DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Course	ECE 36800 - Data Structures
Type of Course	Required for CmpE Program, Elective for EE Program
Catalog Description	Provides insight into the use of data structures. Topics include stacks, queues and lists, trees, graphs, sorting, searching, and hashing.
Credits	3
Contact Hours	3
Prerequisite Courses	ECE 23000 or equivalent course of Python programming
Prerequisites by Topics	Programming experience in Python. Experience in using software scripting tools and software testing tools.
Textbook	Data Structures, zybooks
Course Objectives	This course provides insight into the use of data structures. Covered topics include data structures of lists, stacks, queues, trees, and graphs. Associated algorithms of searching, sorting, tree-based and graph-based algorithms are also covered. Students use their previous programming experience to design and test software using the data structures and algorithms learned in this course.

Course Outcomes

On successful completion of this course, students should be able to:

1. Analyze the time complexity of basic algorithms using big-O notation. (1)
2. Apply recursive programming in problem solving. (1)
3. Use basic data structures (arrays, linked lists, stacks, queues, trees, heaps, and hash tables) for storage and retrieval of data. (2)
4. Select the appropriate searching and hashing algorithms for a given application. (2)
5. Select the appropriate sorting algorithms for a given application. (2)
6. Apply graph algorithms to solve engineering problems. (2)
7. Write, test, and debug computer program solutions to problems using learned data structures and algorithms.(7)

Lecture Topics	1. Complexity analysis using big-O notation
	2. Basic abstract data types
	3. Arrays and lists
	4. Stacks and queues
	5. Recursive thinking
	6. Trees and heaps
	7. Searching algorithms
	8. Hashing and hash table
	9. Sorting algorithms
	10. Graphs and graph algorithms

Computer Usage   High

Laboratory Experience   None

Design Experience   High

Coordinator   Chao Chen, Ph.D.

Date   April 2022