**COURSE TITLE: CSCI 2073, DATA STRUCTURES, CRN: 62713**

# I. Contact Information

 **Instructor:** Jose L. Cordova, Ph.D

 **Electronic mail:** cordova@ulm.edu

 **Office:** 345 Hemphill Hall

 **Office phone:** 342-1855

 **Office hours** Monday and Wednesday: 9:00 am to 11:00 am

 (In person, by email, or Zoom)Monday, Wed, Thursday: 1:00 pm to 3:00 pm

1. **Course Description:** An introduction to classic elementary data structures that builds on object-oriented concepts such as abstraction and inheritance. Topics include lists, stacks, queues, recursion, trees, graphs, sets, and maps.

1. **Course Prerequisites:** CSCI 2003 with a grade of C or better and CSCI 2026

1. **Course Objectives:** After the successful completion of the course, the student will be able to:
	* Design, implement, test, and use simple inheritance hierarchies.
	* Identify and use basic techniques for handling run time exceptions.
	* Describe common applications for classic data structures.
	* Implement user-defined data structures in a high-level language.
	* Compare alternative implementations of data structures with respect to performance.
	* Write programs that use the following data structures: lists, stacks, queues, hash tables, and trees.
	* Compare and contrast the costs and benefits of dynamic and static data structure implementations.
	* Choose the appropriate data structure for modeling a given problem.
	* Describe the concept of recursion and give examples of its use.
	* Identify the base case and the general case of a recursively defined problem.
	* Compare iterative and recursive solutions for elementary problems.

# V. Course Topics

* Basic concepts of inheritance, class hierarchies, and polymorphism
* Exception handling
* Abstract classes and interfaces
* Array lists
* Linked structures
* Stacks
* Queues
* Recursion
* Sets and maps
* Tree terminology and applications
* Hash tables
* Binary search trees
* Strategies for choosing the right data structure

# VI. Instructional Methods and Activities

* Students will participate in instructor-guided lectures, class discussions, and problem-solving sessions.
* Students will complete online laboratory exercises to reinforce concepts.
* Students will complete programming assignments to gain experience in the use of data structures.
* Students will complete in-class quizzes or exercises to demonstrate understanding of the material.
* Students will complete three unit tests as well as a partially comprehensive final exam.

1. **Evaluation and Grade Assignment:** Quizzes and exams will be administered in class following a closedbook, closed-notes policy.

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| **Assessment\***  | **Point Value**  | **Grading Scale**  |
| Homework, Quizzes, Exercises, Assignments  | 180 points  | 90 - 100 %  | A  |
| 3 unit tests\*  | 300 points  | 80 - 89 %  | B  |
| Final exam\*  | 120 points  | 70 - 79 %  | C  |
|   |   | 60 - 69 %  | D  |
| **TOTAL**  | **600 points**  |  0 - 59 %  | F  |

*\* In order to satisfy class meeting requirements and provide students ample time for testing, unit tests 1 and 2 will be administered on Fri Feb 3 and Fri March 3, as shown on the course schedule*

1. **Class Policies and Procedures:** All policies stated in the current ULM *Student Policy Manual &*

*Organizational Handbook* (see [*http://www.ulm.edu/studentpolicy/*)](http://www.ulm.edu/studentpolicy/) will be followed. Additional class policies include:

* 1. **Textbook(s) and Materials:** Required textbook:*Data Structures: Abstraction and Design Using Java*, by Koffman and Wolfgang, John Wiley and Sons, 3rd edition, 2016.

* 1. **Attendance Policy:** Regular attendance and class participation –whether remotely or physically-- is expected. Physical attendance for unit tests and final exams is required. The student is responsible for any information, material, and announcements given by the instructor during any missed class period(s). The student will be allowed to make up graded work only if the absence is excused and documented. Any student who is not present for at least 75% of the scheduled class sessions in any course may receive a grade of W if this condition occurs prior to the last day to drop a course or a grade of F after that date.

Federal Regulations require *determination and verification of every students’ physical location while enrolled in classes (where they are physically located while taking classes), regardless of the delivery method (on campus, online). At the beginning of every semester and whenever physical location changes, students must update or verify their current location through banner* [*https://ssbprod.ec.ulm.edu/PROD/bwgkogad.P\_SelectAtypUpdate.*](https://ssb-prod.ec.ulm.edu/PROD/bwgkogad.P_SelectAtypUpdate)

* 1. **Make-up Policy:** Make-up examinations and quizzes will be given in special circumstances only, as outlined in the ULM attendance regulations, provided that the student can document the absence. The student must strive to inform the instructor at the first opportunity after it is known that a test will be missed. Preferably this will be prior to the test. Late homework assignments will not be accepted. Programming assignments turned in after the due date and time will be assessed a late penalty of 10% of the grade for each day the assignment is late, including holidays and weekends. **Academic Integrity:** The ULM policy on Academic Dishonesty (see ULM *Student Policy Manual* -- [http://www.ulm.edu/studentpolicy/)](http://www.ulm.edu/studentpolicy/) will be followed strictly. Exams and quizzes are given under policy A of the Computer Science Policy statement. Programming assignments and other out-of-class assignments shall be completed following policy C of the Computer Science Policy statement, unless otherwise noted by the instructor.

* 1. **Course Evaluation Policy:** Students are expected to complete the on-line course evaluation administered by the Office of Academic Affairs.

* 1. **Student Services:** Information about ULM student services, such as those below, is available at the Student Services web site: [*http://www.ulm.edu/studentaffairs/*.](http://www.ulm.edu/studentaffairs/)
		+ Student Success Center:<http://www.ulm/edu.cass/>
		+ Counseling Center:<http://www.ulm.edu/counselingcenter/>
		+ Special Needs:<http://www.ulm.edu/studentaffairs/>
		+ Library:<http://www.ulm.edu/library/referencedesk.html>
		+ Computing Center Help Desk:<http://www.ulm.edu/computingcenter/helpdesk>

* 1. **Emergency Procedures:**

Students are expected to become familiar with the nearest exit in case of an emergency. Should an emergency arise, students should proceed cautiously to the nearest exit.

* 1. **Discipline/Course Specific Policies:**
	+ The instructor will strive to provide feedback on homework, quizzes, and exams at the next scheduled class period. Feedback on programming assignments will be given within two weeks of the due date.
	+ Cellular phones should be turned off or set to vibrate only when in academic buildings (including the University Library) and may be used only in restrooms, group study rooms, and offices. Text messaging may be used throughout the Library (with the exception of the classrooms) provided that no audible sound is used to notify the recipients. All people carrying cell phones into a classroom, laboratory, or clinic must turn off and store (e.g., in a backpack, purse, phone holster, or other similar item) their phones prior to entering the room. **Unless directed by the instructor for class purposes, cell phones are not allowed on desk or table tops**.
	+ *The use of mobile phones, pagers, and other electronic equipment for purposes not related to class is prohibited. In particular, possession of such devices while taking a test shall be considered an act of academic dishonesty. The use of computer equipment for purposes not related to class is strictly prohibited. A student in violation of this policy will lose the privilege of computer access during class.*
	+ Tests and quizzes will be administered in class to students who are physically present. Providing a password to a student who is absent shall be considered an act of academic dishonesty.

The University of Louisiana at Monroe strives to serve students with special needs through compliance with Sections 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act. These laws mandate that postsecondary institutions provide equal access to programs and services for students with disabilities without creating changes to the essential elements of the curriculum. While students with special needs are expected to meet our institution's academic standards, they are given the opportunity to fulfill learner outcomes in alternative ways. Examples of accommodations may include, but are not limited to, testing accommodations (oral testing, extended time for exams), interpreters, relocation of inaccessible classrooms, permission to audiotape lectures, note-taking assistance, and course substitutions.

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds, including federal loans and grants.

Furthermore, Title IX prohibits sex discrimination to include sexual misconduct, sexual violence, sexual harassment and retaliation. If you encounter unlawful sexual harassment or gender-based discrimination, please contact Student Services at 318-342-5230 or to file a complaint, visit [www.ulm.edu/titleix](http://www.ulm.edu/titleix)

Current policies on serving students with disabilities can be obtained at the ULM website:

[http://ulm.edu/counselingcenter/.](http://ulm.edu/counselingcenter/) If you need accommodation because of a known or suspected disability, you should contact the director for disabled student services by calling 318-342-5220 or visiting the ULM Counseling Center, 1140 University Avenue (this building and room are handicapped accessible).

Mental Wellness on the ULM Campus. If you are having any emotional, behavioral, or social problems, and would like to talk with a caring, concerned professional please call one of the following numbers:

* The ULM Counseling Center 342-5220
* The Marriage and Family Therapy Clinic 342-9797
* The Community Counseling Center 342-1263

Remember that all services are offered free to students, and all are strictly confidential. **If you have special needs that I need to be aware of you should contact me within the first two days of class.**

**IX. COVID-19 Pandemic Guidelines**

# Health and Safety Requirements

To safeguard the health and safety of the ULM Community during the COVID-19 pandemic, the University has instituted a variety of protocols in response to State and University of Louisiana System guidelines. All students are expected to be in compliance with these required policies and procedures.

The University’s policies and protocols for responding to the COVID-19 pandemic are focused on maintaining a safe and healthy campus environment. The plans align with federal, state and local guidelines. Safety requirements include good hygiene, maintaining adequate distancing, and wearing a face mask or covering inside all campus buildings. The University expects all employees and students to comply with these protocols. Failure to comply with these safety requirements can result in disciplinary action including removal from class.

# COVID-19 Symptoms and Testing

Testing and contact tracing for those individuals who develop symptoms of COVID-19 is paramount to the safety of our community. Information on what you are required to do should you develop symptoms or test positive for COVID-19 can be found at:

<https://www.ulm.edu/safety/student_positive_test/index.html>

In the event that one or more individuals in a course are diagnosed with COVID-19, contact tracing will be completed to determine the potential exposure to other individuals in the class. One potential outcome of this tracing might be a recommendation that the members of the class quarantine for a period of time. If this happens, the course will go into *temporary remote instruction* during that time period.

# Temporary Remote Instruction

During the semester, campus operations might be disrupted by an emergency, such as a tornado, fire, or pandemic. If in-person instruction becomes impossible for a period of time, the class will enter a phase of temporary remote instruction (TRI). During this phase, instruction will take place via virtual means, either synchronously or asynchronously. Your instructor will alert you when this happens via e-mail and will include a description of how the course will proceed.

During a period of temporary remote instruction, the need for the course to continue in a virtual manner means that you will be required to have appropriate equipment, software, and telecommunication access to allow you to participate. This course will require that you have the following, should we have to go into TRI:

1. Laptop or desktop computer equipped with wired (preferred) or wireless network adapters and software
2. OpenJDK 8 (freely available at [adoptopenjdk.net)](https://adoptopenjdk.net/)
3. JGRASP 2.0.6 (freely available at [jgrasp.org)](https://spider.eng.auburn.edu/user-cgi/grasp/grasp.pl?;dl=download_jgrasp.html). To make thing easier, this site also contains a package that bundles OpenJDK and JGRASP along with other tools
4. Latest version of ULM-Moodle [Respondus Lockdown Browser](https://moodle.ulm.edu/mod/page/view.php?id=1684460)

## X. Tentative Course Schedule

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| Instructor:  | Jose L. Cordova, Ph.D  |
| Electronic mail:  | cordova@ulm.edu  |
| Office:  | 345 Hemphill Hall |
| Office phone:  | 342-1855  |
| **Office hours** (Via e-mail or Zoom) | Monday and Wednesday: 9:00 am to 11:00 am Monday, Wed, Thursday: 1:00 pm to 3:00 pm  |

The following is a tentative schedule of topics and test dates. *The instructor reserves the right to adjust the schedule as needed.* For Spring 2023, CSCI 2073 will meet at two additional time slots which will be used to administer unit tests: **Fri Feb 3 and Fri Mar 3, from 9:00 am to 10:50 am.**

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|  | CSCI 2073 - SPRING 2023 SCHEDULE |  |
| DATE | TOPICS | NOTES |
| Thursday, January 12, 2023 | 1.2 – OOP and Inheritance |  |
| Tuesday, January 17, 2023 | 1.2 – OOP and Inheritance |  |
| Thursday, January 19, 2023 | 1.3 – Method Overriding and Overloading |  |
| Tuesday, January 24, 2023 | 1.3 – Polymorphism |  |
| Thursday, January 26, 2023 | 1.4, 1.5 – Abstract Classes and the Object class |  |
| Tuesday, January 31, 2023 | 1.1 – ADTs and Interfaces |  |
| Thursday, February 2, 2023 | 2.2 – The List Interface and ArrayList Class |  |
| Friday, February 3, 2023 | UNIT TEST 1 |  |
| Tuesday, February 7, 2023 | 2.3 - Applications of ArrayLists |  |
| Thursday, February 9, 2023 | 2.4 - ArrayList Implementation |  |
| Tuesday, February 14, 2023 | 2.5 – Single-Linked Lists |  |
| Thursday, February 16, 2023 | 2.6 – Double-Linked Lists |  |
| Tuesday, February 21, 2023 | MARDI GRAS HOLIDAY |  |
| Thursday, February 23, 2023 | 2.7 – The Iterator and ListIterator Interfaces |  |
| Tuesday, February 28, 2023 | 2.10 – The Collections Framework Design |  |
| Thursday, March 2, 2023 | 4.1 – The Stack ADT |  |
| Friday, March 3, 2023 | UNIT TEST 2 |  |
| Tuesday, March 7, 2023 | 4.2 – Stack Applications |  |
| Thursday, March 9, 2023 | 4.3 - Stack Implementations | Mid-Term Grades Due |
| Tuesday, March 14, 2023 | 4.5 – The Queue ADT and Applications |  |
| Thursday, March 16, 2023 | 5.1 – Recursive Thinking |  |
| Tuesday, March 21, 2023 | 5.2 – Recursive Definitions and Methods |  |
| Thursday, March 23, 2023 | Examples of Recursive Methods |  |
| Tuesday, March 28, 2023 | UNIT TEST 3 |  |
| Thursday, March 30, 2023 | 7.1 – Sets and the Set Interface |  |
| Tuesday, April 4, 2023 | 7.2 – Maps and the Map Interface |  |
| Thursday, April 6, 2023 | 7.3 – Hash Tables |  |
| Tuesday, April 11, 2023 | SPRING BREAK |  |
| Thursday, April 13, 2023 | SPRING BREAK |  |
| Tuesday, April 18, 2023 | 7.5 – Implementation Considerations |  |
| Thursday, April 20, 2023 | 6.1, 6.2 – Tree Terminology and Tree Traversals |  |
| Tuesday, April 25, 2023 | 6.5 – Binary Search Trees |  |
| Thursday, April 27, 2023 | 6.5 - Binary Search Trees (Cont) |  |
| Tuesday, May 2, 2023 | The Comparable Interface |  |
| Friday, May 5, 2023 | FINAL EXAM | 10:00 AM |