

**COSC 2336.001 – Data Structures & Algorithms**  
**Spring 2022 Course Syllabus**

**Schedule:**

Lecture: MWF 9:05 AM – 10:00 AM COB 255

**Course Description:**

Topics include recursion, the underlying philosophy of object-based and object-oriented programming, fundamental data structures (including stacks, queues, linked lists, trees, heaps and graphs), the basics of algorithm analysis.

**Course Prerequisites:**

The Object-Oriented Paradigm (COSC 1337), Calculus I (MATH 2413)

**Required Textbook:**

Data Abstraction and Problem Solving with Java, 3ed, Janet J. Prichard and Frank M. Carrano, Pearson/Addison Wesley, ISBN: 9780132122306

**Contact Information:**

Instructor: Dr. Yi Li  
Email: [yli@uttyler.edu](mailto:yli@uttyler.edu)  
Office: COB 315.08  
Office Hour: Monday & Wednesday 10:30 am to 12:00 pm on Zoom  
Make an appointment via email if you cannot meet during these times

**Grading Policy:**

Exam 1	20%
Exam 2	20%
Final Exam (Comprehensive)	25%
Programming Assignments	20%
Quizzes	5%
Attendance	10%

**Grading Rubric:**

<b><i>Weighted Total</i></b>	<b><i>Letter Grade</i></b>
<hr/> >= 90	A
<hr/> >= 80 and < 90	B
<hr/> >= 70 and < 80	C
<hr/> >= 60 and < 70	D
<hr/> < 60	F

### Topics:

1. Introduction to Data Structures
2. Brief Review of Java Fundamentals
3. Overview of Programming Principles and Software Engineering
4. Fundamentals of Recursion
5. Abstract Data Types
6. Linked Lists and List Processing
7. Introduction to Stacks
8. Introduction to Queues
9. Algorithm Efficiency and Sorting
10. Introduction to Trees
11. Introduction to Graphs and Networks

### Course Objectives:

1. Describe how the data structures in the topic list are allocated and managed in memory.
2. Describe common applications for each data structure in the topic list.
3. Write programs that implement the basic operations of each of the following data structures: array, linked lists, stacks, queues and trees.
4. Compare and contrast the costs and benefits of dynamic and static data structures.
5. As related to the concept of recursion: give examples of its use, identify the base case(s) and the general case(s) of a recursively defined problem; describe its implementation using a stack; determine when appropriate for a problem; and implement, test, and debug simple recursive functions and procedures.
6. Using Big-O notation, determine the time and space complexity of simple algorithms.
7. Differentiate the computational efficiency of the main algorithms for sorting and searching.
8. Implement the most common quadratic and  $O(n \log n)$  sorting algorithms.
9. Model problems in computer science using graphs and trees.
10. Be familiar with factors other than computational efficiency that influence the choice of algorithms, such as programming time, space overhead, maintainability, and the use of application specific patterns in the input data.

### Course Examinations:

An official one-week notice will be provided preceding each course examination. At least one class period prior to each examination a review guide will be provided, detailing exam format, major topical coverage, problem descriptions and types, etc. Examinations will be graded on as timely a basis as possible with results posted on Canvas. Relevant problems from graded exams will be discussed in a subsequent class. For the remainder of the semester, students are strongly encouraged to talk with the instructor during scheduled online office hours to more fully discuss their examinations.

### **Missed Assignments and Tests:**

Assignments and programs will be due before the beginning of classes on their due dates. Points will be deducted for late assignments. A penalty of 20% will be deducted from your score for the first 24-hour period your assignment is late. A penalty of 50% will be deducted from your score for  $\geq$  24-hour period. No credit for  $\geq$  3 days. Weekend days will be counted.

Tests must be taken when scheduled. Make-up exams will be granted at the discretion of the instructor. Make-ups will be given only under extremely unusual circumstances, will be different from exams given during the regular class time and may be discounted by up to 50% of the grade. Permission for a makeup exam must be obtained PRIOR to the regular exam and must include written documentation of the student's absence.

### **Attendance Policy:**

Attendance is a critical factor for student success. We will take attendance at the beginning of each class. The 10% attendance grade will count as follows for a Mo-We-Fr class: 1-2 absences = 10%; 3 absences = 8%; 4 absences = 6%; 5 = 4%; 6 = 2% and 7 = 0%; having more than 7 absences is considered excessive and the student will be asked to withdraw, or I will no longer grade any assignments and tests. I assume that if you miss a class, you have a very important reason; you do not have to give any explanation. But follow the assignment calendar when you return. This grading policy is meant to reward good attendance and discourage spotty attendance. I am reasonable and understand true emergencies. Contact me promptly to discuss your absence if you are absent two classes in a row. Prolonged illness or each absence for campus sports team events requires a written excuse from a doctor or coach.

### **Classroom and Lab Rules:**

- Please do not surf the Web during class unless instructed to access the Internet.
- Do not access inappropriate Web sites during class. This will lead to dismissal from the class.
- Please do not work on other computer assignments during class.
- Please do not talk to your neighbor during class.
- Please do not bring food or an uncovered drink into the computer classroom lab.
- Please do not order food to be delivered to the classroom.
- Do not use your phone during class.

### **TA Information:**

Will be updated later on Canvas.

**Important Dates:**

Date	Day	Description
01/10/2021	Monday	Courses Begin
01/17/2021	Monday	Martin Luther King, Jr. Holiday, no class
01/24/2021	Monday	Census Date
02/01/2021	Tuesday	Registration for Summer 2021 begins
03/01/2021	Tuesday	Final Filing Deadline for Spring 2021 Graduation
03/07 - 03/11		Spring break, no class
03/28/2021	Monday	Last day wot withdraw from 15-Week courses
04/01/2021	Friday	Registration for Fall 2021 begins
04/25/2021	Monday	Study day & Final exam week begins

**Tentative Test Schedule:**

Date	Description
The week of 2/14	Exam1
The week of 3/18	Exam2
TBD*	Final Exam

\*Exam is administered based on the Spring 2022 Final Exam Schedule.

**Plagiarism:**

Plagiarism will result in disciplinary actions. To spare yourself accusations of plagiarism review the following statements: (Adapted from SFSU Department of Computer Science cheating and plagiarism policy)

***Plagiarism occurs when a student:***

- submits the work of another student representing it a their own.
- allows another student to replicate or submit their work.
- submits code or portions of code with modifications in an effort to make it look original.
- fails to inform the instructor of collaborating with others on code or projects.
- posts assignments on internet sites for solutions.
- submits code found online and modified without proper citation.
- submits code found online with and used verbatim regardless of proper citation.

***Plagiarism does not occur when a student***

- has permission to collaborate on a program or project and list all collaborators.
- receives guidance from instructors or teaching assistants
- help with errors or provide tips on programming that will help others in the learning process.
- discuss requirements of an assignment and strategies for implementation
- inclusion of code copied form another source when properly cited and specifically allowed by instructor

**Tentative Course Schedule:**

Week	Dates	Lecture Topics	Chapter
1	01/10, 12, 14	Introduction to data structure and Java Fundamental Review	1
2	01/19, 21	Principle of Programming & Recursion	2, 3
3	01/24, 26, 28	Recursion & ADTs	3, 4
4	01/31, 02/02, 04	Linked Lists	5
5	02/07, 09, 11	Backtracking and More on Recursion	6
6	02/14, 16, 18	Exam 1 Review & <b>Exam 1</b>	
7	02/21, 23, 25	Introduction to Stacks	7
8	02/28, 03/02, 04	Introduction to Queues	8
9	03/07, 09, 11	<b>Spring Break</b>	
10	03/14, 16, 18	Complexity and Sorting Algorithms	9
11	03/21, 23, 25	Complexity and Sorting Algorithms (cont'd)	9
12	03/28, 30, 04/01	Exam 2 Review & <b>Exam 2</b>	
13	04/04, 06, 08	Introduction to Trees	10
14	04/11, 13, 15	Trees and Heaps	10, 12.2
16	04/18, 20, 22	Introduction to Graphics & Final Exam Review	14
17	04/25, 27, 29	<b>Final Exam</b> (Date to be determined)	

\*Dates may vary depending on the pace of class.

**Important Covid-19 Information:**

- Information for Classrooms and Laboratories: Students are expected to wear face masks covering their nose and mouth in public settings (including classrooms and laboratories). The UT Tyler community of Patriots views adoption of these practices consistent with its Honor Code and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.
- Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher than normal temperature should stay at home and notify their faculty. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.
- Recording of Class Sessions: Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.