

MTH 301–01

Discrete Mathematics, Elmhurst College
2:15–3:20 p.m. M W F, Circle Hall 014, Spring 2020

Professor: Dr. A. Rogers, he/him/his, Daniels Hall 218, (630) 617-3697, allenr@elmhurst.edu

Office hours: M W F 1:00–2:00, or by appointment.

Text: Epp, *Discrete Mathematics with Applications*, 5th ed., ISBN 9781337694193.

Web Page: arogers.elmhurst.edu

Why “Discrete”? *Discrete* means “taking on a finite or countably infinite number of values: not mathematically continuous” (*Webster’s Ninth New Collegiate Dictionary*). Alternatively, quoting from the *Random House Dictionary*, this course deals with mathematics “using only arithmetic and algebra, not involving calculus.”

Information and its communication have become at least as important as the production of material goods. Whereas the physical or material world is most often modeled by continuous mathematics, that is, the calculus and prerequisite ideas from algebra, geometry, and trigonometry, the nonmaterial world of information processing requires the use of discrete (discontinuous) mathematics. Computer technology, too, wields an ever-increasing influence on how mathematics is created and used. Computers are essentially finite, discrete machines, and thus topics from discrete mathematics are essential to solving problems using computer methods.

—*Curriculum and Evaluation Standards for School Mathematics*,
National Council of Teachers of Mathematics, 1989

Course Description: Logic and proof, elementary number theory, mathematical induction and recursion, set theory, functions, relations, and combinatorics. Prerequisite: MTH 151 Calculus I. Course credit: 1.0. One course credit (1.0) at Elmhurst College is equal to four (4.0) semester hours.

Student Learning Outcomes:

1. Develop the ability to think abstractly.
2. Strengthen critical thinking skills.
3. Use logically valid forms of argument and avoid common logical errors.
4. Appreciate what it means to reason from definitions.
5. Know how to use both direct and indirect argument to derive new results from those already known to be true.
6. Be able to work with symbolic representations as if they were concrete objects.
7. Address complex problems by formulating solutions from previously solved problems.
8. Develop a profound appreciation for the practical utility of abstract mathematical ideas.

Outline of Course Topics:

- Ch 2. The Logic of Compound Statements
- Ch 3. The Logic of Quantified Statements
- Ch 4. Elementary Number Theory and Methods of Proof
- Ch 5. Sequences, Mathematical Induction, and Recursion
- Ch 6. Set Theory
- Ch 7. Properties of Functions
- Ch 8. Properties of Relations
- Ch 9. Counting and Probability
- Ch 10. Theory of Graphs and Trees

Grading: Letter grades are computed from four components, weighted as follows:

Quizzes/Presentations/Seminar	25%
Exam 1 (Wed, Mar 11)	25%
Exam 2 (Wed, Apr 29)	25%
Final Exam (over entire course) (Mon, May 18, 1:00–3:00)	37%

This adds up to 112%. The lowest of the four components will be weighted 12 percentage points less. No quiz, exam, or other graded activity is dropped; everything counts. Your lowest component will still count, but it counts less.

Quizzes/Presentations/Seminar: There will be a quiz on each of the following days: Feb 26 (Wed) and Apr 15 (Wed). Quizzes usually will be given toward the end of the class period and must be taken in class at that time. If you miss a quiz for a reason that is excused by me, then the points can be made up: your next quiz counts double, or if it is the last quiz then you can take a make-up.

A weekly schedule will be given for oral homework problem presentations. On any day during your assigned week, choose a problem from the current homework assignment, write the solution on the board before class starts, explain your solution to the class at the beginning of class, and then submit on Blackboard your statement that you did it. If you miss giving your presentation during your assigned week, you may still do it for partial credit during the first week after your week—after that, no credit.

For your in-class oral presentation to count, you must, after your presentation, submit on Blackboard your statement that you did it together with the problem number and section, either later during the same calendar week you presented or during the next calendar week—after that, no credit.

You are required to attend one of the math seminars, write a one or two page summary paper for the seminar you attend, and submit your paper on Blackboard. Seminars usually are held on Wednesdays from 4 to 5 in Daniels Hall 213. The paper is worth one presentation and is due May 15.

Your quizzes will be half of the Quizzes/Presentations/Seminar component. Your presentations and seminar paper will be the other half.

Missed Exams: You need a compelling reason to be excused for missing an exam and to be allowed a make-up. You must notify me by email as soon as possible, and in advance when possible. I may require documentation before excusing the absence and allowing a make-up.

Time Expectations: You should plan to devote at least ten hours each week (including class time) to this course. More time may be required.

Snow Days: Visit elmhurst.edu, or use the link posted on BlueNet to “Sign Up for EC Alert” in advance, to find out if classes are cancelled.

Use of Mobile Devices and Laptops in Class: Not allowed! Not allowed on your desk. Not allowed in your lap hiding under your desk. If you have to use your mobile device, step outside the room. Exceptions: After giving your oral presentation, you may use Blackboard briefly to submit your statement. You may refer to an e-book version of our text if you ask me. Other exceptions may be permitted if you ask me.

Disability Services: Elmhurst College will make reasonable accommodations for students with disabilities based on the presentation of appropriate documentation. If you believe that you have a disability that may impact your work in this course, contact Linda Harrell, ADS Coordinator, at disability.services@elmhurst.edu or (630) 617-6448. The ADS office is located on the main floor of the A.C. Buehler Library. Classroom accommodations must be renewed each term.

Learning Center: Academic Support: The Learning Center offers services to support the academic performance of all Elmhurst College students. Sessions are structured to promote principles of self-regulated learning and academic management. Areas of peer tutoring include math, statistics, writing, biology, chemistry, kinesiology, psychology, political science, French and Spanish. Additionally, assistance with special test preparation (e.g., ACT, SAT, GRE, and TAP), academic reading/study strategies, and academic coaching is available. For more information, contact Emmi McAdams, Tutoring Coordinator, at emmim@elmhurst.edu, (630) 617-5376, or Susan Roach, Learning Center Director, at susan.roach@elmhurst.edu, (630) 617-3155. The Learning Center is located on the main floor of the A.C. Buehler Library.

Non-Discrimination/Non-Harassment Policy: The College believes that all employees and students should be able to work and learn in an educational environment free from discrimination and harassment. Harassment includes unwelcome conduct, whether verbal, physical, written or graphic, that is based on protected status such as race, color, national origin, religion, sex, gender identity, sexual orientation, age, disability, citizenship, veteran’s status, pregnancy, marital status or other protected status. The College’s Non-Discrimination/Non-Harassment Policy may be found on the college website.

Code of Conduct: The College attempts to establish a climate that encourages responsibility by students for their individual and collective actions. It is the responsibility of each student to comply with the community standards of our educational community, to interact in a civil manner with other members of the College community, and to respect the property of others. The Student Code of Conduct may be found in the Student Handbook available on the college website.

Academic Integrity Statement: Students are expected to be familiar with and abide by the Code of Academic Integrity in the Elmhurst College Student Handbook. For example, intentionally obtaining or attempting to use unauthorized materials or information or unauthorized help from another person is considered cheating. The following comments are illustrative but not exhaustive.

Tests test how well the student has learned. Therefore, unless the professor specifies otherwise, all examinations are to be completed by the student alone, without extraneous assistance of any kind. That means no help is to be given to or received from other persons during the test; no books, notes, calculators, or other materials of any kind are to be consulted; and if a calculator or other hand-held electronic device is permitted to be used for mathematical calculations, no other information may be programmed into or retrieved from the device. Whenever the professor permits an exception to any part of these rules, the exception applies only as far as specified by the professor. Such exceptions must be expressly permitted and cannot be presumed from prior exceptions on other tests. (From *A Student's Guide to Academic Integrity at the University of Oklahoma*, Office of the Senior Vice President and Provost, University of Oklahoma, Norman Campus, <http://www.ou.edu/provost/integrity/>, accessed August 23, 2006.)

Tentative Class Schedule: (subject to change)

Feb 3	Ch 2	Feb 5	Ch 2	Feb 7	Ch 2
Feb 10	Ch 2	Feb 12	Ch 3	Feb 14	Ch 3
Feb 17	Ch 3	Feb 19	Ch 3	Feb 21	Ch 4
Feb 24	Ch 4	Feb 26	Ch 4, Quiz 1	Feb 28	Ch 4
Mar 2	Ch 4	Mar 4	Ch 4	Mar 6	Ch 5
Mar 9	Review	Mar 11	Exam 1	Mar 13	Ch 5
Mar 16	Ch 5	Mar 18	Ch 5	Mar 20	Ch 6
Mar 23	No class	Mar 25	No class	Mar 27	No class
Mar 30	Ch 6	Apr 1	Ch 6	Apr 3	Ch 7
Apr 6	Ch 7	Apr 8	Ch 7	Apr 10	No class
Apr 13	Ch 8	Apr 15	Ch 8, Quiz 2	Apr 17	Ch 8
Apr 20	Ch 8	Apr 22	Ch 9	Apr 24	Ch 9
Apr 27	Review	Apr 29	Exam 2	May 1	Ch 9
May 4	Ch 9	May 6	Ch 9	May 8	Ch 10
May 11	Ch 10	May 13	Ch 10	May 15	Review
May 18	Final 1:00–3:00				

(This syllabus is subject to change at my discretion. Although I don't anticipate needing to change quiz/exam dates or the grading computation, I would communicate such changes as soon as possible, in class or by email.)