

# Math 243 – Discrete Mathematics in Computer Science

**Term:** Spring 2020

**Section:** 003 ; M W 4:00–5:15

**Text:** Online interactive textbook  
from zyBooks

**Websites:** <http://math.arizona.edu/~cjewell/243>  
<http://learn.zybooks.com>

**Instructor:** Chris Jewell

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**Office Hours:** Tue 9:00–10:00

Wed 2:00 – 3:00

Thu 4:00–5:00

Thu 12:00–1:00 (tutoring room)

## Course Description, Objectives, and Expected Learning Outcomes

This course is focused on how to think and use abstract structures in the context of useful, discrete mathematics relevant to computer science. Topics include: Set theory, logic, discrete structures, induction and recursion, graphs and networks, and techniques of proof.

### Course Objectives

- To apply mathematical tools to obtain quantitative information relevant to decision making.
- To promote problem-solving and critical thinking skills.
- To prepare students for subsequent work in Computer Science/Computer Engineering.
- To develop logic and proving skills.
- To develop effective communication skills.
- To promote the ability to work as part of a team.
- To help strengthen students' general academic skills.

### Expected Learning Outcomes

By the end of the course, students should be able to:

- recognize and use set notation to describe sets
- create valid proofs (or disproofs) of mathematical propositions
- identify valid and invalid logical arguments
- solve problems involving factors and multiples of positive integers
- identify properties of a given relation
- solve problems using mod  $p$  arithmetic
- identify loop invariants
- use big-Oh notation to characterize the growth of given functions
- use mathematical induction to prove statements about integers
- represent relations using graphs, matrices, and sets
- find the explicit formula for a recurrence relation using the characteristic equation

## Attendance

Attendance of each class meeting is expected from every student. Participating in the course and attending lectures is important to the learning process. While no points/portion of the final grade calculation is directly tied to attendance, absences may negatively affect a student's final course grade. Students who miss the first class meeting may be administratively dropped unless they have made other arrangements. In addition, students with an excessive amount of unexcused absences may be administratively dropped from the course.

- The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>
- The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable <http://policy.arizona.edu/human-resources/religious-accommodation-policy>
- Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. <https://deanofstudents.arizona.edu/absences>

It is the student's responsibility to notify the instructor in advance of an absence related to religious observation or an activity for which a Dean's excuse has been granted, and to arrange for how any missed work will be handled. It is also the student's responsibility to keep informed of any announcements made during scheduled classes.

## Required Texts and Materials

### Textbook

This course will utilize an online interactive textbook from zyBooks.

To access the online textbook:

1. Create an account (or sign-in if you already have an account) at [learn.zybooks.com](http://learn.zybooks.com)
2. Enter zyBook Code

**ARIZONAMATH243JewellSpring2020**

3. Subscribe

A subscription will include access to online course material until May 28, 2020.

### Calculators

A calculator is a useful tool and may be helpful for portions of this course. You may be required to complete some coursework without a calculator, including but not limited to, some exams.

## **Communication with Students**

If it is necessary to make announcements or disseminate other important course information outside of normal class meetings, such information will be sent to each student's official University email. It is the student's responsibility to check for messages and announcements regularly.

Email communication is written communication and is expected to be conducted with the proper level of decorum. This does not mean that each email needs to be overly formal, but it does mean that an attempt at proper spelling, grammar and etiquette should be made. Please keep this in mind when initiating email contact.

## **Academic Integrity**

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog.

<http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

## **Classroom Behavior Policy**

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

The use of personal electronics such as laptops, iPads, and other such mobile devices is distracting to the other students and the instructor. Their use can degrade the learning environment. Therefore, students are not permitted to use these devices during the class period.

## Other Relevant University Policies Relating to Conduct

- **Threatening Behavior Policy**

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself.

<http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>

- **UA Nondiscrimination and Anti-harassment Policy**

The University is committed to creating and maintaining an environment free of discrimination.

<http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

## Accessibility and Accommodations

It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or other limitations, please contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu/>) to establish reasonable accommodations.

## Grades

### Breakdown of points:

Class Prep/Participation	50 points
Homework	150 points
In-class exams total	300 points
Final exam	200 points
<hr/> Total possible points	<hr/> 700 points

Grades will be no lower than those set forth in the following scale

<b>A</b>	if you earn at least 630 points
<b>B</b>	if you earn between 560 and 629 points
<b>C</b>	if you earn between 490 and 559 points
<b>D</b>	if you earn between 420 and 489 points
<b>E</b>	if you earn less than 420 points

## Withdrawal

A student may withdraw from the course (using UAccess) with a deletion from record through January 28, 2020, or may withdraw with a grade of "W" through March 31, 2020.

## Homework/Quizzes

Homework and quizzes together represent 150 points of your final grade. Written homework assignments can be found by following the “Course Calendar/Homework Assignments” link from the course homepage. You will find a calendar view of the semester with links to the assignments, each in the form of a pdf file. You are expected to print the relevant assignment, and complete your work on those sheets.

It is strongly recommended that you attempt (and complete) more problems than the minimum required for credit. At the end of each section in the zyBooks text there are additional problems that you are encouraged to complete. Many of these have the solutions available so that you can check the accuracy of your solution and gauge your personal level of mastery of the material. These problems are suggested and, as the name implies, these are problems which should be done for your benefit, but will not be collected. Even though you will not receive any direct credit for the recommended problems, doing them will pay dividends as they will help solidify some concepts and provide feedback on your progress.

At the end of the course, roughly 10% of the lowest homework scores (including missing assignments) will be dropped. The subtotal of the remaining scores will then be scaled to a score out of 150 points. Other in-class assignments or quizzes may also be given and counted in the written homework portion of the homework/quiz score.

Discussion of homework problems (“working together”) is encouraged, but each student is required to write his/her OWN solutions. Students are advised to seek help whenever needed and are encouraged to ask questions during office hours and to use the free tutoring available.

Specific homework procedures, policies, and instructor pet peeves involving homework can be found on the separate *Homework Procedures* document.

**Homework is an essential component of the course, whether it is assigned for grading or not. Do lots of problems!**

The intent of the homework assignments is to give you some practice with the material and to provide an opportunity for feedback prior to taking an exam. You should treat all required and optional assignments and problems in this manner— it is a learning experience for you. Ultimately you are in this class to learn the material. It is a bad mistake to become overly (or only) concerned with receiving as many points as possible on each assignment. Obviously, everyone wants as many points as possible, but earning those points is best done as a consequence of **knowing the material**. It may sound overly cliché, but if you are only concerned with getting points by any means necessary (liberal use of “help” from other sources), you are ultimately only cheating yourself.

## In-class Exams

There will be three in-class exams. All exams are closed-book and closed-notes. The exams are *tentatively* scheduled for Monday, February 24; Wednesday, April 1; and Wednesday, April 29. Each test will be worth 100 points. The exact dates of the in-class exams will be announced in class at least one week in advance. Any questions regarding the grading of exams need to be cleared up within one week after the exam has been returned.

## Missed Exams

Students are expected to be present for all exams. If a verifiable emergency arises which prevents you from taking an in-class exam at the regularly scheduled time, you must notify me as soon as possible, and in any case, prior to the next regularly scheduled class. Make-up exams will be administered only at the discretion of the instructor. If a student is allowed to make up a missed exam, (s)he must take it at a mutually arranged time. No further opportunities will be extended. Failure to contact me as stated above or inability to produce sufficient evidence of a real emergency will result in a grade of zero on the exam.

## Final Exam

There is a comprehensive common final exam. The final exam is worth 200 points of your final course grade. As scheduled by the University (<http://www.registrar.arizona.edu/schedules/finals.htm>), the Final Exam is on **Friday, May 8 from 3:30 to 5:30 p.m.** Do not arrange to leave town prior to this date as this exam will only be given on the date scheduled by the University. The University's Exam regulations (<https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information>) for final exam week will be strictly followed.

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Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor. In particular, the dates of midterm exams, the number of exams, and the order in which topics are covered may differ from the dates and arrangement in the tentative weekly schedule.