Course Syllabus

Course Information

Course Number/Section	CS/CE 2305.002
Course Title	Discrete Mathematics for Computing I
Term	Spring 2025
Days & Times	TuTh 8:30 am – 9:45 am
Room	HH 2.402

Professor Contact Information

Professor	Jason Jue
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Office Location	ECSS 4.408
Office Phone	(972) 883-4429
Office Hours	TuTh 11:30 am – 12:30 pm or by appointment

Course Pre-requisites, Co-requisites, and/or Other Restrictions

Prerequisites: ALEKS score required or (MATH 2413 or MATH 2417) with a grade of C or better.

Course Description

Discrete Mathematics for Computing I (3 semester credit hours) Principles of counting. Boolean operations. Logic and proof methods. Recurrence relations. Sets, relations, functions. Elementary graph theory. Elementary number theory.

Course Learning Outcomes

1. Ability to use and apply basic definitions and properties of logic
2. Ability to recognize and construct valid proofs including proofs by induction
3. Ability to understand what an algorithm is, use algorithms, use Big-O notation and algorithmic complexity
4. Ability to use basic counting techniques
5. Ability to use and apply basic definitions and properties of sets, relations, functions
6. Ability to understand and apply elementary number theory
7. Ability to understand and apply graph theory

Course Content

All content for this course (lecture videos, assignments, exams, etc.) are for registered students of this course only. Do not share or publicly post any of these materials.

Course Mode

The course mode is face-to-face. Lectures will be in our assigned classroom on campus. Exams will be taken in the testing center. Homeworks and Smartbooks are online.

Grading Policy

- Homeworks 25%: There will be roughly one homework assignment for each chapter of the book we cover (roughly every 1 to 2 weeks), consisting of a mix of multiple choice and written answer problems.
- Smartbooks 15%: Smartbook assignments are taken online through the McGraw Hill Connect platform. They will be assigned each week and are graded based on the percentage you complete.
- Exams 60%: There will be a midterm and a final, each worth 30%. Each exam will be 90 minutes long and will be taken at the UTD testing center. The Midterm can be taken from Thursday 3/06 to Wednesday 3/12. The final can be taken from Monday 5/12 to Friday 5/16.

Your lowest homework score and your lowest Smartbook score will automatically be dropped.

The following cutoffs will be used when determining your course grade:

- 95 <= A+ <= 100
- 85 <= A < 95
- 80 <= A- < 85
- 75 <= B+ < 80
- 65 <= B < 75
- 60 <= B- < 65
- 55 <= C+ < 60
- 45 <= C < 55
- 40 <= C- < 45
- 35 <= D+ < 40
- 25 <= D < 35
- 20 <= D- < 25
- F < 20

Connect and eLearning

We will be using McGraw Hill Connect this semester. The recommended way to sign up is as follows. Go to eLearning. Click on the first homework or Smartbook assignment. This will direct you to a pay screen for Connect. At that time you can purchase Connect access for $86 with a credit card which will give you access to Connect, including the ebook. You will also see two other options, the first is if you already bought a code from the bookstore (which may be more expensive), and the other option is complementary two-week access, though you will eventually need to purchase.

For homework and Smartbook assignments, you should always access them through eLearning (i.e. let eLearning direct you to Connect, rather than directly going to Connect), as this will ensure your grades will be populated in eLearning.

Testing Center Information

Exams will be at the UTD testing center. Sign up and guidelines:
https://ets.utdallas.edu/testing-center/students

Please carefully read all the guidelines for the testing center. You are strongly encouraged to register for your exam time slots at the beginning of the semester. Depending on availability, you can change your time slots later.

Those who do not register at least 48 hours in advance will not be able to take the exam.

The midterm will be available from 3/06 to 3/12. The goal is to have the midterm review on 3/04, however, the schedule is tight, so it may occur on 3/06. *Thus, it is recommended that when selecting a midterm time slot, you pick one that is after class time on 3/06.* Also, when scheduling your exam keep in mind that we may cover new material in class on one or both of 3/06 and 3/11, however, this new material will not be on the midterm.
For exams you can bring a "cheat sheet", which is a single sheet of paper of size no more than 8.5x11 inches (i.e. standard size). You can only write on one side of the sheet. You can type or handwrite this sheet. You are not allowed any other materials at the exams.

Course & Instructor Policies

- No late homeworks will be accepted, unless the student provides a valid documented reason, i.e. medical or family emergencies. I intend to enforce this strict late homework policy, which is partly the reason for allowing the lowest homework score to be dropped.
- If a student is unable to take the examinations on their scheduled dates, they should inform the instructor well in advance. Makeup examinations will be scheduled only if the student has a valid medical excuse.
- Any request for a regrade needs to be made within one week of the assignment or exam being returned. Note that a regrade request means "regrade", i.e. your score could go down. Homework regrade requests should be made directly to the Grader/TA.
- Students are required to solve problems without the help of outside sources (i.e. "googling the solution").

Textbook and Course Content
The required textbook for this course is "Discrete Mathematics and its Applications" by Kenneth Rosen, eighth edition. Below is a list of sections to be covered.

Chapter 1: The Foundations
1.1 Propositional Logic
1.3 Propositional Equivalences
1.4 Predicates and Quantifiers
1.5 Nested Quantifiers
1.6 Rules of Inference
1.7 Introduction to Proofs
1.8 Proof Methods and Strategy

Chapter 2: Basic Structures
2.1 Sets
2.2 Set Operations
2.3 Functions
2.4 Sequences and Summations
2.5 Cardinality of Sets

2.6 Matrices

Chapter 3: Algorithms
3.1 Algorithms
3.2 The Growth of Functions
3.3 Complexity of Algorithms

Chapter 4: Number Theory
4.1 Divisibility and Modular Arithmetic
4.2 Integer Representations and Algorithms
4.3 Primes and Greatest Common Divisors
4.4 Solving Congruences

Chapter 5: Induction and Recursion
5.1 Mathematical Induction
5.2 Strong Induction and Well-Ordering
5.3 Recursive Definitions and Structural Induction
5.4 Recursive Algorithms

Chapter 6: Counting
6.1 The Basics of Counting
6.2 The Pigeonhole Principle
6.3 Permutations and Combinations
6.4 Binomial Coefficients and Identities
6.5 Generalized Permutations and Combinations

Chapter 8: Advanced Counting Techniques
8.1 Applications of Recurrence Relations
8.2 Solving Linear Recurrence Relations
8.3 Divide and Conquer Algorithms and Recurrence Relations
8.5 Inclusion-Exclusion
8.6 Applications of Inclusion-Exclusion

Chapter 9: Relations
9.1 Relations and Their Properties
9.3 Representing Relations
9.5 Equivalence Relations
9.6 Partial Orderings

Chapter 10: Graphs
10.1 Graphs and Graph Models
10.2 Graph Terminology and Special Types of Graphs
10.3 Representing Graphs and Graph Isomorphism
10.4 Connectivity
10.5 Euler and Hamilton Paths

Chapter 11: Trees
11.1 Introduction to Trees
11.3 Tree Traversal
11.4 Spanning Trees

Class Material

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Attendance

The University's attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes.

Class Participation

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

Computer Science Mentoring Center

The Computer Science Mentoring Center (CSMC) is a resource made freely available to all students taking this class, with costs supported by the CS Department. The CSMC provides assistance in many areas including:

- Understanding core concepts related to this class

- Developing a logical framework for a program
- Connecting programming constructs to the logic of the program
- Assisting in solving syntax and logical errors in your code
- Exam reviews and reworks (by faculty request)

The mentors will meet with you 1-on-1 to address your specific problem areas. Their goal is to help you understand what is wrong and how to fix it, but they will not do the work for you. For more information about the CSMC, including location and hours of operation, please visit http://csmc.utdallas.edu

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Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students.

Please go to Academic Support Resources webpage for these policies.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please review the catalog sections regarding the credit/no credit or pass/fail grading option and withdrawal from class.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

These descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.