CSE 191
Introduction to Discrete Structures

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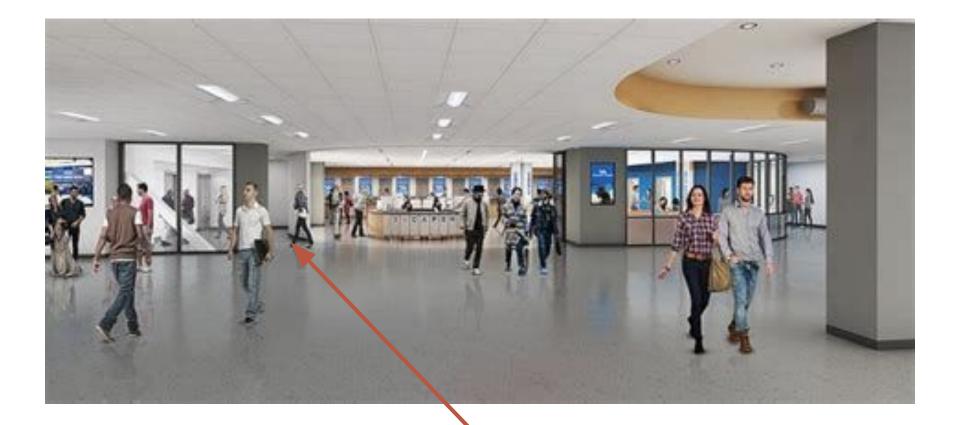208 Capen Hall

Course Introduction

Instructor

Eric Mikida

Email: epmikida@buffalo.edu
- Try to keep course discussions on Piazza
- If you do email, make sure to include [CSE 191] in the subject

Office: Capen 208 (inside of 212 Capen)

Teaching Assistants and Office Hours will be announced on Piazza

Take the elevators next to 1Capen to 2, then turn right.

Logistics

- **Course Website**
  - cse.buffalo.edu/~epmikida/teaching/sp23/cse191
  - All course materials, links, schedule, extra resources
- **Course Forum (Piazza)**
  - piazza.com/buffalo/spring2023/cse191c
  - All discussion for the course is hosted here – check regularly
- **UBLearns**
  - Assignment submission, quizzes, grades

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Please keep class discussions on Piazza (private/anonymous posts exist)
Always include [CSE 191] in the subject line when emailing

Grading

Grade Breakdown:

- Homework: 35%
- Quizzes/Particpation: 10%
- Midterm: 25%
- Final Exam: 30%

Score (x)	Letter Grade	Quality Points
90% ≤ x ≤ 100%	A	4
85% ≤ x < 90%	A-	3.67
80% ≤ x < 85%	B+	3.33
75% ≤ x < 80%	B	3
70% ≤ x < 75%	B-	2.67
65% ≤ x < 70%	C+	2.33
60% ≤ x < 65%	C	2
55% ≤ x < 60%	C-	1.67
50% ≤ x < 55%	D	1
0% ≤ x < 50%	F	0

Written Homeworks

Written homework assignments
- Mostly bi-weekly (some may be weekly depending on difficulty)
- Can be submitted at most 24-hours late for a 25% penalty
  - (by 11:59PM ET the next day)
- You are responsible for generating an appropriate submission
  - We will collect all written work in PDF format
  - If your submission does not load properly, you will receive a 0
    - Download and open your submitted work to make sure you submitted in correct format, correct work, and a legible file

Attendance/Participation Quizzes

Attendance in lecture and recitation is not mandatory

Course Participation is tracked by weekly quizzes

- Released every Friday on UBLearns
- Covers material covered during that week
- Quiz will open on UBLearns at the start of class
- Due at the end of the day (11:59PM)

Exams

One In-Class Midterm (Wednesday March 8)
- Content covered is roughly Weeks 1- 5 in the syllabus
- More details as exam approaches

One Final Exam (Monday May 16, 3:33-6:30, Davis 101)
- Comprehensive, covering any topics from throughout the semester
- Check for conflicts ASAP
- If HUB changes the date/location…trust the HUB

If you need accommodations, contact [Accessibility Resources](#) ASAP

Academic Integrity

Collaboration, AI, Extra Resources

Do...

- Work together to brainstorm ideas
- Explain concepts to each other
- Discuss course content
- Include a list of your collaborators on all submitted work

Do Not…

- Write solutions when working together
- Describe the details of solutions to problems
- Leave your work in a place where it is accessible to another student

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When in doubt, ask a member of the course staff!

Resource Policy

Do…
- Use materials provided by course staff (Piazza, Class, OH)
- Use materials from the course textbook or readings
- **Cite** all materials you reference for written work

Resource Policy

Do NOT…
- Reference random videos on YouTube that "helped you solve the problem"
- Hire "private tutors"
  - Save the money from Chegg
  - If you're not doing the work yourself, you're not learning
- Reference exact solutions found online

If you are caught using unauthorized resources, you get an F

Other Ways to Get an F

- Work in a group by assigning each person to a problem

- Copying your friend's homework because you forgot
  - Each homework is not worth a lot on its own

- Sharing your homework with your friend
  - I have no way to know who did the work and who shared

- Submitting work without citations
  - Citing outside work will help you avoid AI repercussions
  - (we grade you on the work you did, but you won't get an AI violation)

Other Ways to Get an F

You are liable/punishable if someone else submits your work as their own.

Ways to Avoid an F

Don't Cheat…

Ways to Avoid an F (amnesty policy)

Don't Cheat...but we understand mistakes are made.

We will grant amnesty for any AI violation **IF** you tell us about it **BEFORE** we discover it

Why does Academic Integrity Matter?

Solutions may exist due to the simplicity of the problems
- Exercises try to force you to think a certain way
- Learning requires simplified/limited problems

You will not understand the design process from a solution
- Experience solving problems isn't obtained from reading solutions
- Anyone (who can read and write) can do copy-paste

Exact solutions to every problem don't always exist
- Stack Overflow/ StackExchange (and similar platforms) cannot do your job
- Open source solutions may not do what you need
- Depending on licensing, you can't always use open source solutions in closed source

Why does Academic Integrity Matter?

But it doesn't JUST hurt you...it also hurts the credibility of UB and its graduates!

Utilizing Resources

Interact with the course staff regularly!

- Don't search Google for answers when you can instead ask on Piazza
  - You will get a better understanding of the problems
  - You will get assistance that is specific to the context of this course
- Attend office hours
  - Come with specific questions in mind
  - Do not expect us to review your work to find your question

How to ask a question

First…check if the answer exists (syllabus, Piazza, course website)

Then…

Ask in lecture, recitation, Piazza, or office hours

Come prepared, form the question carefully, many times you will answer your own question in the process!

Thinking through your question is a great first step.

Discrete Structures

What is Discrete Structures?

Discrete: consisting of **distinct** or **unconnected** elements; noncontinuous [Merriam-Webster Dictionary]. For example:

- Number of students in class
- Integers
- Anything digital

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Opposite of continuous
(which would include things like real numbers, a person's height, etc)

What is Discrete Structures?

Structure: something that is constructed (in a definite pattern of organization) [Merriam-Webster Dictionary]

What is Discrete Structures?

Discrete Structures: The study of discrete, mathematical structures.

Discrete mathematics is the study of mathematical structures that are fundamentally discrete rather than continuous. [Wikipedia]

Discrete mathematics is the part of mathematics devoted to the study of discrete objects. [Rosen]

Why study it?

- We will learn proof methodology, i.e., how to reason, which is fundamental for CS and CEN.
- Provides the mathematical foundations for many CSE courses
  - **Data structures**, **Algorithms**, computer security, network systems...
- Concepts introduced in this course are widely used to solve problems in optimization, chemistry, biology, engineering, and so on.
- The problems and exercises studied in this course force you to think!

Topics

- Propositional and Predicate Logic (AI, ML, System and Software Specification)
- Logical inferences and mathematical proofs (Why do we need proof!)
  - Mathematical induction
  - Proof by contradiction and case analysis
- Sets and set operations
- Strings
- Functions and relations
- Counting methods
- Sequences and summations
- Graph and tree properties (networks)
- Regular languages (pattern matching, compiler)
- Formal languages, regular expressions, finite automata

Questions?