Math 232 Discrete Math Syllabus

Fall 2025

About the course

Welcome to the Discrete Math course! Here, we will learn mathematical ideas that deal with separate, countable objects, usually involving integers instead of continuous quantities like in Calculus. We will learn why this area of mathematics is useful in computer science, number theory, probability, logic, graph theory, optimization, and even in our real lives!

Instructor & Contact

- Instructor: Denae Ventura
- Please contact me via **Moodle**. Otherwise, email me at dventuraarre@mtholyoke.edu
- Office hours: M–Th 3:10 – 4:00 PM at Clapp 404-A. If you need to attend at a different time, please let me know.

Classes

M-W-F 1:45 - 3:00 PM in Clapp 401.

Prerequisites

Intended for students who have passed MATH-102 or above or COMSC-150/151.

Learning goals

During the semester the plan is to learn

- **Counting & Combinatorics:** Work with sets, subsets, sequences, and permutations; apply induction, inclusion-exclusion, and the pigeonhole principle; use the Binomial Theorem and Pascal's Triangle.
- **Logic & Probability:** Understand statements, connectives, and truth tables; recognize logical equivalence; compute probabilities.
- **Number Theory:** Apply divisibility, prime factorization, and congruences; use Fermat's Little Theorem and the Euclidean Algorithm.
- **Graphs & Trees:** Analyze degrees, paths, cycles, and connectivity; understand Eulerian and Hamiltonian properties; define, grow, and count trees, including unlabeled ones.

Course books

We will use both of these books but the first will be used the most. I believe these are open access books and can be found on the LITS portal. You may purchase them if you wish, but it is not required.

1. **Main.** Discrete Mathematics: Elementary and Beyond by L. Lovász, J. Pelikán, and K. Vesztergombi. 2003. Springer.
2. **Complementary.** Elements of Discrete Mathematics by Richard Hammack. 2017.

Important dates (subject to change)

1. First exam October 10, 2025 during class
2. Second exam November 24, 2025 during class
3. Final exam Self-scheduled

Grading (subject to change)

- **Homework** 32%
  There will be approximately 10 weekly homework assignments throughout the course. There will be no homework due during exam weeks. I will take **8** homework assignments into consideration for 32% of final grade. Homework grades are based on **completion** of the assignment and must be turned in on Gradescope every Friday before 8 PM.
  No partial or late homework assignments will be considered, so try to use the homework relaxation for unforeseen situations.
- **Two midterms** 20% + 20%
  There will be two midterms. Each will make 20% of your final grade. The first midterm will be on **October 10** and the second on **November 24**.
- **Final exam** 20%
  The final exam will be self-scheduled and worth 20% of the final grade.
- **Participation** 8%
  Participation is fundamental for success in this course. Attending class and participating actively can make a great impact on your learning and performance. Please feel free to stop me at anytime to ask a question. I also encourage you to get together with other classmates to work on homework assignments or to study together. Explaining a concept to someone else not only helps them understand, it also deepens your own learning. Try to attend seminars and activities that I promote in class. And very important, come to office hours!

Homework submission

You may turn in your homework assignments in one of two ways:

1 Upload a pdf document with your completed assignment on Gradescope. The use of LaTeX is highly encouraged for writing your homework assignments. You don't need a compiler on your computer. You can use Overleaf, which is an online LaTeX editor. To see a brief introduction to Overleaf, click here. You do not have to purchase a Premium account. The free version is good enough. Otherwise, you may use any editor with the option for **writing math**. Make sure your math expressions are clear and do not leave room for confusion.

2. Upload a clear hand-written document to Gradescope. In this case, please upload pictures converted to pdf format to Gradescope.

Letter grading

Overall letter grades will be based on a scale no stricter than the usual:

- 93-100: A
- 90-93: A-
- 88-90 B+
- 83-88: B
- 80-83: B-
- 78-80: C+
- 73-78: C
- 70-73: C-
- 68-70: D+
- 63-68: D
- 60-63: D-
- 0-60: F

Evening Help

Tuesdays 7 to 9 PM at Clapp 402 with Julianna.

Class conduct and academic integrity

- **I encourage you** to be respectful of this class, our TA, myself and your classmates. Please leave your phone in your bag and keep it silenced or turned off during my lectures, office hours and tutoring sessions. If you need to step outside, do so quietly. Asking questions and engaging in discussions is a great way to learn.
- It is very important for you to follow the **Honor Code** in all of your work for this course. Collaboration on homework assignments is encouraged. Please write your assignments in your own words understanding everything you are writing. I cannot give credit for plagiarized work and might have to refer such issues to the academic deans. If you have any questions about whether something is an Honor Code violation, please ask me.

Technology

Here are some general remarks on the use of calculators, software, and phones.

- For all homework, quizzes, and exams, you may use a scientific calculator, but it is not necessary or required.
- Software like Wolfram Alpha or Desmos can be used on homework or other outside the class work, but its use should be cited and you are expected to show your work on problems. These resources will not be available on quizzes and exams.
- ChatGPT or other AI should be avoided when doing assignments since one of the fundamental focuses of our class is learning to reason and explain thought processes through writing. Such software can also sometimes be unreliable when it comes to mathematical reasoning.
- It is ok to take photos of the board for note taking, but please do not share online.
- Please keep your phones on Do Not Disturb mode in class, especially during quizzes and exams, so as not disturb others with ringers or vibrations.
- If you're unsure whether something is ok to use, please feel free to ask.

Student Accessibility

If you are a student who requires academic accommodations, please submit your Letter of Accommodation to me as soon as possible, ideally within the first two weeks of this course.