads and Runnables
9. UML Class and Sequence diagrams

Optional list of topics that could be covered

1. Design patterns
2. Recursion
3. Abstract data types* (*some exposure to this topic strongly desired)