



Course Syllabus: Advanced Structures and Algorithms

McCoy College of Science, Mathematics and Engineering
CMPS 3013 - Section 101
Fall 2026

Course Information

Class hours: 12:30 pm to 1:50 pm, Tuesdays & Thursdays.
Classroom: Bolin 313.

Contact Information

Instructor: Eduardo Colmenares
Office: Bolin Hall, 124B
Office phone: (940) 397-4183
E-mail: eduardo.colmenares@msutexas.edu

Office Hours

Monday: 2:30 pm to 4:30 pm
Tuesday: 8:30 am to 9:30 am
Wednesday: 2:30 pm to 3:30 pm
Thursday: 8:30 am to 9:30 am
Friday: **No office hours**

ZOOM information

[Zoom Link](#)

Course Description

This course provides a rigorous introduction to the design and analysis of algorithms, with an emphasis on evaluating efficiency and correctness. Students will learn techniques for analyzing algorithmic time and space complexity using asymptotic notation.

Topics will be selected from trees, heaps, priority queues, graphs, hashing, sorting, pattern matching, recurrence, and others as appropriate.

Textbook & Instructional Materials

Is the textbook required? The answer is no, however, these books are recommended

1. Textbook name: Introduction to Algorithms
 - Textbook edition: Third Edition
 - Textbook Authors: Cormen et al.
 - Publisher: PHI Learning Pvt. Ltd. (Originally MIT Press); Third edition (February 2, 2010)
 - Paperback: 1312 pages
 - ISBN-10: 9788120340077
 - ISBN-13: 978-8120340077
2. Algorithms Illuminated: Omnibus Edition
 - Author: Tim Roughgarden
 - Publisher : SOUNDLIKEYOURSELF PUBLISHING; 1st edition (September 15, 2022)
 - Language : English
 - Hardcover : 690 pages
 - ISBN-10 : 0999282980
 - ISBN-13 : 978-0999282984

Required Software

Visual Studio 2022. Please remember that Visual Studio is available to MSU students free of charge and is accessible in multiple computer labs in the Bolin Building.

Students are welcome to use Replit **without AI assistance** to develop their programming projects and to build foundational, marketable skills expected of a computer scientist. All projects will be run and graded based on their correctness and behavior when executed in Visual Studio 2022. It is the student's responsibility to ensure that any project successfully developed in Replit executes flawlessly in Visual Studio 2022. Failure to comply with this requirement will result in a poor grade.

Please note that Visual Studio is not the same as Visual Studio Code. Make sure that you understand the difference.

Required Hardware

- Regular traditional PC/Mac. Chromebooks are NOT allowed since they do not work really well with D2L.
- Access to a Printer, white Paper and a stapler.

Study Hours and Tutoring Assistance

Tutoring is available in Bolin 115 Tutor Lab and the Office of Tutoring and Academic Support Programs (TASP) in Moffett Library. A tutor may assist with programs and homework for computer science classes. The tutor cannot do your work.

Student Handbook

Refer to: [Student Handbook](#)

Academic Misconduct Policy & Procedures

Academic Dishonesty: Cheating, collusion, and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). Additional guidelines on procedures in these matters may be found in the Office of Student Conduct.

[Office of Student Conduct](#)

Moffett Library

Moffett Library provides resources and services to support student's studies and assignments, including books, peer-reviewed journals, databases, and multimedia materials accessible both on campus and remotely. The library offers media equipment checkout, reservable study rooms, and research assistance from librarians to help students effectively find, evaluate, and use information. Get started on this [Moffett Library webpage](#) to explore these resources and learn how to best utilize the library.

Grading

Table 1: Points allocated to each assignment

Assignments	Percentage
Test 1	20%
Test 2	20%
Final Exam	22%
Homework	22%
Participation (Quizzes)	10%
Attendance	6%

Table 2: Total points for final grade.

Grade	Points
A	90
B	80 to 89.9
C	70 to 79.9
D	60 to 69.9
F	Less than 60

Homework

This category may have two types of homeworks, in class homeworks (ICH) and take home homeworks (THM). Take-home homework assignments must be completed without the assistance of any AI tools or classmates. The main objective of these assignments is to expose students to situations in which conceptual knowledge, combined with critical thinking skills, results in a functional and valid solution, while developing and strengthening the lifelong, marketable skills expected of a computer scientist.

In-class homework assignments may be designed to be completed on paper or on a laptop. However, during these assignments, the use of AI plugins or AI assistants is strictly prohibited and will result in an automatic grade of zero for the assignment.

Students must be prepared to defend and properly explain any submitted code or homework at any time.

Quizzes

- Quizzes are announced in nature and conducted to evaluate how well the students understand material explained and or assigned in class. There is no make up for quizzes.
- If you arrive to the classroom after a quiz has started, you will not be allowed to take it and an unexcused absence assigned. Please be on time.

Exams

You will have three exams: Test 1, Test 2, and the final exam. These exams constitute 62% of your total grade.

Projects Required

There is no semester project associated with this class.

Mid-Term Exam

You will have what you can consider two midterms, also known as Test 1 and Test 2, worth 20% each, for a combined total of 40% of your grade.

Final Exam

- There is no make-up final exam.
- This exam is worth 22% of your total grade.
- The final exam will take place in our regular classroom (unless decide otherwise by the University). It is the student's responsibility to keep track of the designated date, time. A complete list of all MSU exams (by time) can be found at [Final Exam Schedule](#).
- The date of our final exam is on Thursday, December 10, from 10:30 am to 12:30 pm.

Extra Credit

There is no extra credit work of any kind.

Late Work

Nothing will be accepted late. Please refer to the "**Instructor Class Policies**" section for full and complete details.

Make Up Work/Tests

Tests

Tests are comprehensive in nature. No make-up exams will be given, except for the following cases:

- Properly documented Surgery, Medical Emergency, Death in the family, Presentation at a Conference, some others as determined by the instructor.
- If you miss an exam then you need to notify the instructor and demonstrate with the proper official documentation (signatures, seals, contact information) that an emergency that you could not circumvent existed. This documentation must be presented not later than 24 hours after the test. The date on the documentation must match the date of the exam that you missed.
 - a. Students who miss an exam due to University business should notify the instructor in advance, and present the sponsoring university member's written justification.
 - b. If your instructor cannot verify or validate the given documentation, then it will consider invalid and no make-up exam will be given.

If you do miss an exam and your case fall in one of the categories above this means that you have a properly documented case. Your instructor will proceed to assign a temporary grade of zero, which will be substituted for your excused test grade (Final Exam). However, this substitution can only be performed once during the semester. Exams are uniquely composed for each term.

Important Dates

- Last day for term schedule changes: Check date on [Academic Calendar](#).
- Deadline to file for graduation: Check date on [Academic Calendar](#).
- Last Day to drop with a grade of "W:": Check date on [Academic Calendar](#).
- Refer to: [Drops, Withdrawals & Void](#)

Desire-to-Learn (D2L)

Extensive use of the MSU D2L program is a part of this course. Each student is expected to be familiar with this program as it provides a primary source of communication regarding assignments, examination materials, and general course information. You can log into [D2L](#) through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

Attendance

- Attendance is a component of the course grade (six percent). Each student will begin with 100 points for their attendance grade. For each additional

unexcused absence 33.33 points will be subtracted from the attendance grade.

- Your instructor will go over the class roster at the beginning of class and will call the students by name, if the student is not present at that time, an absence will be given and not removed after arrival. Arriving late will be considered unexcused absence. The Attendance grade is 100% under the student's control.
- After five (5) unexcused absences the student will be dropped from the class. This can happen during any week of the semester in course (To be enforced).
- Additional class attendance related MSU Policies apply.

Computer Requirements

For this class, you are not required to buy a laptop. However, if the instructor announces an ICH (In Class Homework) or ICA (In Class Activity), you are responsible for:

- a. Bringing a laptop with all necessary programs properly installed, configured and tested.
- b. Bringing the laptop's charger: If you do not bring your charger and cannot complete the assignment(s) because your battery died, then your grade will not be a good one.
- c. Make sure that you have a fully working and in-classroom tested Wi-Fi capabilities. If you cannot submit your homework because your Wi-Fi does not work, then your grade will not be a good one.
- d. Students may complete programming assignments on their personal computers or one of the campus computers. C++ is available in Bolin labs 103 and 119. Bolin 103 is also used as a classroom, see availability posted outside the classroom door. Bolin 119 is open 8-5 M-F. There is also a computer lab in Clark Student Center that is open 24/7, and a lab in Moffett Library that is open during library hours.
- e. Technical difficulty will not be considered a valid reason for a late submission. Computers are available on campus in various areas, as well as the Academic Success Center.

Recording Classes

Class recordings are not allowed.

Instructor Class Policies

No Procrastination Policy

Students are strongly encouraged to contact the instructor during office hours to clarify questions associated with lectures, exams, assignments, presentations, quizzes, homework, etc. Questions are more than welcome from the moment the assignments, projects, quizzes, exams are either released or announced, however, all questions stop the day before the assignment, exam, quiz, presentation is due. This rule is designed to promote responsible time management and personal organization.

Assignments - Late Policy & Deadlines

- Submitted work is due when specified, as specified (format) by the instructor. It is in the student's best interest to keep track of all deadlines.
- The instructor is not required to remind students of ANY date and/or deadline associated with tests, homework, reports, project assignment, etc.
- **Late assignments WILL NOT BE ACCEPTED. This rule will be enforced**
 - **What does it mean to be late?** Answer: for example, if your assignment is due today at 8:00 am and you attempt to deliver your report by 8:00:01 am (1 second late) then it will be considered late. There will not be exemptions of any kind.
 - **Assignments MUST be submitted to the corresponding Dropbox via D2L before it closes (deadline).** If the Dropbox has closed and you cannot upload your assignment to it, then you are late and your assignment will not be accepted.
 - Students will have more than enough time to complete their assignment on time.
 - Internet outage, computer problems, car problems, work, and several others are NOT a valid excuse for a late delivery.
- Very Important: Before you submit any file, take your time and double OR triple check that
 - a. You are uploading the correct and ALL necessary files
 - b. Your work is correct at the best of your abilities
 - c. Failure to fulfill (a) and (b) ON TIME, WILL NOT excuse you from a bad grade.

Additional Office Hours & Meeting Policies

In order to protect your wellbeing and the one of those that you care about, the following preventive measurements will take place:

- a) Office hours may be conducted virtually via Zoom. To request a virtual meeting, students must email the instructor in advance and include their first and last name, course name, and several possible meeting times. Requested times must fall within the office hours listed at the beginning of this syllabus. Virtual office hours are not additional office hours; they are held during the instructor's scheduled office hours. After receiving the request, the instructor will send a Zoom invitation. Please refer to this syllabus for detailed office hour information.
- b) Your instructor will not touch any computer or USB Drive. NO Exemptions.
- c) If at some point you need/want me to look at your programming assignment or class project, you can do it by sharing your desk via ZOOM (Virtually) during office hours.
- d) Questions associated with ADVISING, degree plans, etc., will be addressed (Virtually-ZOOM) during office hours.

- e) The faculty member is open and available to face to face meetings if the student is in good health condition and not showing symptoms of running nose, sneezing, coughing, flu, covid, streptococcus, etc.

Excusing Late Work

Any document used to excuse the late delivery of an assignment MUST be presented no longer than one week from the corresponding missed deadline. Valid excuses (Surgery, Medical Emergency, Death in the family, and Presentation at a Conference). Failure to fulfill this requirement will make null the excuse, leading to a permanent grade of zero in the corresponding assignment.

Additional Grade Policy

Once the grades, have been either returned to the students, or published via D2L, the student will have one week to examine them and check for inconsistencies, errors, etc. After the one week window of opportunity all grades will become PERMANENT and WILL NOT change. It is not only the student's responsibility to check the accuracy of his/her grades, but also in his/her best interest to do it. This rule DOES NOT apply to the final exam because the final is exam triple checked by the instructor before publishing the grade.

Policy on Testing Process

The Department of Computer Science has adopted the following policy related to testing.

- a) All bags, purses, electronics (turned off), books, etc. will be placed in the front of the room during exams, or in an area designated by the instructor.
- b) Unless otherwise announced by the instructor, nothing is allowed on the desk but pen/pencil/eraser and test papers.
- c) You are not allowed to leave the classroom. Please take this seriously and into consideration before any test and the final. Prepare yourself to be in the classroom during the entire exam.
- d) If you decide to leave the classroom during a test and/or the final exam, your exam will be collected, and you will not be allowed to continue.

Late Arrival to Tests and/or Final Exam

Be aware that this is an additional day of class, and arriving late will be considered an unexcused absence. You will receive an absence if you arrive late. However, if you arrive after the first student has submitted the exam, you will not be allowed to take the exam. No make-up exam will be given, and a permanent grade of zero will be assigned for the missed test or exam.

Computer Science Academic Misconduct Policy & Procedures

Cheating, collusion, and plagiarism (the act of using source material of other persons, devices, AI Generators, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). The Department of Computer Science has adopted the following policy related to cheating (academic misconduct). The policy will be applied to all instances of cheating on assignments and exams as determined by the instructor of the course. (See below for link to MSU definitions.)

- 1st instance of cheating in a course: The student will be assigned a non-replaceable grade of zero for the assignment, project or exam. *If the final grade in the course, does not result in a one letter grade reduction, the student will receive a one letter grade reduction in course.*
- 2nd instance of cheating in a course: The student will receive a grade of F in course & immediately be removed from course.
- All instances of cheating will be reported to the Department Chair and, in the case of graduate students, to the Department Graduate Coordinator.

Note: Letting a student look at your work is collusion and is academic misconduct!

Can I use AI to solve my homework and/or project: The answer is NO, this is also an academic misconduct!

See Also: [MSU Student Handbook](#): Appendix E: Academic Misconduct Policy & Procedures.

Change of Schedule

A student dropping a course (but not withdrawing from the University) within the first 12 class days of a regular semester or the first four class days of a summer semester is eligible for a 100% refund of applicable tuition and fees. Dates are published in the Schedule of Classes each semester.

Refund and Repayment Policy

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs. As described below, two formulas (federal and state) exists in determining the amount of the refund. (Examples of each refund calculation will be made available upon request).

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through Disability Support Services, located in the Student Wellness Center, (940) 397-4140. Current documentation of a disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to [Disability Support Services](#).

Emergency Aid Resources for Basic Needs

Unexpected life circumstances can affect anyone. If you are experiencing challenges meeting basic needs—such as housing, utilities, food, transportation, healthcare, technology, textbooks or other life necessities, resources may be available to help. Visit the [Student Emergency Support and Resources webpage](#) to learn more, and explore emergency support opportunities through MSU and how to access them. For additional information, please contact the Office of Student Affairs: Clark Student Center #108, (940) 397-7500, student.affairs@mstuexas.edu.

College Policies

Campus Carry Rules/Policies

Refer to: [Campus Carry Rules and Policies](#)

Smoking/Tobacco Policy

Midwestern State University seeks to provide a safe, healthy, pleasant environment for its faculty, staff, and students. To this end, the use of tobacco products, including smoke and smokeless tobacco, and the advertising, sale, free distribution, and discarding of tobacco products shall be prohibited in all indoor and outdoor facilities and in all university vehicles. The policy extends to faculty, staff, students, vendors, guests, and visitors.

Alcohol and Drug Policy

To comply with the Drug Free Schools and Communities Act of 1989 and subsequent amendments, students and employees of Midwestern State are informed that strictly enforced policies are in place which prohibits the unlawful possession, use or distribution of any illicit drugs, including alcohol, on university property or as part of any university-sponsored activity. Students and employees are also subject to all applicable legal sanctions under local, state and federal law for any offenses involving illicit drugs on University property or at University-sponsored activities.

Campus Carry

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes has prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit [Campus Carry](#).

Active Shooter

The safety and security of our campus is the responsibility of everyone in our community. Each of us has an obligation to be prepared to appropriately respond to threats to our campus, such as an active aggressor. Please review the information provided by MSU Police Department regarding the options and strategies we can all use to stay safe during difficult situations. For more information, visit [MSUReady – Active Shooter](#). Students are encouraged to watch the video entitled “Run. Hide. Fight.” which may be electronically accessed via the University police department’s webpage: ["Run. Hide. Fight."](#)

Classroom Civility

All violations of classroom civility will be reported to the Dean of Students. Students are expected to assist in maintaining a classroom environment that is conducive to learning. In order to ensure that all students gain from time spent in class, students are prohibited from engaging in any form of distraction, e.g. leaving the room for extended periods of time, reading newspapers (or other articles), working on other courses, and using cell-phones or laptops for calls or messages. If you indulge in any such inappropriate behavior (without explicit consent of the instructor), you will (at the very least) be asked to leave the classroom. [MSU Dean of Students Website](#).

Research and Creative Activity Opportunities at MSU

EURECA

Enhancing Undergraduate Research Endeavors and Creative Activities (EURECA) is a program that provides opportunities for undergraduates to engage in high-quality research and creative activities with faculty. EURECA provides incentives and funding through a system that supports faculty and students engaged in collaborative research and creative works. For more information contact the Office of Undergraduate Research at (940) 397-6274 or by email at eureca@msutexas.edu or better yet, stop by the UGR office located in the atrium of the Clark Student Center, room 161. Information and resources are also available at [Eureca's website](#)

UGROW

Like EURECA, Undergraduate Research Opportunities and Summer Workshop provides opportunities for students to conduct research with faculty. However, the research occurs in the summer. For five weeks UGROW students experience the authenticity of scientific research as well as research and creative activities in art, music, theater education, business, health and social sciences, English, history, etc. in a highly interdisciplinary environment. Students work on projects of their choice and present their findings at the end of program and the MSU Undergraduate Research and Creative Activity Forum. Faculty members will introduce their research ideas February 13th, 2019, at 5:00 p.m., Comanche Suites, Clark Student Center. A break-out session with individual faculty members will follow. If you have any questions, contact the Office of Undergraduate Research at (940) 397-6274 or by email at eureca@msutexas.edu. More information and resources are available at [ugrow's website](#).

Grade Appeal Process

Update as needed. Students who wish to appeal a grade should consult the Midwestern State University [MSU Catalog](#)

***Notice:** Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructor.

Precautions for Covid, Flu, Streptococcus, or any respiratory disease.

You are not obligated to wear a mask, however, if you wish to show courtesy and help protect the well-being of your classmates, please feel free to wear one. This would be greatly appreciated.

Tentative Agenda

The instructor reserves the right to add, remove, reorder topics, as he considered convenient towards the benefit of the class.

- 1) Course Information; Specifications; Expectations
- 2) Opening Files
- 3) Recursion Review
- 4) Pointer Review
- 5) Dynamic Linked List Structures
- 6) Stack Review
- 7) Queue Review
- 8) Analysis
- 9) More on Analysis
- 10) Recurrence Relations
- 11) Trees (spec and basic operations)
- 12) Trees (implementation)
- 13) Binary Search Tree

- 14) AVL Trees
- 15) Red-Black Trees
- 16) B-Trees
- 17) Review $O(n^2)$ Sorts
- 18) Merge Sort
- 19) Quick Sort
- 20) Radix and Counting Sort;
- 21) Heaps
- 22) Heapsort
- 23) Intro to Graphs
- 24) Graphs (spec and basic operations)
- 25) Graphs (complex operations); Graph implementation 1
- 26) Graph Implementation 2
- 27) DFS
- 28) BFS
- 29) A* Search
- 30) Topological Sort
- 31) Hash Tables