

# CS 212: Discrete Structures

**Term:** Spring 2022  
**Credits:** 3  
**Meets:** 12:40 PM – 1:40 PM, MWF in HS 202  
**Prerequisites:** CS 262 and Math 171 OR Math 206, all with a grade of C or better.

## Classroom Mask Requirement

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All students are required to wear an appropriate mask that covers their mouth and nose when they're in the classroom. They must also adhere to additional expectations communicated by the instructor or posted in the classroom. Note: UWO procedure dictates that, during the COVID-19 pandemic, an instructor cannot begin class until all students are wearing a mask properly. If a student is non-compliant with the masking policy and refuses to leave the classroom promptly when requested, the instructor is required to cancel class. Students responsible for class cancellation for these reasons will be referred to the Dean of Students office, and the student will be unable to attend class until they meet with the Dean of Students. The student may be dropped from the class by the Dean of Students.

## Instructor

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**Instructor:** Scott Summers  
**Email:** [summerss@uwosh.edu](mailto:summerss@uwosh.edu)  
**Phone:** 920-424-1324  
**Office:** Halsey 220  
**Office hours:** Indicated by the cells shaded in gray in the following table and subject to change.

	Mon	Tues	Wed	Thu	Fri
9:00 AM					
10:10					
11:10					
12:00 PM					
1:40					
2:40					

## Course Description

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This course focuses on discrete mathematical structures that are essential to computer scientists. In this course, students will develop their analytic and algorithmic thinking skills through practice with propositional and first-order predicate logic, various proof techniques, mathematical and structural induction, sets, functions, sequences, recurrence relations, algorithm analysis and computational complexity, the basics of counting, and an introduction to discrete probability.

## Course Website

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The course website is: <https://uwosh.edu/canvas/>. You should check Canvas on a regular basis, perhaps two or three times per day.

## Required Textbook

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We will be using an online “zyBook” textbook. Follow these instructions:

1. Sign in or create an account at <http://learn.zybooks.com/>.
2. Enter zyBook code UWOSHCOMPSCI212SummersSpring2022.
3. Subscribe.

A subscription is **\$58**. You may begin subscribing on Dec 18, 2021. Subscriptions will last until June 14, 2022.

## Course Grade

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Your final course grade will be based on the following components.

### 10% ZYBOOK ACTIVITIES

Throughout the semester, you will have to complete activities selected from the course zyBook.

### 15% ASSIGNMENTS

You will be given one homework assignment roughly every week. Each homework assignment will cover roughly the material that was discussed during the previous three lectures. Each homework assignment will be due roughly one week after it was assigned. In order to receive any credit, all homework assignments must be written in  $\text{\LaTeX}$  and the resulting PDF file must be submitted electronically via the corresponding assignment dropbox in Canvas. All homework assignments will be equally-weighted. You must work individually on each homework assignment and are not allowed to discuss any aspect of any assignments with anybody, by any means (online, offline, etc), except with the course instructor. Basically, you should do and submit your own work.

### 75% EXAMS

There will be three, equally-weighted, in-class exams. Calculators will not be allowed for any of the exams. Exam material will come from the lecture notes, assignments and zyBook activities. There will be more information about each exam as it approaches. We will review for each exam during the lecture prior to the exam.

If you are unable to take a scheduled exam, it may be possible to take a make-up exam provided that you do both of the following, which are then subject to my approval:

1. Make arrangements prior to the scheduled exam (for last minute emergencies, telephone me at 920-424-1324 or leave a message at the Computer Science office, 920-424-2068. **No after-the-fact notifications will be accepted.**
2. Have a written medical excuse signed by the attending physician OR have a note of justification from the Dean of Students Office.

If allowed, only one make-up exam will be given. It will be a comprehensive exam given at an arranged time during the last week of the semester.

## Grading Scale

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Grading will be on a plus/minus system. Grading may be done on a curve depending on the overall performance of the class. If no curve is used, then your grade will be computed based on the following:

Percentage	Grade
> 91	A
> 89 and $\leq$ 91	A-
> 87 and $\leq$ 89	B+
> 81 and $\leq$ 87	B
> 79 and $\leq$ 81	B-
> 77 and $\leq$ 79	C+
> 71 and $\leq$ 77	C
> 69 and $\leq$ 71	C-
> 67 and $\leq$ 69	D+
> 61 and $\leq$ 67	D
> 55 and $\leq$ 61	D-
$\leq$ 55	F

## Re-grading

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If you believe an assignment or exam was graded incorrectly or unfairly and would like to have it re-graded, please let me know about it in writing within one day of receiving the assignment or exam back. I will re-grade the entire assignment or exam and you may gain or lose points.

## Late Work

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Late work will NOT be accepted. Late work is worth 0 points. Extensions may be granted at the discretion of the instructor if you provide a valid justification (in the form of a written excuse from a medical doctor or the Dean of Students Office) before the due date.

## University Policy on Academic Integrity

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The University of Wisconsin Oshkosh is committed to a standard of academic integrity for all students. The system guidelines state: "Students are responsible for the honest completion and representation of their work, for the appropriate citation of source, and for respect of others' academic endeavors" (UWS 14.01, Wisconsin Administrative Code).

## Course Objectives

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1. Students will be able to use the basic principles of propositional and predicate logic to prove logical statements.
2. Students will be able to prove a mathematical statement using the principle of induction (mathematical, strong and structural).
3. Students will be able to prove a mathematical statement using an indirect proof (i.e., proof by contradiction, proof by contrapositive).
4. Students will be able to prove a mathematical statement using a direct proof (i.e., proof by construction).
5. Students will be able to explain the basics of set theory (union, intersection, complement, subset, cardinality, power set, cross product, equality of two sets).

6. Students will be able to explain the basics of mathematical functions (definition, composition, domain, range, inverse, injective, surjective) and relations (definition, equivalence, inverse, composition, partial orderings, and total orderings).
7. Given a recursive algorithm, students will be able to formulate a recurrence equation that describes its running time.
8. Given a recurrence equation that describes the running time of some algorithm, students will be able to solve the recurrence relation, using a standard technique such as iteration or the Master Theorem, in order to derive the running time of the algorithm.
9. Students will be able to explain basic combinatorial principles (combinations, permutations, principle of inclusion-exclusion, pigeonhole principle, binomial coefficients).
10. Students will be able to identify and apply basic probability concepts.

## **Statement Regarding Diversity, Equity & Inclusion**

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Diversity drives innovation, creativity, and progress. At the University of Wisconsin Oshkosh, the culture, identities, life experiences, unique abilities, and talents of every individual contribute to the foundation of our success. Creating and maintaining an inclusive and equitable environment is of paramount importance to us. This pursuit prepares all of us to be global citizens who will contribute to the betterment of the world. We are committed to a university culture that provides everyone with the opportunity to thrive.

## **Required Disclosure Statement**

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Students are advised to see the following URL for disclosures about essential consumer protection items required by the Students Right to Know Act of 1990:  
<https://uwosh.edu/financialaid/consumer-information/>