

# CS 3653 – Discrete Mathematics for Computer Science

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**Instructor**  
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**Virtual Office Hours:** MWF 2:00pm – 3:00pm (Central Time) or by appointment.

## Description

***This is an online course.** All lectures, resources, assignments, and correspondence are accessed entirely online through Canvas at [canvas.okstate.edu](https://canvas.okstate.edu). Sign in using the O-Key username and password provided to you by OSU. Once you sign in, you will see the Canvas Dashboard, which provides you with a list of links for the courses in which you are enrolled. You should see our course listed as CS 3653 - Discrete Mathematics for Computer Science **Online Fall 2020**. Click on that link to go to the course homepage.*

This course covers elementary discrete mathematics for computer science and engineering. It emphasizes mathematical definitions and proofs as well as applicable methods. Topics include formal logic notation, proof methods, sets, functions, Algorithms, the Integers and Matrices, induction and recursion, counting principles, discrete probability, relations, elementary graph theory; Trees, Boolean algebra.

## Prerequisites

The prerequisite for the course is MATH 2144.

## Goals

The goal of this course is to introduce students to ideas and techniques from discrete mathematics that are widely used in Computer Science. The course aims to present these ideas "in action"; each one will be geared towards a specific significant application. Thus, students will see the purpose of the techniques at the same time as learning about them.

## Objectives

Upon completion of CS 3653, students will be able to explain and apply basic methods of discrete mathematics in computer science. They will be able to use these methods in subsequent courses in the design and analysis of algorithms, computability theory, software engineering, and computer systems. In particular, students will be able to:

- Use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, and integers.

- Reason mathematically about basic data types and structures, such as numbers, sets, graphs, and trees used in computer algorithms and systems.
- Evaluate elementary mathematical arguments and identify fallacious reasoning.
- Model and analyse computational processes using analytic and combinatorial methods.
- Apply principles of discrete probability to calculate probabilities and expectations of simple random processes.
- Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction.

## Textbook

- Kenneth H. Rosen, “Discrete Mathematics and its Applications”, 7<sup>th</sup> Ed., McGraw Hills. ISBN: 9780073383095.
- In this particular course an online textbook called zybooks may be used for practice. Following steps may be followed for completing the registration on zybooks:
  1. Sign in or create an account at *learn.zybooks.com*
  2. Enter zybook code: **OKSTATECS3653JainFall2020**
  3. Subscribe:
    - a. Subscription cost is **\$58**.
    - b. Students may begin subscribing on **Aug 03, 2020**.
    - c. The cutoff to subscribe is **Nov 21, 2020**.
    - d. Subscriptions will last until **Dec 18, 2020**.

## Instructor Response Time

As this is an online course, it is expected that, all correspondence should be done through Canvas. But, if you need to contact me on an individual basis, the most preferred way is through email. I will try my best to respond you within 24 hours, though sometimes it could be as long as 48 hours or more, especially in case of a weekend or holiday. To ensure that I perceive your email, please make sure to begin the subject line of your email with the course number in square brackets, followed by the message subject; for example:

*[CS 3653] Unable to view grades on Canvas*

For those of you located in other than my time zone (Central Time, GMT-6), please be aware that this also may affect the time it takes me to respond to your emails.

Providing grades and/or feedback for assignments may take up to 2 weeks of the assignment due date.

## Participation Expectations

Students should expect this course to be more challenging and take a lot of effort. You are going to learn an elementary mathematics course, the only way to become proficient is to do a lot of practice in solving different problems in it.

The typical rule of thumb is that you should expect to spend 2-3 hours for every hour of online class. It is expected that, you should plan to spend 6-9 hours per week on average reading, doing homework and other assignments.

To do well in this course, students are expected to

- Keep up with the course material, including the homework assignments.
- Read or view the instructional material posted to Canvas frequently.
- Ask for help if any of the material covered is not clear.
- Complete the assignments and submit them before their deadlines.
- Regularly check Canvas for announcements.

## Grading Policy

Grades in this course will be calculated according to the completion of following assignments:

Assignment	Value in Points	Percentage of Total Grade
Homework - Quizzes	300	30%
Assignment	300	30%
One Mid-term Exam	200	20%
Final Exam	200	20%
<b>Total</b>	<b>1000</b>	<b>100%</b>

Final grades will be assigned according to the following scale:

Grade	Percentage Earned
A	90 – 100%
B	80 – 89.99%
C	70 – 79.99%
D	60 – 69.99%
F	0 – 59.99%

## Homework - Quizzes

There will be Homework - Quizzes after completion of each section / chapter, which will also be completed through the Canvas.

## Assignment Descriptions

- All assignments should be submitted **ONLY** through Canvas.
- As this is a mathematics course, it is expected to submit the scanned copy of hand- written solutions to the assignments.
- 10% penalty of available points per day late. However, you cannot receive negative points for an assignment.
- Not all assignments will be of same complexity.
- An Incomplete assignment will not be considered for grading.
- No make-up exams will be scheduled except in extreme cases.
- If you are going to miss an exam or assignment, contact the instructor in advance.
- Exceptions can be made if a serious family or personal emergency arises.

## Exams

There will be one midterm exam during the semester and a final exam during finals week; Both exams will be online proctored exams (approx. \$15-20 each) and will be using Examity through Canvas only. You must have a Computer/Laptop with web-cam, microphone, speaker and Internet connection. More information regarding Examity is available on Students Quick Guide on Canvas.

## Collaboration

Discussion of concepts, ideas, and techniques is acceptable. After discussion, each student must write up his/her own solution. Copying another person's work, in part or in whole, is not allowed. Giving another student your work, in part or in whole, is considered cheating as well. If you are unsure whether your collaboration is acceptable, speak with the instructor in advance. Take care that your solutions are not exposed to or by other students.

Students who do not comply with the collaboration policies described above will be assigned sanctions in accordance with OSU policy 2-0822 (Academic Integrity). Depending on the circumstances of the violation, the sanctions may result in a score of zero on an assignment, a final grade of F! for the course, or dismissal from the OSU graduate program. In all instances, the violation will be reported to the appropriate institutional officials.

## Disabilities Act

If any student feels that he/she has a disability and needs special accommodations of any nature whatsoever, the instructor will work with you and Student Disability Services, 315 Student Union, to provide reasonable accommodations to ensure that you have a fair opportunity to perform in this class. Please advise the instructor of such disability and the desired accommodations at some point before, during, or immediately after the first scheduled class period.

## Tentative Course Schedule

SN	Module	Date	Week	Homework & Assignment	Due Date
1.	The Foundation-I	Aug 17 – Aug 23	1	HW-1 & Assignment-1	Sept 06
2.	The Foundation-II	Aug 24 – Aug 30	2		
3.	The Foundation-III	Aug 31 – Sept 06	3		
4.	Basic Structures-I	Sept 7 – Sept 13	4	HW-2 & Assignment-2	Sept 20
5.	Basic Structures-II	Sept 14 – Sept 20	5		
6.	Algorithms-I	Sept 21 – Sept 27	6	HW-3 & Assignment-3	Oct 04
7.	Algorithms-II & Number Theory	Sept 28 – Oct 04	7		
<b>MID TERM EXAM</b>					
8.	Induction & Recursion	Oct 05 – Oct 11	8	HW-4 & Assignment-4	Oct 25
9.	Counting & Advance Counting Techniques-I	Oct 12 – Oct 18	9		
10.	Counting & Advance Counting Techniques-II	Oct 19 – Oct 25	10		
11.	Discrete Probability	Oct 26 – Nov 01	11	HW-5 & Assignment-5	Nov 08
12.	Relations	Nov 02 – Nov 08	12		
13.	Graphs	Nov 09 – Nov 15	13	HW-6 & Assignment-6	Nov 22
14.	Trees-I	Nov 16 – Nov 22	14		
15.	Trees-II	Nov 23 – Nov 29	15	--	--
<b>FINAL EXAM</b>					