

**MATH 4401: SECONDARY MATH FROM AN ADVANCED STANDPOINT
SPRING 2021 COURSE INFORMATION**

Instructor	Professor Goodson (she/her)
Email	heidi.goodson@brooklyn.cuny.edu (I don't often check my email between the hours of 8pm – 8am, so please don't expect a response until the next day.)
Class Times	Tuesday/Thursday 4:15 - 5:55 PM on Zoom (link and login info on Blackboard).
Office Hours	Tuesday/Thursday 3:30 - 4 PM, Wednesday 3 - 4 PM on Zoom (link and login info on Blackboard). Please email me to set up a time to meet outside of office hours.
Textbook	“Mathematics for Secondary School Teachers,” by Bremigan, Bremigan, and Lorch. There is a free copy of the book online through the Brooklyn College library. There may also be some supplementary readings posted on Blackboard.

Course Content and Goals

This is a capstone course is for mathematics majors who plan to teach secondary mathematics and who have completed at least through Abstract Algebra (Math 3301). The goal of this course is to promote a deep, detailed, and integrated understanding of pre-college mathematics through a study of

- **Basics:** Exploration of central ideas in the pre-college math curriculum from both intuitive and rigorous points of view.
- **Connections** among topics, making essential use of tools from college-level math.
- **Extensions** to college-level content and problems that have a compelling relationship to pre-college math.

This will help you become mathematics teachers who can more easily bring conceptually challenging mathematics into their classes. Further, the pedagogy of the course will be collaborative, student-centered, and with qualitative whole-class discussions about the underlying concepts of the mathematics examined. Topics include:

- Functions from an Advanced Standpoint (Chapter 1)
- Lines in the Plane (parts of Chapter 2)
- Quadratic Polynomials (Chapter 3)
- Trigonometry (parts of Chapter 4)
- Exponentiation (Chapter 9)
- Transcendental Functions and Complex Numbers (Chapter 11)

If there's time, then we'll also discuss Divisibility Tests (8.3) and other topics.

Considering the time available in this course, we cannot possibly address every topic that you will need to know as a teacher. Instead, what I hope to do in this course is to prepare you to think about mathematics in ways that will help you as a future teacher.

We will strive to approach our study of mathematics with a *growth mindset*: experiences, struggling, making mistakes and learning from them – all of these things cause you to learn and grow your intelligence. Research shows that students who are taught with a growth mindset approach achieve at much higher levels, and that

in fact all students can succeed in mathematics. It's essential for you, future teachers of mathematics, to believe that your students can succeed, and to clearly communicate that belief (and expectation) to your students. I believe that you too can succeed as long as you remain open to being curious and to persevering through mistakes and struggles!

The prerequisite for this course is Abstract Algebra (Math 3101). If you are undecided about whether to take the course, please talk to me about it!

Technology

Computer. In order to be successful in this course, you need a computer or tablet with a webcam and an Internet connection that allows you to watch videos, attend virtual classes, and upload files. If you do not have access to a computer, Brooklyn College has Chromebooks that can be loaned to you. Visit www.brooklyn.cuny.edu/web/about/offices/studentaffairs/health-wellness/coronavirus/device-loan-requests.php for more information.

Zoom. Class sessions and Office Hours will be held on Zoom. CUNY Zoom Pro accounts are available to all students using your CUNY login (<https://cuny.zoom.us>). Class sessions will be recorded so that you can watch the videos to review material or in case you have to miss a class. Please do not share the class recordings with people who are not in our class.

Blackboard. Course organization (calendar, assignments, pdfs of handouts) will be on Blackboard. Emails with course announcements will often be sent through Blackboard so please be sure they are not filtered from your inbox.

Gradescope. A website where you upload your assignments to be graded. You will be able to log in and see your grades and my comments on your assessments. Make an account for our course at www.gradescope.com using the entry code on Blackboard. You do not need to enter your student ID number.

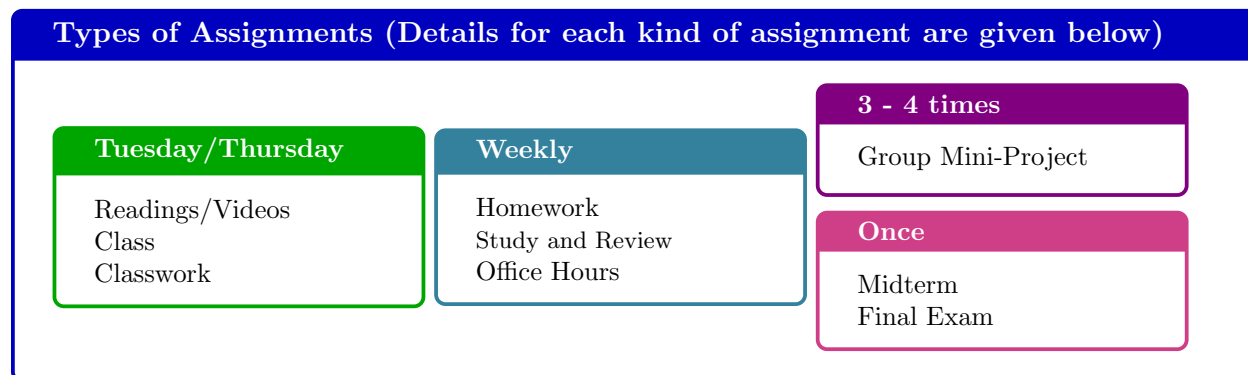
Miro. A website that we will use for groupwork. You can sign up for a free account at <https://miro.com/contact/education/>. For “What will you use Miro for?” you can write: My professor is using it for class.

Calculators. You will be allowed to use calculators (including online calculators) on assignments and exams in this course.

Coursework

You have to spend some energy and effort to see the beauty of math.

– Maryam Mirzakhani, 2014 Fields Medalist



Reading assignments. Each week, there will be reading assignments and/or videos posted on Blackboard. You are expected to do the reading and/or watching before class so that you will be prepared for class. There may be some online or in-class activities that will encourage you to keep up with these pre-class assignments. During class, I will rely on the fact that you have read the sections/watched the videos, but I will not assume that you have completely absorbed them.

Suggestions for reading math (from Professor Ben Braun at University of Kentucky):

- (1) **Understand the story.** Even if you don't understand all the words, you can understand a lot by skimming the expository paragraphs. Is this portion of the text about a specific example? a general phenomenon? Does the author say it is related to something you know about? Does the section contain a lot of theorems and proofs, or mainly a collection of examples? What words are defined in the section?
- (2) **Understand the broad ideas.** Read the definitions. Create small examples and non-examples. Read the theorems. Create small examples and non-examples to illustrate the theorem. Skip all proofs. Summarize the text in your own words.
- (3) **Understand the details.** Read the examples and proofs. Create larger examples and non-examples. Create generalizations of the definitions and theorems. Try to prove your generalizations.
- (4) **Continually repeat this cycle.** Read the section again. Create a short summary of the text in your own words. Create a short outline of the text. Explain the material in the section to your study group.

Classwork. I will provide you with course notes that we will work through during class. These notes will include exercises and problems related to the topics that we are covering. You should aim to finish the notes, exercises, and problems (either during class or after class) so that you can practice and learn the topics we are covering.

Classwork is an opportunity to learn math the best way possible – by doing it. In order to encourage you to keep up with the material, I will ask you to submit your work to 3 - 5 problems that I will choose from each week's notes. You will submit your classwork on Gradescope. Some of the classwork assignments will be group assignments, and in this case only one person from each group needs to submit the work. Classwork will be due on Sundays at 11:59 PM, starting on February 7.

The classwork consists of both exercises and problems. *Exercises* are based on applications of ideas discussed in class, while *Problems* usually involve an additional component of investigation and communication. You may collaborate on the classwork, but the work that you submit for individual assignments should reflect your own understanding of the problems. Please see the policy on collaboration below.

Homework. Weekly homework will be due most Sundays at 11:59 PM, starting on February 14 (the second week of class) on Gradescope. All homework assignments will be posted on Blackboard. You will post your solutions on Gradescope. Your homework should be typed or written extremely neatly. The homework consists of problems that enable you to gain a deeper understanding of the class material, to improve your problem-solving skills, and to practice your mathematical writing. The work that you submit should reflect your own understanding of the problem. Homework will be open notes and you may collaborate on the homework, but you should not use the internet to look up answers. Please see the policy on collaboration below.

Homework is graded so that you can practice writing mathematics and receive feedback on your progress. A low score on a homework assignment indicates that in order to stay on track you should get help from your instructor.

I will mostly grade your written homework for completion, however I will also carefully read and assess some of the problems. These problems will be graded not only on the content of your solutions, but also on the clarity of exposition, with full marks awarded only when the solution is sufficiently clear in terms of both the

step-by-step logic and overall organization. Remember: the point of writing your solutions is *communication*. In particular, your solution should be clear enough to communicate all of the important ideas to the grader, and it also should be clear to *you* a few weeks or months later! When writing your homework, use complete sentences and correct grammar.

Group Mini-Projects. You will work in groups of 2 - 3 on problems that extend our work in the course. These will sometimes require an analysis of student work. You will have at least one week to work on the project and you will submit your work on Gradescope. Your score will be a number from 0 to 10, and everyone in your group will receive the same score. These are not points, but numerical assignments for the following categories

- 0 No assessment could be made
- 5 **Attempted:** You tried, but your answer or solution does not show that you have carefully thought about the problem.
- 7 **Passed:** Your answer or solution shows you have a basic understanding of the problem but you made a few mistakes or omitted some important considerations.
- 9 **Satisfactory:** You have a complete answer or solution with only small mistakes that shows an advanced understanding of the problem.
- 10 **Exceptional!** You have gone above and beyond what was expected from this assignment. You have thoroughly impressed the professor with your outstanding solution.

After receiving feedback, your group will have one week to make corrections in order to improve your grade.

Course Engagement. There are many ways to be engaged in this course, including: asking and answering questions in class, working with others both inside and outside of the classroom, attending office hours, and emailing questions. You are expected to come to every class prepared to do mathematics. You should bring paper, pens or pencils, and other equipment you may need. You must be up to date and prepared for class to participate effectively.

Attendance and Participation are not a part of your grade, but they are required if you will be successful in the course. I hope you will attend class if you are able to so that you will be successful in this course and so that we can still feel a sense of community. However, we are still living through a pandemic and I understand that many unexpected things may come up for each of us during the semester. Class sessions will be recorded so that you can view them at a later date. This will benefit people with limited internet access during our classtime, those who have children, younger siblings, or other family members to take care of, and, really, everyone who has disruptions to their schedule due to closures, illness, or anything else.

Exams. There will be two exams in this class: one midterm and one final exam. The midterm exam will be during class on **Thursday, March 18**. The final exam will be during Finals Week on Tuesday, May 25 at 3:30 - 5:30 PM. You may be required to turn on your webcams during exams. Please contact me as soon as possible if you have any questions or concerns about this.

No exams missed due to unexcused absences may be made up. Excused absences are granted only in extreme circumstances.

Grade Calculation

Grades are a reflection of your mastery of the material and your ability to communicate through the graded assignments. Grades are not a reflection of your self-worth. Your grade for the course is determined by:

Classwork	15%	Homework	20%
Group Mini-Project	15%		
Midterm Exam	25%	Final Exam	25%

Late Work Policy

There will be set due dates for all assignments (see the Course Schedule at the end of this syllabus). Due dates are motivations to keep you moving through the course material and learning. Because we are all trying to manage hectic schedules and lives during a pandemic, I am actually very flexible. For most assignments, you will have several days to complete and submit the work. I will accept late submissions of work (not including exams) for 48 hours past the deadline. Late assignments will still get full credit, but try to do stuff in a timely manner. Please do not email me late assignments – you can submit them on Gradescope.

Please talk to me if you can't keep up with the pace and we will find an alternative.

Academic Integrity

The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both.

Submitting the work of another person or persons without proper attribution is considered plagiarism, and will be treated accordingly. Proper attribution requires identifying the source of your work. Failure to do so may result in a charge of plagiarism, and students can be subject to administrative actions, including

- a grade of 0% on the assignment or exam,
- an F grade in the course.

Additional actions may be taken by the College, including admonition, warning, censure, disciplinary probation, restitution, suspension, and expulsion. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for policy implementation can be found at brooklyn.cuny.edu/bc/policies. If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member must report the violation.

If you have any questions about what constitutes plagiarism in this course, please ask your instructor.

Classroom Etiquette

In order to support a flourishing mathematical community, our in-class discussions will focus on dialogue rather than monologue. You will each share your own ideas and ask questions of others. You will listen to each other and carefully consider each other's ideas. In each class discussion, make sure you have heard from everyone in your group! That includes you!

Remember that the online classroom is still a classroom and it is up to each of us to foster a positive learning environment for everyone. Treat others how you want to be treated. Be kind, be patient, have compassion. We are all adults who want to do our best. How a person behaves online reflects one's willingness to learn, seriousness and motivation both as a student and as an individual. Please visit Brooklyn College's website on "Netiquette" for guidance on having productive discussions in an online setting: <http://www.brooklyn.cuny.edu/web/academics/centers/ctl/supporting-students/netiquette-for-remote-instruction.php>

Collaboration

Collaboration on homework is encouraged! However, you need to carefully balance learning with your fellow students and finding your own path through the material. For the written homework, you must follow the collaboration guidelines below.

- (1) When solving homework problems, you are not allowed to use outside materials (e.g. from the web) unless I give express permission.
- (2) You **must** indicate on your written homework who your collaborators are. (If you collaborate with different people on different problems, say so!)
- (3) Work on a problem by yourself until you have your own “idea” about the problem; after that, you may start collaborating. (A valuable idea can be as simple as a sense of why you are stuck!)
- (4) Keep your written collaborative work separate from your written individual work. The same applies when you discuss problems with your instructor.
- (5) Do the actual write-up of your homework without your collaboration notes so as to reflect your own understanding of the problem. If you cannot write the solution without referring to your collaboration notes, then you have not yet understood the solution. In that case, go back to step (3).

Note that the last guideline above means that while you are collaborating, you cannot be simultaneously working on the final draft of your problem set!

So as to ensure productive collaborations, you should not be working in groups larger than four people on any given problem at any given time. Two- or three-person groups are better than four. Large groups of people “working together” are not really working together.

On-campus Resources

Office Hours. Please stop by office hours to ask questions! I have set aside this time specifically to help you learn and be successful in the course. If you are unable to make any of my office hours, please email me to set up an appointment.

Please check this website for updates on services at Brooklyn College, including Personal Counseling, Advising, Financial Aid, Immigrant Student Services, and Internet Access:

brooklyn.cuny.edu/web/about/offices/studentaffairs/health-wellness/coronavirus/student-resources.php

Support and Accommodations. Brooklyn College is committed to supporting the learning process for all students. Please contact me as soon as possible if you are having difficulties in the course. There are also many resources on campus available to you as a student, including

Center for Academic Advisement and Student Success

brooklyn.cuny.edu/web/about/offices/caass.php

Personal Counseling

brooklyn.cuny.edu/web/about/offices/studentaffairs/health-wellness/counseling.php

Center for Student Disability Services

brooklyn.cuny.edu/web/about/offices/studentaffairs/student-support-services/disability.php

The Center for Student Disability Services (CSDS) will be working remotely for the fall semester. In order to receive disability-related academic accommodations students must first be registered with CSDS. Students who have a documented disability or suspect they may have a disability are invited to schedule an interview by calling (718) 951-5538 or emailing testingcsds@brooklyn.cuny.edu. If you have already registered with CSDS, email Josephine.Patterson@brooklyn.cuny.edu or testingcsds@brooklyn.cuny.edu to ensure the accommodation email is sent to your professor.

Immigrant Student Success Office. The mission of the Immigrant Student Success Office is to recruit, enroll, and retain students, with an emphasis on new immigrants, such as students granted Deferred Action for Childhood Arrivals (DACA) who identify with the Development, Relief and Education for Alien Minors Act (DREAMERS), and first-generation students by providing the necessary academic and non-academic

support to ensure graduation from Brooklyn College in a timely manner.
brooklyn.cuny.edu/web/about/offices/studentaffairs/student-support-services/isso.php

Off-campus Resources.

COVID-19 hotline: The New York State Department of Health has set up a hotline, 888-364-3065, to answer questions about COVID-19.

NYC Well

English: 1-888-NYC-Well (1-888-693-9355), Press 2

Espanol: 1-888-692-9355, Press 3

Text WELL to 65173

Free confidential mental health support for NYC residents:

<https://nycwell.cityofnewyork.us/en/>

Crisis Text Line

Text HOME to 741741

<https://www.crisistextline.org/>

Tentative Schedule

All due dates are Sundays at 11:59 PM except for the midterm and the final exam. I will update the schedule on Blackboard throughout the semester, so be sure to check there for the most up-to-date information!

Week	Date	Book Section	Assignments	
Week 1	Tues 2/2	1.1, 1.2		
	Thurs 2/4	1.3	Classwork (due every Sunday)	
Week 2	Tues 2/9	1.4		
	Thurs 2/11	1.5	HW 1	
Week 3	Tues 2/16	1.6		
	Thurs 2/18	1.7	HW 2	
Week 4	Tues 2/23	2.5		
	Thurs 2/25	2.6	HW 3	
Week 5	Tues 3/2	2.7		
	Thurs 3/4	3.1, 3.2	Group Mini-Project	
Week 6	Tues 3/9	3.2, 3.3		
	Thurs 3/11	3.4 or 3.5	HW 4	
Week 7	Tues 3/16	Review		
	Thurs 3/18		Midterm Exam (in-class)	
Week 8	Tues 3/23	4.2		
	Thurs 3/25	4.3	No HW :)	
Week 9	Tues 3/30	Spring Break		
	Thurs 4/1	Spring Break		
Week 10	Tues 4/6	4.5		
	Thurs 4/8	4.6 or 4.7	HW 5	
Week 11	Tues 4/13	Early sections of Chapter 9		
	Thurs 4/15	9.4	Group Mini-Project	
Week 12	Tues 4/20	9.4, 9.6		
	Thurs 4/22	Chapter 10		
Week 13	Tues 4/27	11.1		
	Thurs 4/29	11.2, 11.3	HW 6	
Week 14	Tues 5/4	11.4		
	Thurs 5/6	11.5	Group Mini-Project	
Week 15	Tues 5/11	8.3		
	Thurs 5/13	Review	HW 7	

Other Important Dates

Friday, January 29	First day of Spring 2021 classes
Thursday, February 4	Last day to add a course
Monday, May 17	Last day to withdraw from a Fall course with a W grade
Tuesday, May 18	Reading Day