

Syllabus: Math 5384, Geometric approach to
abstract algebra (Spring 2022)

January 8, 2022

Commitment to being a good educator

This is a math class. And I will speak, repeatedly, of what it means to be a mathematician. Part of my job this semester is to show you what it is to be a mathematician—in practice, through knowledge, and with confidence.

But let me state the obvious, which is that you are human beings first. And what I care much more about, much more than the math, is that you are able every day to walk upright as human beings.

If anything in your life is preventing you from learning, that is *our* problem; if not passing this class delays your life in anyway, it is our problem; if I am doing anything that prevents you from learning with dignity, that is our problem.

So as I commit to being a good educator for each and every one of you; I want you to commit to tell me if I am not being a good educator. Your commitment will make my commitment a lot less empty.

1 Logistics

- Instructor: Hiro Lee Tanaka (you can call me Hiro). If you need to e-mail me, you can search for me on TXST’s directory, find me on the department website, or reply to one of the e-mails I’ve sent you.
- Meeting Times: Tuesday and Thursday, 5:00 - 6:20 PM. We will meet via Zoom.
- Office Hours: TBD.

1.1 Check your e-mails

My primary mode of communication with you will be your TX State e-mail. All important e-mails from me will begin the subject line with “[Math 5384].”

There may be what the university calls a “disruption to routine learning”—for example, if Hiro gets sick. You will receive notifications about such events via your TX State e-mail. Typically, a substitute instructor will take over, and they will be asked to continue online Zoom instruction.

When you send me e-mails, if the e-mail seems to require a response, I will often respond within two or three days. I expect our communications to be cordial, and to also demonstrate the same kind of respect that colleagues should have for each other. If you ask a math question, be prepared to receive more questions back. This is because you will have the ability to answer most questions with sufficient introspection and effort.

1.2 You will need Zoom

You will need to use the Zoom app to participate in class. (And you are expected to come to every class, though exceptions are flexible—see attendance policy below.) You can download the Zoom app and log into your Zoom account through the TX State DOIT website:

<https://doit.txstate.edu/services/online-meetings>

Zoom information for classes, labs, and office hours have been e-mailed to you.

Minimum hardware and software requirements: A device (hardware) capable of implementing the Zoom App or Application (software) and implementing a web browser (software) capable of viewing websites supported by the Canvas platform. You will also want the ability to convert

whatever documents you prepare for homework and exams into PDF format. This may require software capable of converting images to PDF format, and hardware to take your written work and render them digital images. You will also need to be able to regularly access and read your txstate.edu e-mail account.

Necessary technical skills required to complete this course. You will need to know/learn how to convert documents into PDF format (to submit homework) and how to upload said documents via Canvas. You will also need to know how to log into Zoom, how to access Canvas course websites, and how to read/write e-mails using your txstate.edu e-mail address.

1.3 Prerequisite knowledge

This class assumes you are familiar with sets, direct products, functions, composition, subsets, bijections, injections, surjections, et cetera.

I expect you all to be completely comfortable with basics of proof:

- (i) If, then statements
- (ii) Contrapositives, converses, negations
- (iii) Proof methods: Induction, contradiction, deduction.
- (iv) Meanings of common phrases and words: iff, equivalent statements, Let f be a..., Fix a ... , Suppose ..., Prove ..., Show ...,
- (v) Sets, cardinality, subsets, direct product, how to prove two sets are equal.
- (vi) Functions, injections, surjections, bijections.
- (vii) Analytical skills such as: What ingredients were needed to complete a proof, were all assumptions used, what were the hypotheses of a proof?

1.4 What are office hours for?

Office hours are for *you*. If you have any questions about class—whether it be logistical, or mathematical—this is your chance to ask me in realtime. Fractions, exponents, canceling, derivatives, integrals, homework problems, quiz

problems, test problems, grading schemes, how to use cameras, whatever. This is your chance to ask.

When you join the office hours Zoom, you will be placed in a virtual "waiting room." (This is similar to having to wait outside in the hallway as a professor is having a meeting in their office.) Hang tight. I will let you enter the room eventually. If you think you have been neglected or forgotten during office hours, shoot me an e-mail, too, in case I don't see you in Zoom.

1.5 Grades

Here is the grading rubric:

- Homework and Journal assignments: 60 percent
- Final Paper: 40 percent
- Extra credit: Plenty of opportunities.

Your final letter grade will be based on the above numbers. I will decide the conversion between numerical grades and letter grades after final assignments are completed. This is because some assignments may turn out to have an unfairly low class average, or we may encounter other systemic issues with the numbers.

However, as a rule of thumb, you should assume that a grade of 70 (or above) is sufficient to get a C in this class.

I will try to give feedback on homework within ten days of submissions, trying to point out portions of submissions that should be improved.

1.6 Exams

There will be no exams in this class.

1.7 Absence/attendance/participation policy

Being absent can affect your understanding and performance on your assignments, hence your grade. I am, however, very flexible if there is a good reason for you to be absent. Life happens. Please e-mail me beforehand, if possible, to let me know of absences. If you miss a class for whatever reason, e-mail me and let me know why.

This semester, of course, you may be absent due to COVID 19. If you need bedrest or are unable to attend Zoom for whatever medical reason (e.g., attending to a loved one), please just get your bedrest or do what life requires of you.

2 Academic Integrity (Hiro's take)

You do not get many chances in life to learn something; it is also rare to get straightforward feedback on what you need to do to improve. Any form of cheating or copying robs you of such chances. To get feedback on someone else's work is useless to you in most cases, and to allow someone else to duplicate your ideas robs that person of a chance to think more on their own, or to get honest feedback about what they need to do to succeed. Add on top of that the potential punitive consequences of being caught—nobody feels good about having to initiate an academic honesty investigation—and you'll find a mountain of disincentives. I expect that you will not rob yourself, or rob others, of the time to think for one's self and the opportunity to receive feedback appropriate to one's particular state.

I also trust in your maturity to distinguish between collaboration and plagiarism. Collaborations are encouraged, should be acknowledged in all work you submit ("I worked with so-and-so."), and must also be mutual (it's not a collaboration unless the other parties agree to it); this is just as in other areas of life.

Finally, most plagiarism or cheating occurs as a consequence of other factors in your life. Make sure you place yourself in a position to succeed and think. Give yourself time to do homework. Beginning on the night before a due date is often not good enough, because math takes a very long time to think through. Working both a full-time job and taking four classes takes away this time—if possible, you should consult with the financial aid office to explore options for working less or taking fewer classes. (Though, in my personal opinion, every student should be provided the resources to take classes without having to have a full-time job; I am sorry that you are in a system that does not allow for such freedoms.)

If you utilize outside source (i) without properly citing your source, and (ii)(a) without indicating an understanding of what you utilize, or (ii)(b) without saying that you are using ideas you do not understand, I will consider your utilization an act of plagiarism. You will get a zero on any submission

on which you do this.

Then, any act of demonstrable dishonesty in communication with me—if coupled with repeat offenses of the above paragraph—will result in an F for the course.

3 Resources

3.1 Your learning matters

It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, contact the Office of Disability Services as soon as possible at 512.245.3451 to establish reasonable accommodations. (If we are in a physical classroom, please be aware that the accessible table and chairs in a given classroom should remain available for students who find that standard classroom seating is not usable.)

For more information, see:

<https://www.ods.txstate.edu/faculty-and-staff-resources/resources.html>

If you are having technical difficulties, you can also contact DOIT:

<https://doit.txstate.edu/services/>

3.2 Online documents

There are many resources available to you for various course sequences. Make sure to take advantage of them—resources like these are usually not available later in your college careers.

For example, the math department has posted PDF files of useful facts for people taking Calculus II: <https://www.math.txstate.edu/resources-student/mathcats/course/2472.html>

3.3 Textbook/Required course materials

We will not use a textbook, but I will upload lecture notes every lecture. You can also find on the course website multiple, freely available textbooks (along with notes from last year).

4 Course content, Purpose and Objectives

The main goal of this class is for you to become familiar with mathematical thinking—questioning and understanding why definitions exist, identifying when you or another communicator is being precise or imprecise (and for what purpose), developing tastes that are rooted in practice and informed experience, exploring the mathematical landscape on your own.

From the course description: Definitions and elementary properties of groups, rings, integral domains, fields and vector spaces with great emphasis on the rings of integers, rational numbers, complex numbers, polynomials, and the interplay between algebra and geometry.

5 TX-State-Specific Information

5.1 Honor Code

Policy mandates that I provide “a statement describing Texas State’s Honor Code policy and a Web reference.” Here is the web reference:

<https://policies.txstate.edu/university-policies/07-10-01.html>

In a nutshell, don’t cheat. But you might not know the line between cheating and not cheating sometimes; you can see my personal take on academic integrity above.

6 From Texas State

6.1 Our Mission and Our Shared Values

From the 2017-2023 Texas State University Plan:

6.1.1 Mission

Texas State University is a doctoral-granting, student-centered institution dedicated to excellence and innovation in teaching, research, including creative expression, and service. The university strives to create new knowledge, to embrace a diversity of people and ideas, to foster cultural and economic development, and to prepare its graduates to participate fully and freely as citizens of Texas, the nation, and the world.

6.1.2 Shared Values

In pursuing our mission, we, the faculty, staff, and students of Texas State University, are guided by a shared collection of values:

- Teaching and learning based on research, student involvement, and the free exchange of ideas in a supportive environment;
- Research and creative activities that encompass the full range of academic disciplines—research with relevance, from the sciences to the arts, from the theoretical to the applied;

- The cultivation of character, integrity, honesty, civility, compassion, fairness, respect, and ethical behavior in all members of our university community;
- A diversity of people and ideas, a spirit of inclusiveness, a global perspective, and a sense of community as essential conditions for campus life;
- A commitment to service and leadership for the public good;
- Responsible stewardship of our resources and environment; and
- Continued reflection and evaluation to ensure that our strengths as a community always benefit those we serve.

6.2 Campus Health, Wellness, and Safety

Take the following list as a reminder about:

- 10 Guiding Principles for Health, Safety, and Wellness at Texas State: <https://www.txstate.edu/coronavirus/road-map/health-and-safety-measures.html>, including
 - requirement to wear a cloth face covering <https://www.txstate.edu/coronavirus/road-map/face-coverings-masks.html> and
 - perform a self-assessment each day before coming to campus <https://www.txstate.edu/coronavirus/road-map/self-assessment.html>.
- Importance of the Bobcat Pledge (<https://www.txstate.edu/coronavirus/road-map/health-and-safety-measures.html>), including the shared responsibility to practice healthy behaviors and follow the health and safety guidelines, which shows respect for others and helps prevent the spread of COVID-19 on campus and in the surrounding community.
- Link to the Student Roadmap for more information on students' return to campus: <https://www.txstate.edu/coronavirus/road-map/student-roadmap.html>

6.3 Statement on Civility and Compliance in the Classroom

Civility in the classroom is very important for the educational process and it is everyone's responsibility. If you have questions about appropriate behavior in a particular class, please address them with your instructor first. Disciplinary procedures may be implemented for refusing to follow an instructor's directive, refusing to leave the classroom, not following the university's requirement to wear a cloth face covering, not complying with social distancing or sneeze and cough etiquette, and refusing to implement other health and safety measures as required by the university. Additionally, the instructor, in consultation with the department chair/school director, may refer the student to the Office of the Dean of Students for further disciplinary review. Such reviews may result in consequences ranging from warnings to sanctions from the university. For more information regarding conduct in the classroom, please review the following policies at AA/PPS 02.03.02, Section 03: Courteous and Civil Learning Environment

<https://policies.txstate.edu/division-policies/academic-affairs/02-03-02.html>,

and Code of Student Conduct, number II, Responsibilities of Students, Section 02.02: Conduct Prohibited

<https://studenthandbook.txstate.edu/rules-and-policies/code-of-student-conduct.html>.

6.4 Academic Integrity and Student Conduct

- Code of Student Conduct: <https://studenthandbook.txstate.edu/rules-and-policies.html>
- The Honor Code: <https://www.txstate.edu/honorcodecouncil/Academic-Integrity.html>

6.5 Emergency Management

In the event of an emergency, students, faculty, and staff should monitor the Safety and Emergency Communications web page:

<https://safety.txstate.edu/>

This page will be updated with the latest information available to the university, in addition to providing links to information concerning safety resources and emergency procedures. Faculty, staff, and students are encouraged to sign up for the TXState Alert system:

<https://www.police.txstate.edu/campus-safety/sign-up-for-txstate-alerts.html>

6.6 Sexual Misconduct Reporting (SB 212)

Effective January 2, 2020, state law (SB 212) requires all university employees, acting in the course and scope of employment, who witness or receive information concerning an incident of sexual misconduct involving an enrolled student or employee to report all relevant information known about the incident to the university's Title IX Coordinator or Deputy Title IX coordinator. According to SB 212, employees who knowingly fail to report or knowingly file a false report shall be terminated in accordance with university policy and The Texas State University System Rules and Regulations.