UNIVERSITY OF MONTANA

Department of Mathematical Sciences

M 225
Intro to Discrete Mathematics

Course: M 225 Sec. 02 (CRN 73651) 3 cr., Autumn 2019
Introduction to Discrete Mathematics
T, Th 11:00am–12:20pm in NAC 103

Instructor: Mark Kayll **Econtact:** mark.kayll@umontana.edu
hs.umt.edu/math/people/default.php?s=Kayll

Office: MATH 209
406.243.2403

Hours: T 1:00–1:50pm, Th 12:20–1:10pm & by appointment (*tentative*) (open for all course matters, including DSS accomm.)

Prerequisites: one of M 162 (Applied Calculus), M 171 (Calculus I), or M 181 (Honors Calculus I), or consent of instructor

Text: *Discrete Mathematics: Elementary and Beyond*, L. Lovász, J. Pelikán, and K. Vesztergombi, Springer, 2003 [ISBN-13: 978-0-387-21777-2]

Important Dates:

Labor Day Holiday	Monday, 2 September;
last day to add by Cyberbear	Wednesday, 4 September (5pm);
last day to drop by Cyberbear, or select Audit grade option	Monday, 16 September (5pm);
last day to drop via Add/Δ/Drop link and avoid 'WP' or 'WF'	Monday, 28 October (5pm);
Veterans' Day	Monday, 11 November;
Thanksgiving Break	27–29 November;
last day to add/drop by petition	Friday, 6 December (5pm);
last class meeting (during finals)	Friday, 13 December 10:10am–12:10pm.

Description: This is an introductory course in discrete mathematics for computer science majors and minors. It covers many of the mathematical concepts that provide the background for studying the theoretical foundations of computer science. These concepts include elementary logic, sets, functions, mathematical induction, recursion, combinatorics, and graphs. A major goal of the course is for the students to become comfortable with reading and writing mathematical notation and to become competent at constructing simple proofs. We will be guided by the Lovász *et al.* text, Chapters 1, 2, 3, and 4 of which introduce the main course topics. In addition to covering most of the material in these chapters, we will also study some more advanced material (graphs, trees, combinatorial probability) from Chapters 5, 7, and 8 as time permits.

Learning outcomes: The official outcomes below are reflected in the description above; upon completion of this course, a student will be able to:

1. demonstrate understanding of several central themes of discrete mathematics;
2. explain the important definitions and be able to use them correctly;
3. reason mathematically and communicate ideas in a clear and concise manner;
4. use induction and other techniques of mathematical proofs.

Assessment: Course grades are based on homework assignments, two term tests, and a final exam. Traditional letter grades will be assigned using the +/− system (see *UM catalog* at `https://montana-catalog.coursedog.com/academics/policies-procedures`). UM's policy on Incomplete grades will be followed (see *UM catalog*).

***Tentative* grading schedule:**

Item	Date(s)	Weight
Homework	27 August — 6 December	20%
Test # 1	Thursday, 3 October	25%
Test # 2	Thursday, 7 November	25%
Final exam	Friday, 13 December	30%

(over)

Homework: Assignments are set regularly, and a subset of the assigned problems is graded. Homework is submitted electronically on `gradescope.com`, either in PDF or JPG format from your device. The course number is **58417**, with Entry Code **9J442X**. You'll receive an email invite at your official UM email address; follow the instructions to link to `Gradescope` and get started. The assigned problems represent only a minimal set of problems. You should do the more straightforward exercises on your own as a warmup. I recommend working additional problems whenever possible, especially in an area you find challenging. *Keep in mind that the only way to learn mathematics is to do mathematics.* Students are responsible for compiling their own 'solution sets', comprised of their own submissions, augmented by notes from meetings with other students and with the instructor.

I urge you to acquire the habit of staying on schedule with your reading and homework. This helps to maximize the material you're able to absorb in class, meaning less effort preparing for tests.

Course Moodle pages: These are located at `https://moodle.umt.edu/course/view.php?id=28274`. This is a face-to-face course not making heavy use of Moodle. Nonetheless, students should check the Moodle site regularly to stay in tune with the course flow (announcements, homework, grade book, etc.).

Accommodation: The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you have a disability that adversely affects your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or 406.243.2243. The instructor will work with you and Disability Services to provide an appropriate modification.

General Remarks

On homework: Please use complete sentences, proofread, and polish your work prior to submission. Solutions should be clearly written, giving thorough explanations. Don't assume your audience can read your mind. It often helps to look over your solutions before submission and ask yourself if a classmate could easily understand what you've written. You're encouraged to type homework solutions unless your handwriting is clear. You may work with others on course homework, and you're encouraged to do so; however,

Solutions should be written down privately in your own words.

If you use an important idea of someone else, then please acknowledge that person by giving an appropriate citation in your write-up. This professional courtesy will not affect your grade.

On exams: As noted above, there are two in-class tests and a final exam. The latter is cumulative with a slight emphasis on the material not covered by the in-class tests.

On make-ups: Make-ups for tests will *not* be given unless there is a valid excuse cleared with the instructor *prior* to the test. At least your most detrimental assignment will be dropped; thus, there are no homework make-ups.

On deadlines: Any stated deadlines are firm; please do not ask for extensions.

On electronic devices: Cell phones must be silenced during class meetings and office visits. Use of a cell phone during a test for any purpose other than as a calculator is grounds for earning a zero score on that test.

On conduct: All students need to be familiar with the Student Conduct Code; it can be found in the 'A to Z Index' on the UM home page. All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the university.

Additional References

1. J. L. Gersting, *Mathematical Structures for Computer Science, 7th ed.*, Freeman, New York, 2014
2. J. Matoušek and J. Nešetřil, *Invitation to Discrete Mathematics, 2nd ed.*, Oxford, New York, 2008
3. K.H. Rosen, *Discrete Mathematics and Its Applications, 8th ed.*, McGraw-Hill, Boston, 2018

Combinatorics is the most fundamental, and hence the most important, branch of mathematics, since it deals with FINITE structures, and the world is finite.
Doron Zeilberger, *Board of Governors Professor of Mathematics*
Rutgers University