

# CMPSC 360 - Discrete Mathematics for Computer Science

(3 Credits) Prerequisite(s): CMPSC 122

This course covers discrete mathematics and foundations for modern computer science. Topics include sets, relations, logic, algorithms, graphs, finite state machines and regular expressions. Specific course information follows below.

## Instructor Information

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Office Hours: Monday 11 am - 12:15 pm

## Overview

This course covers the concept and techniques used in computer science and engineering and their applications. Topics include:

- Logic and Proofs (propositional logic, predicate logic, logical equivalence, direct proofs, proofs by contradiction and contraposition, proof by induction, and strong induction)
- Modular Arithmetic (congruence relations, Euclid's GCD algorithm and multiplicative inverses, the RSA cryptosystem, and error-correcting codes)
- Graphs (basics and properties of graph theory and trees)
- Basic set theory
- Sequence
- Recursion
- Functions
- Relations
- Counting techniques

## Course Objectives

After completing this course you will be able to:

1. utilize mathematical reasoning to solve problems related to computer science and engineering.
2. express ideas

- a. abstractly (suppress nonessential details) and
- b. precisely (rigorously)
3. solve problems using mathematical modeling.
4. demonstrate algorithmic thinking.

## Questions and Class Discussion

Rather than emailing questions to the teaching staff, you are encouraged to post your questions on “Discussions” on Canvas.

## Required Course Materials

**Textbook:** Discrete Mathematics and Its Applications(8th Edition) by Kenneth Rosen ISBN: : 978-1-259-67651-2

**Supplementary Textbook and Notes:** [Book of Proof \(3rd Edition\) by Richard Hammack](#) ISBN: 9780989472128

**Lectures:** Two or three video lectures will be posted to Canvas every week.

**Canvas:** All course reading material, assignments, solutions, and grades will be posted on Canvas. You are expected to login to Canvas daily.

## Library Resources

Many of the University Library resources can be utilized from a distance. Through the Libraries website, you can

- access magazine, journal, and newspaper articles online using library databases;
- borrow materials and have them delivered to your doorstep — or even your desktop;
- get research help via e-mail, chat, or phone using the [Ask a Librarian service](#);
- and much more.

You can view the [Online Students' Library Guide](#) for more information.

You must have an active Penn State Access Account to take full advantage of the Libraries' resources and services. Once you have a Penn State account, you will automatically be registered with the library within 24–48 hours. If you would like to determine whether your registration has been completed, visit the [Libraries home page](#), click on Library Accounts, and then click on My Library Account.

## Technical Requirements

Please make sure you meet the [technical requirements for online courses](#).

# Course Requirements and Grading

## Collaboration and Honesty Policy

Collaboration on homework problems is permitted. If you choose to collaborate on some problems, you are allowed to discuss each problem with at most 2 other students currently enrolled in the class. Before working with others on a problem, you should think about it yourself for at least 45 minutes. Finding answers to problems on the Web or from other outside sources (these include anyone not enrolled in the class) is strictly forbidden. No collaboration whatsoever is permitted on optional problems and exams. You must read and sign Collaboration and Cheating Policy. Please keep one copy of the handout for your records. Violations of this policy will be dealt with according to University regulations (see Senate Policy 49-20 on Academic Integrity).

## Quizzes

There will be a quiz every week (except Week 1). The quiz will open every Wednesday at 8:00 PM and close at 10:00 pm (EST) and it will be based on the previous two class lectures (except Quiz 2). The lowest quiz grade will drop for final grade.

## Homework

There will be an assignment due every Thursday. Homework must be submitted on Thursday no later than 11:00 PM. After 11:00 PM on Thursday, no homework will be accepted. Every Monday you will be able to see your HWs grade. You will get 24 hours to regrade request. After the end of Tuesday, we will not accept any regrade requests. The lowest homework score will be dropped when calculating final grades. You should be as clear and concise as possible in your write-up of solutions. This is as desirable as correctness because the communication of technical material is an important skill. A simple, direct analysis is worth more points than a convoluted one because it is simpler and less prone to error and is easier to read and understand. Points might be subtracted for illegible handwriting and for solutions that are too long.

Incorrect solutions will get from 0 to 30% of the grade, depending on how far they are from a working solution. Correct solutions with possibly minor flaws will get 70 to 100%, depending on the flaws and clarity of the write-up. Some homework assignments will include optional problems. Later, if you ask an instructor for a recommendation or express an interest in working on a research project with her, she will definitely check how well you did on the optional problems.

## Exams

The midterm and final exams will be given online and proctored through Examity. Please read all instructions under the Examity tab in the course menu and complete the Examity pretest prior to your first exam.

This course may require you to take exams using certain proctoring software that uses your computer's webcam or other technology to monitor and/or record your activity during exams. The proctoring software may be listening to you, monitoring your computer screen, viewing you and your surroundings, recording and storing any and all activity (including visual and audio recordings) during the proctoring process. By enrolling in this course, you consent to the use of the proctoring software selected by your instructor, including but not limited to any audio and/or visual monitoring which may be recorded. Please contact your instructor with any questions.

## Grading Distribution

Category	Percentage
Homeworks	30%
Quizzes	10%
Midterm Exam	30%
Final Exam	30%

## Grading Scale

The following table shows the minimum numerical score/percentage needed for a given letter grade.

Grade	Percentage
A	93
A-	90
B+	87
B	83
B-	80
C+	77
C	70
D	60
F	0

Important Note: Do not rely on Canvas to calculate your grade. Consider Canvas as a place where grades are stored. Canvas will most likely not calculate your grade properly.

## Academic Integrity

Academic integrity is the pursuit of scholarly activity in an open, honest, and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, students should act with personal integrity, respect other students' dignity, rights, and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts. Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation, or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others (see [Faculty Senate Policy 49-20](#), [G-9 Procedures](#) and the [Code of Conduct](#)).

A lack of knowledge or understanding of the University's Academic Integrity policy and the types of actions it prohibits and/or requires does not excuse one from complying with the policy. Penn State and the College of Engineering take violations of academic integrity very seriously. Faculty, alumni, staff and fellow students expect each student to uphold the University's standards of academic integrity both inside and outside of the classroom.

In addition to the University Academic Integrity regulations, you are also expected to follow the [Academic Integrity Standards for CMPSC, CMPEN, and CSE Programming Courses](#).

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## Accommodating Students with Disabilities

Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has resources for students with disabilities. The [Student Disability Resources \(SDR\) website](#) provides [contacts for disability services](#) at every Penn State campus. For further information, please visit the [SDR website](#).

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability resources office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation based on the [documentation guidelines](#). If the documentation supports your request for reasonable accommodations, your campus's disability resources office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. You must follow this process for every semester that you request accommodations.

## Additional Policies

Counseling and Psychological Services

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional well-being. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

[Counseling and Psychological Services at University Park \(CAPS\)](#) : 814-863-0395

Counseling and Psychological Services at [Commonwealth Campuses](#)

Penn State Crisis Line (24 hours/7 days/week): 877-229-6400

Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

## Educational Equity/Reporting Bias

Penn State takes great pride to foster a diverse and inclusive environment for students, faculty, and staff. Acts of intolerance, discrimination, or harassment due to age, ancestry, color, disability, gender, gender identity, national origin, race, religious belief, sexual orientation, or veteran status are not tolerated and can be reported through Educational Equity via the [Report Bias webpage](#).

## Copyright Statement

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