CMPS 201 Data Structures
Course Syllabus

Credit Hours: 3
Semester: Fall 2021
Time: TR: 11:00-12:20
Class Room: Thurman, N205
Prerequisite: CMPS191

Instructor: **Dr. Shizhong Yang**
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          Office hours: TR 2:00-5:00

Catalog Description:
    This course is intended to present the data structures which may be used in computer storage to represent the information involved in solving problems (heaps, hash tables, B-trees). Emphasis will be placed on concepts of data abstraction and its implementation. Also sorting and searching techniques including arrays. Prerequisite: CMPS 191.

Audience:
  This course is designed for students in the under-graduate program in computer science.

Objectives:
    The students learn in this course the concepts of data structures.   A successful student will have the knowledge of various ADTs such as lists, stack, queue, and tree structures. Students will also have thorough understanding of graph concepts and some sorting and searching algorithms. In addition, students will be able to implement various ADTs using C++.

Text:
    C++ Plus Data Structures by Nell Dale, 6th edition, ISBN: 9781284089189

Topic Outline:
    1. Review of Programming Concept
    2. Software Engineering Principles
    3. Data Abstraction
      A. Abstract Data Type
        B. Language Features to Support Data Abstraction
   C. Comparison of Algorithms (Big - O Notation)
    4. Unsorted and Sorted Lists.
      A. Sorting

B. Searching
5. Linked Lists.
 A. Single
 B. Double
 C. Circular
6. Stacks
7. Queues
8. Recursion
9. Trees
 A. Tree Concepts
 B. Binary Search Trees
 C. Traversals of Trees
 D. Heaps
 E. Advance Tree Concepts
10.   Graphs
 A.   Depth First and Breath First Algorithms
 B. Graph Algorithms – Prims, Dijkstra, Floyds
11. Advanced Sorting and Searching Techniques
 A. Hashing
 B. Quicksort
12. Additional Topics
    May include Graphs, AVL Trees, 2-3 Trees and other advanced topics.

Course Requirements:

Programs and Programming Projects
Programming assignments are a mandatory part of the course. Homework programs will concentrate on implementing fundamental programming concepts and techniques. Projects will be large scale programs implementing the Abstract Data Types discussed in class. Programming Projects will be worth significantly more points than homework programs. All programs are individual assignments.

Examinations
Several written examinations will be given and a comprehensive final exam will be given. Examination dates will be announced at least 1 week in advance.

Several programming exams will also be given. A programming exam consists of a student being required to complete several programming assignments during the class period with no assistance.

Quizzes and Homework
Quizzes are generally unannounced and may be given at any time and may cover any class material or any assigned material. Programming quizzes may also be given where the student is required to complete programming assign during the class period with no assistance.

Grading will consist of attendance and performance, programming projects, quizzes and exams.

Some Rules:
 No late submission.
 No make-up quiz.
 No make-up exam except providing evidence of absence (medical document, doctor's note).
 No plagiarism.
    Any questions/concerns about the grade of homework/quiz/exam should be addressed in 5 business days.

Program Educational Objectives:

This course addresses ABET Program Educational Objectives 1, 2, and 3.

The Educational Objectives of CMPS201 of the Computer Science Program are to produce graduates who:

PEO1: Are thoroughly trained in methods of analysis, including the mathematical and computational skills appropriate for problem solving.

PEO2: Have developed the skills pertinent to the design of computing systems, including the ability to formulate problems, to think creatively, to synthesize information, to work collaboratively, and to communicate effectively.

PEO3: Are able to use current data analysis techniques for computer science applications.

Program ABET Outcomes:

This course addresses ABET Program Outcomes a, b, f and i. Each graduate by the time of graduation will demonstrate:

Outcome a: an ability to apply knowledge of computing and mathematics appropriate to the discipline. [PEO1]

Outcome b: an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution. [PEO2]

Outcome f: an ability to communicate effectively with a range of audiences. [PEO2]

Outcome i: an ability to use current techniques, skills, and tools necessary for computing practice. [PEO3]

Disability Statements:

Students with documented disabilities who believe that they may need accommodations in this class are encouraged to contact the Disability Services Coordinator in the Office of Disability Services, 246 A.C. Blanks Hall, 225-771-3546 (Voice), 225-771-3949 (Fax), as soon as possible to ensure that such accommodations are implemented in a timely fashion. Students who need accommodations must be registered with the Office of Disability Services. Students are responsible for informing the instructor of any instructional accommodations and/or special learning needs at the beginning of the semester. All discussions will remain confidential.

Course Work Grade:

	Approx. weight in grade
Attendance and Performance	10%
Quiz and Assignments	30%
Midterm Exam	30%
Final Exam	30%

Grading Scale:

90% – 100%	-	A
80% – 90%	-	B
70% – 80%	-	C
55% – 70%	-	D
Below 55%	-	F