



Hankuk University of Foreign Studies
2024 Summer Session
CSC 320 Data Structures and Algorithms
Course Outline

Course Code: CSC 320

Instructor: Dr. Mahfuza Farooque

Home Institution: Pennsylvania State University, USA

Office Hours: By appointment

Email: mff5187@psu.edu

Credit: 4

Class Hours:

This course will have 52 class hours, including 32 lecture hours, professor 8 office hours, 8-hour TA discussion sessions, 4-hour review sessions.

Course Description:

Students in this class will further strengthen their programming skills by learning data structures and problem-solving techniques, as well as some important and advanced features of Java. The new programming paradigm, Object Oriented Programming, will also be emphasized.

We will cover linked lists, stacks, queues, trees, and binary search trees. Students will implement and analyze them in order to understand their advantages and disadvantages for different problems. Some basic techniques for searching and sorting will be studied. Students will learn how to measure the computational complexity of programs and problems. Also, students will learn a powerful programming technique, recursion, to solve many complex problems.

Required Textbooks:

Data Structures, Abstraction and Design Using Java, Third Edition, by Elliot B. Koffman & Paul A. T. Wolfgang

Grading & Evaluation: Final grades will be computed per the following:



- Assignments: 35%
- Project(s): 15%
- Midterms: 20%
- Final: 20%

Grading System (1 ~ 100)

A+ : 96 - 100	A : 91 - 95
B+ : 86 - 90	B : 81 - 85
C+ : 76 - 80	C : 71 - 75
D+ : 66 - 70	D : 60 - 65
F : 0 - 59	
Pa : Pass	Fa : Fail

Course Schedule:

Week1: Object Oriented Programming and Class hierarchies

- Session1: ADRs, Interface, and the Java API, Introduction to OOP
- Session2: Method of overloading, Method of Overriding, Polymorphism, Abstract Classes
- Session 3: Class Object and Casting, Exception Class hierarchy
- Session 4: Packages and Visibility, A Shape Class Hierarchy

Week2: Lists and the Collections Framework

- Session1: Algorithm Efficiency and Big-0, The List Interface
- Session2: ArrayList, Application of ArrayList, Implementation of an ArrayList
- Session3: Singles Linked List, Double Linked List
- Session4: LinkedList Class, Application of the LinkedList Class

Week3: Stack, Queue, Recursion

- Session1: Stack Applications and Implementations
- Session2: Queue Application and Implementation
- Session3: Recursion, Recursive Array Search
- Session4: Recursive Data Structure, Problem Solving with Recursion

Week4: Trees

- Session1: Tree Terminology and Applications, Tree Traversals
- Session2: Implementing a Binary Tree, Binary Search Tree
- Session3: Heap and Priority queues
- Session4: Huffman Trees
- Session5: Selection Sort, Insertion Sort, Bubble Sort
- Session6: Merge Sort, Heap Sort, Quick Sort
- Session7: Review Session