University of Minnesota, Morris
Syllabus for Math 3231, Abstract Algebra I
Spring 2024

David P. Roberts

1 Introduction

Welcome to Abstract Algebra I. To find out more about me, you should check out my homepage, `davidproberts.net`. For relatively brief questions, a good time to talk to me is right before or right after class. For longer questions, I am looking forward to seeing you in my daily office hours. You can find me in the Science Building, Room 2360. You can also reach me at `roberts@morris.umn.edu` at my office phone number 589-6348.

Abstract algebra forms a large part of modern mathematics. The goal of the course is to familiarize you with some of the main concepts of abstract algebra. Our text is

A book of Abstract Algebra, Second Edition
by Charles C. Pinter

It is recommended that you buy the text at its extremely modest price. It is also freely available online.

For the first three quarters of the course, we will be following much of the book closely, doing many exercises. However the book is certainly too long for a one-semester course. So we will be skimming parts of the book and skipping other parts of the book altogether. In the last quarter of the course I will replace the book by notes which cover similar material from a different viewpoint.

This course aligns with several components of the UMM Student Learning Outcomes

(`https://morris.umn.edu/about/student-learning-outcomes`),

including problem-solving, quantitative literacy, technology literacy, written communication, teamwork, collaboration, and in-depth studies.

University policy says "one credit is defined as equivalent to an average of three hours of learning effort per week..." Our course is a four-credit course, meeting (rounding up!) approximately four hours per week. Thus, *you are expected to spend eight hours per week working outside of class.* My job is to make your learning effort as efficient and pleasant as possible, but it is your job to put in the quality time!

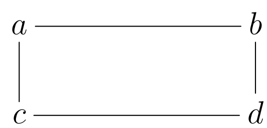
2 A unified four-part course

I have divided the course into four parts. Each part has its own focus, and you should find it interesting by itself. The fourth part is chosen so that it brings together strands from the first three parts. There will be a test at the end of Parts I, II, and III. The final exam will be cumulative, and will emphasize Part IV slightly more than the other parts.

The parts roughly correspond to Chapters 2-8, Chapter 9-16, Chapter 17-26, and Chapters 27-33 of our text. However, as said already, we will be covering only some of the material in each case. Also our treatment in Part IV will not closely follow the book. It will be less theoretical and more computational, and the emphasis will be on seeing how all the material in the previous parts combines in a deep study of polynomials.

The rest of this section gives an informal overview of each of the four parts. You should re-read it periodically as we go through the course. At the beginning of the course, you'll likely find that you understand only small fragments of these overviews. With each reading, you should understand more. One of my points in giving these overviews here is to make it clear how the four parts of the course fit together to form a whole.

Part I. Symmetry and its measurement by groups. The concept of symmetry is important in many situations. In mathematics, symmetry is measured by *groups*. For example, the rectangle



is somewhat symmetric, because there are four ways you can send it to itself. We call these four ways 0, 180, $|$, and $-$, as follows. First, you can flip about the horizontal axis through the middle of the rectangle. This operation, which we call $-$, switches the vertices a and c, and simultaneously switches the vertices b and d. We summarize these switches by writing $- = (ac)(bd)$. Or you can similarly flip about the vertical axis through the middle of the rectangle, thereby switching vertices according to $| = (ab)(cd)$. Or you can rotate the rectangle 180 degrees, with this time $180 = (bc)(ad)$. An interesting thing is that the horizontal flip followed by the vertical flip is exactly the 180 degree rotation. Reading functions from right to left (exactly as you do normally, as in $(f \circ g)(x) = f(g(x))$), we write this relations as $| \circ - = 180$. Also, going in the other direction, the vertical flip followed by the horizontal flip is also the same rotation: $- \circ | = 180$.

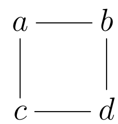
There is a fourth operation on the rectangle that you might not think of right away because it is too simple: the "do nothing operation", which we symbolize as 0. It is necessary to include this operation if we want to be able to have a nice "calculus of symmetries". It allows us to summarize obvious facts like "two horizontal flips return the rectangle to its starting position" in an equation: $- \circ - = 0$. Considering all possibilities, the composite

$a \circ b$ is as follows:

$a \setminus b$	0	180	$-$	$\mid$
0	0	180	$-$	$\mid$
180	180	0	$\mid$	$-$
$-$	$-$	$\mid$	0	180
$\mid$	$\mid$	$-$	180	0

It is traditional to use the symbol V in the context (from the German word *Vier* for four) for the set $\{0, 180, -, |\}$ of symmetries of the rectangle. In fact V is naturally a group, because it comes with the composition operator just discussed. Notice how exotic-looking the equations embedded in the last two paragraphs have been. Your first order of business is to get comfortable with them, to the point that they seem like "the obvious right thing to do"!

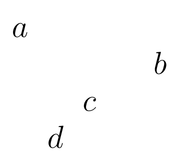
As a related example, consider the square:



It is more symmetric than the rectangle because there are *eight* ways you can send it to itself. Besides 0, 180, $|$ and $-$ as above, there are the rotations (always considered counterclockwise) 90 and 270, and the diagonal flips $/$ and $\setminus$. The rotation 90 sends a to c, c to d, d to b, and b to a. We will be abbreviating this very slickly, via $90 = (acdb)$ with the understanding always that b gets sent back to a. Similarly $/ = (ad)(b)(c)$.

The set $D_4 = \{0, 90, 180, 270, -, |, /, \setminus\}$ of symmetries is likewise a group under the composition operator. Here D stands for *dihedral*, and captures that the square has a front face and a back face; the subscript 4 comes from the fact that the square has four vertices. A key fact is that symmetries typically do not commute. For example, $| \circ / = 90$ but $/ \circ | = 270$. This failure of commutativity is completely expected from your previous mathematics experience with composition. For example, the functions $e^{\sin(x)}$ and $\sin(e^x)$ are completely different. The surprise is more that all symmetries in V commute!

The most important groups in Part I are the symmetric groups S_1, S_2, S_3, S_4, S_5, $\ldots$. Here S_n is the group of *all* permutations of an n-element set. The image one should keep in mind is one of n *unstructured* points, as in



for $n = 4$. All permutations are allowed. For example, one can send a to b, b to c, and c back to a, all the while fixing d. This permutation would be denoted as $\sigma = (abc)(d)$. The group S_n has $n!$ elements. For example, S_3 has six elements because

$$S_3 = \{(a)(b)(c),\ \ (ab)(c),\ \ (ac)(b),\ \ (bc)(a),\ \ (abc),\ \ (acb)\}.$$

As another example one has $V \subset D_4 \subset S_4$. The group V consists of four of the permutations of $\{a, b, c, d\}$, the group D_4 consists of eight, and finally S_4 consists of all 24.

There are other sources of algebraic structures similar to the ones just discussed. For example, fix a positive integer n and consider the set of numbers $\{0, 1, 2, \ldots, n-1\}$. Adding elements of this set in the normal way forces you to leave the set. However you can add them by "clock addition" and stay in the set. An ordinary clock has $n = 12$. For $n = 4$, the addition table is

+	0	1	2	3
0	0	1	2	3
1	1	2	3	0
2	2	3	0	1
3	3	0	1	2

The additive group obtained in this way has several standard notations, one of which is C_n. Here C stands for cyclic, because numbers on a clock form a circle.

In group theory, one allows binary operations $\star$ from arbitrary sources. The most common source is composition as in our first examples; here non-commutativity is natural. The next two most common sources are ordinary addition and multiplication of numbers, which only yield commutative groups. In all the examples above, the groups are finite. Infinite groups, like the symmetries of a circle, are even more important in mathematics. However, we mostly avoid them since their study involves not only algebra but also analysis.

One of your main goals in Part I is to fully understand the idea "symmetry is described by groups". For example, we will work out cases where the square above is replaced by the tetrahedron, octahedron, or icosahedron. Another goal is to get super-comfortable with the symmetric groups S_n. Visualizing rotations of the icosahedron is hard, but this group can be trickily stuck inside of S_5. Then computing in S_5 is very easy. Yet a third goal is to get yourself into the spirit of abstract algebra: you should be comfortable with working with binary operations $\star$ in general, without worrying whether they come from composition, addition, or multiplication.

Part II. More on finite groups. Having seen that finite groups are very important, a natural task is to understand them better. In Part II we will do this, with a focus on understanding that it makes sense to try to classify all finite groups.

A first issue is to decide when two different groups should be considered as similar enough to count as the same in the classification. This is resolved by the important but technical notion of *isomorphism*. A second issue is to understand the most basic groups really well; these are the cyclic groups C_n mentioned before, one for each order n.

The word *isomorphism* means "same structure". A key idea is that the concrete source of the group does not matter. For example, consider three groups as follows:

- The set $C_{4a} = \{0, 1, 2, 3\}$ of clock numbers under addition modulo 4 (as above),
- The set $C_{4m} = \{1, i, -1, -i\}$ of complex numbers under multiplication,
- The set $C_{4c} = \{0, 90, 180, 270\}$ of rotations of the square under composition.

Then these three groups are different, but isomorphic. They count as the same group C_4 in our classification.

As examples of classification results, there are two groups of order four, the cyclic group C_4 and the group V above. Similarly, there are five groups of order eight, the cyclic group C_8, the group D_4 above, and three other ones. In fact for $n \leq 24$, the number $\#_n$ of groups of order n is as follows:

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
#	1	1	1	2	1	2	1	5	2	2	1	5	1	2	1	14	1	5	1	5	2	2	1	15

Note that on this table, $\#_n = 1$ whenever n is prime; this statement is in fact true for all prime numbers n. However for composite numbers n, the number $\#_n$ can be very large; for example $512 = 2^9$ and $\#_{512} = 10,494,213$.

A remarkable fact is that finite groups can be built from what are called "simple groups". You can think of a general finite group as like a molecule and its constituent simple groups as like its atoms. The simple groups come in two types. The commutative ones are just the C_p for p prime. Thus their sequence of orders is the familiar sequence 2, 3, 5, 7, 11, 13, ... The noncommutative ones are much more complicated. Their sequence of orders is 60, 168, 360, 504, ...

One of your main goals in Part II is to familiarize yourself with yet more groups. For example, a new and interesting group is the group $Q = \{1, -1, i, -i, j, -j, k, -k\}$ with a non-commutative multiplication to be described later. Another goal is to understand how groups are related to each other. Among the fundamental concepts are *subgroup*, *quotient group*, and *homomorphism*.

Part III. Rings and factorization. *Rings* are sets R with two binary operations, not just one. We will always denote one of these operators by $+$ and the other by $\cdot$. In a way, rings are more concrete than groups, since almost always $+$ is very closely related to ordinary addition and $\cdot$ is very closely related to ordinary multiplication. As usual with multiplication, we often suppress the $\cdot$ and just write ab instead of $a \cdot b$. In a general ring R, the operator $+$ is always required to be commutative, and there is always a 0. Following the book, we will very commonly restrict attention to rings R for which $\cdot$ is commutative too. All the examples in the syllabus are in this restricted context.

A very important ring is the ordinary ring $\mathbf{Z} = \{\cdots, -3, -2, -1, 0, 1, 2, 3, \ldots\}$ of integers. A ring R is called a *field* if 0 does not have a reciprocal, but all other elements do. So $\mathbf{Z}$ is not a field, because only -1 and 1 have reciprocals. Familiar examples of fields are $\mathbf{Q}$, $\mathbf{R}$, and $\mathbf{C}$, the fields of rational, real, and complex numbers respectively. Less familiar are the important rings $\mathbf{Z}_n = \{0, 1, 2, \ldots, n-1\}$, where addition and multiplication is "modulo n." The ring $\mathbf{Z}_n$ is a field if and only if n is prime. When one considers only addition, $\mathbf{Z}_n$ becomes the cyclic group C_n mentioned before. However in this part we are typically considering both addition and multiplication, making $\mathbf{Z}_n$ a ring.

The previous paragraph shows that numbers are a fundamental source of rings. A second fundamental source of rings are functions of various sorts. Our main example is polynomials. For any ring R, one has the ring $R[x]$ whose elements are polynomials with coefficients in R.

One of the highlights of Part III concerns the ring $\mathbf{Z}$. This highlight (Chapter 22) says that every positive integer factors uniquely into primes. Thus, for example $60 = 2^2 \cdot 3 \cdot 5$ and there is no other way to prime-factorize 60. Another of the highlights of Part III concerns the rings $F[x]$ for any field F. This highlight (Chapter 25) says that a monic polynomial factors uniquely into monic irreducible polynomials. Finally a highlight—illustrating the power of abstract algebra—is that the proofs in the two cases are extremely parallel; with the right language, the two proofs become special cases of one more general proof.

As an example of unique factorization in polynomial rings $F[x]$, consider $f(x) = x^4 - 2x^2 + 9$. It is irreducible in $\mathbf{Q}[x]$, as we will be proving. In the larger ring $\mathbf{R}[x]$, it factors into two quadratics:

$$x^4 - 2x^2 + 9 = \left(x^2 + 2\sqrt{2}x + 3\right)\left(x^2 - 2\sqrt{2}x + 3\right). \tag{1}$$

In the even larger ring $\mathbf{C}[x]$, one can go even further:

$$x^4 - 2x^2 + 9 = \left(x - (\sqrt{2} + i)\right)\left(x - (\sqrt{2} - i)\right)\left(x + (\sqrt{2} - i)\right)\left(x + (\sqrt{2} + i)\right). \tag{2}$$

The behavior of $x^4 - 2x^2 + 9$ is typical in regard to factorization. First, a "random polynomial" in $\mathbf{Z}[x]$ is extremely likely to be irreducible in $\mathbf{Q}[x]$. Second, it always factors into linear and quadratic polynomials in $\mathbf{R}[x]$. Third, it always factors into linear polynomials in $\mathbf{C}[x]$.

Part III will have many types of specific problems that you will learn to do. However, more generally speaking, it should give you the feeling that abstract algebra is not all that far removed from ordinary high school algebra. It is more like a higher perspective on and a vast generalization of ordinary high school algebra.

Part IV. A glimpse of Galois theory. Let $ax^2 + bx + c$ be a quadratic polynomial with coefficients a, b, and c in $\mathbf{Z}$. The quadratic formula then says that its roots in $\mathbf{C}$ are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}. \tag{3}$$

A classical and very natural question is to find similar formulas for a polynomial $f(x) \in \mathbf{Z}[x]$ of arbitrary degree n. A modern and also very natural question relates to the big gap between the typical irreducibility of $f(x)$ over $\mathbf{Q}[x]$ and the factorization into small degree polynomials over $\mathbf{R}[x]$ and $\mathbf{C}[x]$ as in (1) and (2). It asks for how $f(x)$ factors in the $\mathbf{Z}_p[x]$, as the prime p varies.

Chapter 1 of the text recounts dramatic events in the history of the classical problem. In the first half of the 1500's, general formulas analogous to (3) were discovered for the cases $n = 3$ and $n = 4$. In the first third of the 1800's, it was proved that general such formulas do not exist for $n \geq 5$. However certain special polynomials in degree $n \geq 5$ are still *solvable*, meaning that their roots can be given by formulas that involve only radicals $\sqrt[k]{}$ and integers, just like (3).

The final part of the course will give a glimpse at the famous solutions to these two problems. Both solutions involve a group G_f, called the Galois group of f. This group permutes the complex roots of $f(x)$ in a way that respects any natural structures that might be present on these roots. From (2), one can see that the set of complex roots of $x^4 - 2x^2 + 9$ form a rectangle. In fact, this example has the unusual and attractive feature that G_f is just the physical symmetry group V discussed earlier. Usually for a degree n polynomial, G_f is just S_n.

The solution to the first problem says that $f(x)$ is solvable exactly if all the "atoms" of G_f are the commutative groups C_p, rather than the more complicated noncommutative simple groups. For example, our sample polynomial is solvable, as its roots are $\pm\sqrt{2}\pm i$. Illustrating the general solution, the Galois group V of our sample polynomial is built from two copies of C_2. The solution to the second problem says that the statistics of the factorization of $f(x)$ in $\mathbf{Z}_p[x]$ are governed by G_f in a precise and appealing way.

Again in Part IV there will be many specific problems that you learn to do. However Part IV should also give you the sense that abstract algebra is a very unified discipline. Both the classical and modern problems are about the *ring* $\mathbf{Z}[x]$. However their solution centers on an associated *group* G_f. The course will conclude by helping you to appreciate an important open problem in mathematics, the inverse Galois problem. This asks whether any finite group G arises in the form G_f. The general expectation seems to be *yes*, but mathematicians are a long way from proving this expectation.

3 Course components

Class periods. We meet Mondays, Wednesdays, and Fridays afternoons from 2:15 to 3:20 in Science 4655. Class periods will have a lot of lecture. One very common topic will be the introduction of new notions and their illustration via examples. Another common activity will be the statement and proof of a central theorem. Finally, I may do some model problems.

We will aim to keep class time active. One way is that many classes will have a "workshop", where you do homework or other problems, either by yourself or in groups. Another way is that the lectures will have lots of pauses: I may ask you to the next step on something, or you may ask me to clarify some point.

Homework problems. There will be typically one or two homework problems after a class period, some from the book, some supplementary. You are encouraged to collaborate with your classmates to do these problems, helping each other out.

You should hand in a well-written solution to the given problems at the beginning of the next class. I will grade your homework on a 0-5 scale. In some cases I will tell you ahead of time that your solutions will be handed out and shared with the class.

Many test problems will have a tight connection with at least one homework problem. The best way to study for the exams is to make sure that you understand all the homework problems well, so that you can quickly and correctly do not only these problems but also variants.

Text. Abstract algebra has a very different feel from much of your previous mathematical experience. You will be slowly accustoming yourself to its spirit as you go through the course. I recommending reading the text both before and after the lecture. You should not expect to understand everything before the lecture, but your reading will make you more receptive to the lecture. After the lecture, the text should make a lot more sense to you on the second reading.

Tests. There will be three in-class tests and then a final. The final exam will cover all the material in the course. It will be two hours in length but otherwise be like the in-class tests. All the tests will center on the main points of the material covered, as already reflected by the homework problems. For full credit, it is required that solutions on tests be well-written.

Office hours. You are always welcome in my office hours. They are

Mondays	10:00-11:00,
Tuesdays	10:00-11:00,
Wednesdays	11:00-12:00,
Thursdays	1:00-2:00,
Fridays	1:00-2:00.

Since my office hours are scattered throughout the day, there should be at least one or two days per week that you can attend! Also we can meet by appointment. *Each of you should drop by at least once before the first test, so that we can get to know each other better.*

Canvas home page. The campus homepage will give you ready access to documents of this course, and keep track of your exam grades. I will be posting slides which summarize class periods where new material is introduced. Also sample answers will be posted after each of the three in-class tests.

4 Schedule

Our first two meetings will be "warm-up days," aimed to get you into the spirit of the course as quickly as possible. On the next two pages, you'll see a day-by-day schedule for the course, including the dates of the tests.

5 Grading policy

Grades will be determined as follows.

Three 100-point in-class tests, lowest score counts half:	250 points
Final exam:	150 points
Homework:	50 points
Class citizenship:	50 points
	500 points

Class citizenship includes coming to class regularly and on time, not using cell phones or other devices inappropriately, and staying on task. But it also means collaborating with others in the daily problem solving sessions and occasionally asking or answering questions in the lecture component of class periods. This category will not be evaluated numerically. For most students, it will only be used to decide grades that are otherwise right on grade borderlines.

Numerical grades will be converted to letter grades using the follow cutoffs.

Date	Topic
Mon, Jan 15	*Martin Luther King Day*
Wed, Jan 17	Intro via the set **N** of natural numbers
Fri, Jan 19	Student introductions/presentations
Mon, Jan 22	2. Operations
Wed, Jan 24	3. Definition of Groups
Fri, Jan 26	4. Elementary Properties of Groups
Mon, Jan 29	5. Subgroups
Wed, Jan 31	6a. Functions
Fri, Feb 2	6b.
Mon, Feb 5	7a. Groups of Permutations
Wed, Feb 7	7b.
Fri, Feb 9	8a. Permutations of a finite set
Mon, Feb 12	8b.
Wed, Feb 14	**Test 1: Symmetry and groups (some of 2-8)**
Fri, Feb 16	9a. Isomorphism
Mon, Feb 19	9b.
Wed, Feb 21	10. Order of group elements
Fri, Feb 23	11. Cyclic groups
Mon, Feb 26	12. Partitions and Equivalence Relations
Wed, Feb 28	13. Counting Cosets
Fri, Mar 1	14a. Homomorphisms
Mon, Mar 4	14b.
Wed Mar 6	15. Quotient groups
Fri, Mar 8	16. Classification of Abelian groups

		B+	87	C+	77	D+	65
A	93	B	83	C	73	D	60.
A−	90	B−	80	C−	70		

If you are taking the course S-N, you need a 70 to earn an S. A numerical score less than 60% corresponds to an F. *Please note that you are not competing against your fellow students.* I will adjust the difficulty of the questions and the scale of the grading so that say a B− score corresponds to what I consider B− achievement. Please note that your performance will likely fluctuate substantially. However my experience says that with so many components to your final grade, the final grade always accurately reflects your achievement.

If you need to miss a test, you need to give me an acceptable excuse and then follow up our conversation with an *e-mail*. I will give you a make-up test or we will make some other arrangement.

Date	Topic
Mon, Mar 18	16. Beyond abelian groups
Wed, Mar 20	**Test 2: More on groups (some of 9-16)**
Fri, Mar 22	17. Rings: Definitions and Elementary Properties
Mon, Mar 25	18. Ideals and Homomorphisms
Wed, Mar 27	19. Quotient Rings
Fri, Mar 29	20. Integral Domains
Mon, Apr 1	21 & 22. The Euclidean algorithm
Wed, Apr 3	22. Factoring integers into primes
Fri, Apr 5	23. Fermat's Little Theorem and 24. Polynomial basics
Mon, Apr 8	25. Factoring Polynomials into irreducibles
Wed, Apr 10	25 & 26. More on factoring polynomials
Fri, Apr 12	Review day
Mon, Apr 15	**Test 3: Rings and factorization (some of 17-26)**
Wed, Apr 17	41. The Fano plane and its symmetries
Fri, Apr 19	42. Sylow's theorem (Book 16LMN)
Mon, Apr 22	43. Sizes of conjugacy classes in S_n (Zoom or moved)
Wed, Apr 24	44. An overview of the wide world of groups (Zoom)
Fri, Apr 26	45. Factpats of polynomials in $\mathbf{Z}[x]$ modulo primes (Zoom or moved)
Mon, April 29	46. Complex roots of polynomials and Galois groups
Wed, May 1	47. An example in Galois theory
Fri, May 3	48. Solving equations by radicals and an open problem
Wed, May 8	**Final Exam. 4:00-6:00, Cumulative, with emphasis on Part IV (which has overlap with 27-33)**

6 Important further topics

Covid policy

Students are expected to follow all University guidelines with respect to Covid. In particular you should stay at home if you experience any signs of illness or have a positive Covid test result. Absences related to illness, including Covid symptoms, for yourself or your dependents, are excused absences and I will work with you to find the best course of action for missed work and course content.

Assessment

Student work from this class may be anonymously used by the program or UMN Morris to assess achievement of student learning outcomes. If you do not wish your work to contribute to learning assessment, please inform the professor.

Student Learning Outcomes

This class has *course outcomes* that will help students achieve *math program outcomes*, as well as UMN Morris *campus outcomes.* Course outcomes and the program and campus outcomes with which they are best aligned:

Course: Students will learn Abstract Algebra at the level of the course's text, *A book of abstract algebra.*

Program: Students will be able to apply mathematical intuition and abstract reasoning to analyze and solve mathematical problems.

Campus: Deep, discipline-specific knowledge

Course: Students will develop skill in using the software program *Mathematica* in the context of Abstract Algebra

Program: Students will be able to apply algorithmic mathematical techniques and methods to demonstrate competence in problem-solving.

Campus: Information and technology literacy

Course: Students will improve their skills at writing mathematical arguments.

Program: Students will be able to communicate mathematical concepts clearly and persuasively in written reports and oral presentations.

Campus: Written, multi-media, and oral communication.

Course: Students will understand that much of their previous mathematical knowledge fits into the context of abstract algebra

Program: Students will be able to integrate their mathematical knowledge from different areas to prepare them for more in-depth mathematical study

Campus: Synthesis across disciplines.

Course: Students will acquire experience on working on mathematical problems in a collaborative context.

Program: Students will be able to communicate mathematical concepts clearly and persuasively in written reports and oral presentations.

Campus: Collaboration.

Disability Accommodations

The University of Minnesota views disability as an important aspect of diversity, and is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

If you have, or think you have, a disability in any area such as, mental health, attention, learning, chronic health, sensory, or physical, please contact the DRC office on your campus (UM Morris 320.589.6178) to arrange a confidential discussion regarding equitable access and reasonable accommodations. Students with short-term disabilities, such as a broken arm, should be able to work with instructors to remove classroom barriers. In situations where additional assistance is needed, students should contact the DRC as noted above.

If you are registered with the DRC and have a disability accommodation letter dated for this semester or this year, please contact your instructor early in the semester to review how the accommodations will be applied in the course. If you are registered with the DRC and have questions or concerns about your accommodations please contact the Coordinator of the Disability Resource Center.

Additional information is available on the DRC website:
`https://academics.morris.umn.edu/offices-programs/`
`office-academic-success-0` ;
or e-mail `hoekstra@morris.umn.edu`

Student Conduct Code

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University you are expected to adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see:

https://regents.umn.edu/sites/regents.umn.edu/files/2019-09/policy_student_conduct_code.pdf

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach;and/or a student's ability to learn. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities.

Use of Personal Electronic Devices in the Classroom

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each instructor to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference: https://policy.umn.edu/education/studentresp . In this class you should be using electronic devices in the classroom only when it is directly relevant to the course.

Scholastic Dishonesty

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code:

https://regents.umn.edu/sites/regents.umn.edu/files/2019-09/policy_student_conduct_code.pdf).

If it is determined that a student has cheated, the student may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: https://policy.umn.edu/education/instructorresp

The Office for Community Standards has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty:

https://communitystandards.umn.edu/avoid-violations/avoiding-scholastic-dishonesty.

If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class, e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

Makeup Work for Legitimate Absences

Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. For complete information, please see: `https://policy.umn.edu/education/makeupwork`

Appropriate Student Use of Class Notes and Course Materials

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: `https://policy.umn.edu/education/studentresp`

The Writing Center

The Writing Center, located in Briggs 252, offers students the opportunity to discuss their writing with a trained peer writing consultant. Writing Center consultants work with student writers at all stages of the writing process, including brainstorming, drafting, organizing, and revising; they can offer feedback on strengthening an argument, choosing and analyzing evidence, focusing paragraphs, writing introductions and conclusions, and more. Consultants do not proofread papers, but they can help writers learn to edit their own work. They can't, however, perform miracles; be sure to schedule appointments well before a paper is due in order to have time for revision. To see this semester's schedule and make an appointment, visit. `http://umm.mywconline.com/`

University Grading Scales

The University has two distinct grading scales: A-F and S-N.

Grade	GPA Points	Definitions for Undergraduate Credit (R.a.=represents achievement; e.i.t.c. = expectations in the course)
A	4.000	R.a. that significantly exceeds e.i.t.c.
A-	3.667	
B+	3.333	
B	3.000	R.a. that is above the minimum e.i.t.c.
B-	2.667	
C+	2.333	
C	2.000	R.a. that meets the minimum e.i.t.c.
C-	1.667	
D+	1.333	
D	1.000	R.a. partially meets the minimum e.i.t.c.
F	0.000	Represents failure in the course and no credit is earned.

Grade	Definitions for Undergraduate Credit
S	Satisfactory (equivalent to a C- or better)
N	Not satisfactory

For *D* grades, credit is earned, but the course may not fulfill major or program requirements.

Sexual harassment, sexual assault, stalking and relationship violence

The University prohibits sexual misconduct, and encourages anyone experiencing sexual misconduct to access resources for personal support and reporting. If you want to speak confidentially with someone about an experience of sexual misconduct, please contact your campus resources including Student Counseling and Health Services, as well as Someplace Safe

If you want to report sexual misconduct, or have questions about the University's policies and procedures related to sexual misconduct, please contact your campus Title IX office or relevant policy contacts.

Instructors are required to share information they learn about possible sexual misconduct with the campus Title IX office that addresses these concerns. This allows a Title IX staff member to reach out to those who have experienced sexual misconduct to provide information about personal support resources and options for investigation. You may talk to instructors about concerns related to sexual misconduct, and they will provide support and keep the information you share private to the extent possible given their University role.

`https://regents.umn.edu/sites/regents.umn.edu/files/2019-09 policy_sexual_harassment_sexual_assault_stalking_and_ relationship_violence.pdf`

Equity, Diversity, Equal Opportunity, and Affirmative Action

The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, membership or activity in a local commission created for the purpose of dealing with discrimination, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy:

{https://regents.umn.edu/sites/regents.umn.edu/files/2019-09/policy_equity_diversity_equal_opportunity_and_affirmative_action.pdf

Mental Health and Stress Management

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University services are available to assist you. You can learn more about the broad range of confidential mental health services available including Student Counseling Services, and Crisis Consultation.

Academic Freedom and Responsibility:

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Division Chair, your adviser, or the Vice Chancellor for Academic Affairs.