CS 2401 **Syllabus** **Summer 2021**
CS 2401 MTWRF 1:15pm-2:20pm ONLINE

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Online Course Access Points
Announcements: Piazza
Homework and Quizzes: Gradescope
Synchronous Meetings and Exams: Blackboard

Course Objectives: This is the second course for students majoring in Computer Science. Students will learn about fundamental computing algorithms, including searching and sorting; elementary abstract data types including linked lists, stacks, queues and trees; and elementary algorithm analysis.

Knowledge and Abilities Required Before Entering the Course: Students are assumed to be comfortable programming in Java. Students should be able to code basic arithmetic expressions, define simple classes, use strings, code loops and conditional statements, write methods, create objects from classes, invoke methods on an object, perform basic text file input and output, and use arrays.

Prerequisites: CS 1301 and CS 1101 with a grade of C or better.

Corequisites: You must be enrolled in the corresponding lab session.

NOTE: The next computer science class CS 2302 (Data Structures) has two prerequisites: CS2401 and MATH 2300 (Discrete Math). To avoid delaying your progress through the program, if you are not currently taking MATH 2300 and have not already passed it, you should seriously consider adjusting your schedule.

Textbooks: *Required: Introduction to Java Programming, Comprehensive Version 10th Edition by Y. Daniel Liang.* We will skip some sections, as announced in class. This textbook is required at all class meetings. *Secondary: Introduction to Algorithms, 3rd Edition by Cormen et. al.; and Algorithms 4th Ed. by R. Sedgewick and K. Weyne.* All these books are available at our library.

Software: Software used in this course is available on the desktop computers in the main computer lab and in the two instructional labs on the first floor for those who need them. To use the course software on your home or laptop computer, instructions will be given in the labs.

Required Reading: Read each section that we cover in class, both before and after class. Skim the section before class, even if you do not understand it fully, to have some idea of what we will be doing in class. Read it more carefully after class to clarify and fill in details you missed in class.

Warning: Sometimes, we will not "cover" all the material from a section in class, but instead focus on a particular aspect of the section. In such cases, I will point out in class which other parts of the section I expect you to read on your own.

Grading: Grades are communicated to students in a timely manner. It is the students' responsibility to keep track of their grades by compiling the grades they receive. Your semester grade will be based on a combination of homework and lab assignments, weekly quizzes, class participation, 3 mid-term exams, student engagement, and a final exam. The approximate percentages are as follows:

- 30% Homework and lab assignments
- 5% Lab attendance
- 10% In-class exercises and quizzes

- 30% Exams (3 exams, 10 points each)
- 25% Final comprehensive exam

The nominal percentage-score-to-letter-grade conversion for CS 2401 is as follows:

- 90% or higher is an A
- 80-89% is a B
- 70-79% is a C
- 60-69% is a D
- Below 60% is an F

Note: Regardless of your standing in the class at that time, you need to earn a 65 or better at the final exam to pass the course. Additionally, you must score 60% or better on the lab assignments to pass this course..

Class Participation: Attendance at and participation in all lecture sessions are critical factors of your success in this course.

Students should be on time for all scheduled online sessions and attend the entire session. Attendance will be calculated indirectly every session and will count towards your class participation grade.

Students should notify the instructor prior to missing a session if at all possible, and certainly right after if earlier was not possible.

It is the student's responsibility to obtain the content covered during missed class(es). Participation points also include completing post-lecture and post-labs online quizzes (when requested) that are administered as surveys to monitor students' overall progress and potential struggles. To facilitate this task, recordings of lecture and lab sessions will be provided.

Homework and Lab Assignments: Homework and lab assignments are designed to allow you to practice using the concepts presented in lecture and in your reading. Homework and lab assignments may include written problems, tutorial exercises, and programming problems. Assignments usually will be due at the start of your lab session. Late homework will be accepted only in unusual circumstances, by prior arrangement if at all possible.
Homework must be done individually. While you may discuss the problem in general terms with other people, your answers and your code should be written and tested by you alone. Do not exchange programs or let someone look at your code, even "just so they can see how you did it." If you need help, consult a TA, a peer leader, or a professors

Laboratory Sessions: Laboratory sessions are designed to give you guidance in getting your homework assignment started well. In a typical lab session, the Teaching Assistant will present additional material that will help you complete the assignment and answer your questions as you begin work.
You are required to sign up for and attend one of the lab sections associated with this course. In Summer, a lab section meets every day. Attendance will be taken. To earn full credit for attendance, you must show up on time, stay for the entire session, and work only on your assignment. You may be excused from lab with full credit if your work has been completed and turned in.
In addition to turning in your lab assignment, you must schedule a one-on-one lab demo session with your TA in which you will explain how your program works and he/she will ask questions to test your understanding of the program being submitted. The TA will then assign a grade for this session; a student receiving a failing grade in this session will receive a grade of zero for the lab assignment. NOTE: The lab demo should be presented before or on the deadline for the assignment.

Late Projects: Lab projects up to 3 days late will receive up to 70% percent of full credit, from 3 days to one week late, up to 50%, and more than a week late will receive no credit.

Quizzes: The purpose of a quiz is to ensure that you have read the weekly reading assignment and to verify that you have mastered the major concepts of recent lectures. Quizzes typically will be about 5-10 minutes

in length and will cover the material assigned to be read for the upcoming lecture plus selected concepts from previous lectures. There will be no make-up on missed quizzes.

Exams: The purpose of the exams is to allow you to demonstrate mastery of course concepts. Each exam will focus on the material from the previous three or four weeks. Exams will take place during the regular class session. There will be three exams, each contributing 10% to your final grade, or 30% total to the overall course grade.

Because the exams contribute so heavily to your total grade, it is vital that you do well on them. If you have test-taking difficulties in general, or if you have difficulties with our tests in particular, please come talk to us as soon as possible (and certainly before the first exam).

Make-up exams will be given only in extremely unusual circumstances. If you must miss an exam, please meet with an instructor, BEFORE the exam if at all possible.

Final Exam: The final exam will be comprehensive and will count 25% toward your course grade. If you cannot demonstrate your understanding of the concepts and skills needed for success in CS 2402, you cannot pass this course even if you have enough points to do so.

You must take the final exam during the time shown in the schedule for the class section that you are formally enrolled in. Do not simply "drop in" to the other section; there will not be a copy of the exam for you. This is University policy. If you have a scheduling conflict (e.g., if you are taking a final at EPCC) or if you are scheduled for three final exams in one day, see one of the instructors IN ADVANCE.

Detailed Learning Outcomes

Level 1: Knowledge and Comprehension. Level 1 outcomes are those in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions. On successful completion of this course, students will be able to:

1. explain basic and introductory-level notions of a virtual machine;
2. explain the concept of polymorphism;
3. use class browsers and related tools;
4. identify class hierarchies;
5. recognize the basic terms associated with particular data structures, for example, head/tail, push/pop/peek.

Level 2: Application and Analysis Level 2 outcomes are those in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details. Upon successful completion of this course, students will be able to:

1. use Big-O notation to express the best-, average- and worst-case behaviors of an algorithm;
2. explain the structure and use of activation records;
3. determine the best, average and worst-case behaviors of an algorithm;
4. assess time and space trade-offs in algorithms;
5. explain, code, and use quadratic and O(n log n) sorting algorithms;
6. implement recursive algorithms over natural numbers, lists, and trees;
7. define and use classes, subclasses and inheritance;
8. implement a simple graphical user interface;
9. perform string manipulation and simple parsing;
10. implement and use multidimensional arrays;
11. describe the importance of encapsulation and information hiding;
12. implement applications and simulations of the data structures identified above;
13. describe and analyze simple sequential and binary search algorithms;
14. implement quadratic sorting algorithms;

15. describe memory allocation of integers, real numbers, arrays and objects.

Level 3 Outcomes: Synthesis and Evaluation. Level 3 outcomes are those in which the student can apply the material in new situations. This is the highest level of mastery. On successful completion of this course, students will be able to identify, implement and use the following data structures as appropriate for a given problem:

1. multi-dimensional arrays;
2. lists implemented as arrays or linked lists;
3. stacks;
4. queues;
5. binary trees and binary search trees;
6. simple hashes.

Policies

Academic dishonesty: It is UTEP's policy, and mine, for all suspected cases or acts of alleged scholastic dishonesty to be referred to the Office of Student Conduct and Conflict Resolution for investigation and appropriate disposition. See Section II.1.2.2 of the Handbook of Operating Procedures.

Attendance: I strongly encourage you to attend every class, though there is no particular grade penalty for absences. You are responsible to find out any assignment that must be made up if you are absent. My goal is for class meetings and activities to complement, rather than echo, the textbook, and thus for every class to be worth attending.

Courtesy: We all have to show courtesy to each other, and the class as a whole, during class time. Please arrive to class on time (or let me know when you have to be late, and why); do not engage in side conversations when one person (me, or another student) is talking to the whole class; do not engage in phone, email, or text conversations during class.

COVID-19 Accommodations: Students are not permitted on campus when they have a positive COVID-19 test, exposure or symptoms. If you are not permitted on campus, you should contact me as soon as possible so we can arrange necessary and appropriate accommodations. (classes with on-campus meetings) Students who are considered high risk according to CDC guidelines and/or those who live with individuals who are considered high risk may contact Center for Accommodations and Support Services (CASS) to discuss temporary accommodations for on-campus courses and activities.

ONLINE ETIQUETTE As we know, sometimes communication online can be challenging. It's possible to miscommunicate what we mean or to misunderstand what our classmates mean given the lack of body language and immediate feedback. Therefore, please keep these netiquette (network etiquette) guidelines in mind. Failure to observe them may result in disciplinary action.

- Always consider audience. This is a college-level course; therefore, all communication should reflect polite consideration of other's ideas.
- Respect and courtesy must be provided to classmates and to the instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on in these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space.
- Be reminded that some materials are subject to copyright and violations are prosecuted, so be cautious on what you share!

Disabilities: If you have, or suspect you have, a disability and need an accommodation, you should contact the Center for Accommodations and Support Services (CASS) at 747-5148, cass@utep.edu, or Union East room 106. You are responsible for presenting to me any CASS accommodation letters and instructions.

Exceptional circumstances: If you anticipate the possibility of missing large portions of class time, due to exceptional circumstances such as military service and/or training, or childbirth, please let me know as soon as possible.

Concept Map: