



DEPARTMENT OF MATHEMATICS AND COMPUTER & INFORMATION SCIENCE

SYLLABUS

COMPUTER PROGRAMMING II CS2511

Prerequisite: Grade of C or higher in Programming I –CS 2510.

COURSE DESCRIPTION: This course is continuation of CS 2510. We will discuss arrays, class and object, inheritance, polymorphism, GUI design, exception handling, recursion, files and string manipulation. We will also introduce basic data structures and algorithms.

COURSE OBJECTIVES: This course completes the programming skill development started in CS2510 Computer Programming I. It utilizes all of the skills developed in CS 2510 and facilitates the students programming skills to a level where they are prepared for CS 3810 Data Structures. Students will continue to use these skills in all of the courses in the computer science track.

At the end of the semester, students should be able to do the following:

1. Plan, design, implement, test and debug, and deploy a complete object-oriented software solution.
2. Define recursion and apply it as a problem-solving technique.
3. Define inheritance and apply it in a software project.
4. Define polymorphism and apply it in a software project.
5. Implement exception-handling in software projects and explain the importance.

TEXTBOOK: **Java Illuminated: An Active Learning Approach** (5th Edition), by Julie Anderson and Herve Franceschi, published by Pearson, ISBN: 978-1-284-14099-6

In this course, Chapters 7-11 are covered. Some contents may be augmented, some contents may be omitted. Chapters 12 and/or 13 will only be partially covered, and only if we have enough time at the end of the semester to cover them. Please come to class ready to take notes.

TOPICS TO BE COVERED*

1. **Chapter 7 Object-oriented Programming Part 2: User-Defined Class**

- 7.1 Defining a Class
- 7.2 Defining Instance Variables
- 7.3 Writing Class Methods
- 7.4 Writing Constructors
- 7.5 Writing Accessor Methods
- 7.6 Writing Mutator Methods
- 7.7 Writing Data Manipulation Methods
- 7.9 The Object Reference this
- 7.10 The toString and equals Methods
- 7.11 Static Class Members
- 7.12 Graphical Objects
- 7.13 Enumeration Types
- 7.15 Creating Packages
- 7.16 Generating Web Style Documentation with JavaDocs

2. **Chapter 8 Single-Dimensional Arrays**

- 8.1 Declaring and Instantiating Arrays
 - 8.1.1 Declaring Arrays
 - 8.1.2 Instantiating Arrays
 - 8.1.3 Combining the Declaration and Instantiation of Arrays
 - 8.1.4 Assigning Initial Values to Arrays
- 8.2 Accessing Array Elements
- 8.3 Aggregate Array Operations
 - 8.3.1 Printing Array Elements
 - 8.3.2 Reading Data into an Array
 - 8.3.3 Summing the Elements of an Array
 - 8.3.4 Finding Maximum or Minimum Values
 - 8.3.5 Copying Arrays
 - 8.3.7 Comparing Arrays for Equality
- 8.5 Using Arrays in Classes
 - 8.5.1 Using Arrays in User-Defined Classes
- 8.6 Searching and Sorting Arrays
- 8.8 Using Arrays as Counters

3. **Chapter 9 Multidimensional Arrays and the ArrayList Class**

- 9.1 Declaring and Instantiating Multidimensional Arrays
 - 9.1.1 Declaring Multidimensional Arrays
 - 9.1.2 Instantiating Multidimensional Arrays
 - 9.1.3 Combining the Declaration and Instantiation of Multidimensional Arrays
 - 9.1.4 Assigning Initial Values to Multidimensional Arrays
- 9.2 Accessing Multidimensional Array Elements
- 9.3 Aggregate Two-Dimensional Array Operations
- 9.4 Two-Dimensional Arrays Passed and Returned from Methods
- 9.7 The ArrayList Class

4. Chapter 10 Object-Oriented Programming, Part 3: Inheritance, Polymorphism, and Interfaces

10.1 Inheritance

10.2 Inheritance Design

10.2.1 Inherited Members of a Class

10.2.2 Subclass Constructors

10.2.3 Adding Specialization to the Subclass

10.2.4 Overriding Inherited Methods

10.3 The protected Access Modifier

10.5 Abstract Classes and Methods

10.6 Polymorphism

10.8 Interfaces

5. Chapter 11 Exceptions and Input/Output Operations

11.1 Simple Exception Handling

11.1.1 Using try and catch Blocks

11.1.2 Catching Multiple Exceptions

11.1.3 User-Defined Exceptions

11.3 Reading Text Files Using Scanner

11.4 Writing and Appending to Text Files

11.4.1 Writing to Text Files

11.4.2 Appending to Text Files

11.5 Reading Structured Text Files

11.7 Reading and Writing Objects to a File

6. Chapter 12 Graphical User Interfaces

Only the beginning of the chapter will be covered if we have time

7. Chapter 13 Recursion

Only the beginning of the chapter will be covered if we have time

* The topics may vary slightly and need to be adjusted as we move through the semester.