

MAT 319/320: Basics of Analysis, Spring 2024

General Course Information

Teaching Staff

319 Instructor: Dimitrios Ntalampekos (dimitrios.ntalampekos@stonybrook)
OHs: <https://www.math.stonybrook.edu/cards/ntalampekodimitrios.html>

319 R01 TA: Jared Krandel (jared.krandel@stonybrook)
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319 R02 TA: Myeongjae Lee (myeongjae.lee@stonybrook)
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320 Instructor: Aleksey Zinger (azing@math)
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320 TA: Randall Kayser (randall.kayser@stonybrook)
OHs: <https://www.math.stonybrook.edu/cards/kayserrandall.html>

MLC: <https://www.math.stonybrook.edu/mlc/center-hours.html>

During the first 6 weeks (through Midterm I), the two courses run jointly as MAT 319. The two instructors split the lectures, and the three TAs rotate through both recitations so that you have the opportunity to meet all of the teaching staff. Please feel free to attend any of the above OHs until the two classes split.

Key Course Policies

All course policies will be *rigidly* enforced, with no exceptions for *anyone*.

Prerequisite 1: proficiency with formal mathematical proofs (MAT 200/250)
Prerequisite 2: familiarity with sequences and series (MAT 127/132)
Required textbook: K. Ross, *Elementary Analysis: the Theory of Calculus*, 2nd ed.
Optional supplementary textbook for MAT 319: S. Abbott, *Understanding Analysis*, 2016 ed.
Optional supplementary textbook for MAT 320: W. Rudin, *Principles of Mathematical Analysis*, 3rd ed.

Homework 20%, Midterm I 22.5%, Midterm II 22.5%, Final 35%

If your weighted average for the semester is 90+ (resp. 80+, 70+, 55+), you will receive at least A– (resp. B–, C, D) for the semester. However, the actual thresholds for the letter grades will likely be somewhat lower based on the absolute difficulty of the exams, *not* relatively to how the class does on the exams. Your letter grade for the semester will then be determined exclusively by your weighted total. Please do not ask the instructor to change your semester grade based on what grade you “need” for whatever purposes; this would be completely inappropriate. According to the university policy, a C means “satisfactory work” and A means “superior work”. This has nothing to do with how many people do better or worse than you or with what grade you to “need” for whatever purposes.

Midterm I: Thursday, February 29 (snow date: Tuesday, March 5), 11:30-12:50
Midterm II: Thursday, April 4, 11:30-12:50 Final Exam: Tuesday, May 14, 11:15-1:45

The lowest HW score (relative to the maximum possible HW score) will be dropped; the remaining (relative) scores will count equally toward the overall HW score. The HW will usually be due **BEFORE** the start of Wednesday’s recitation in the week after it is assigned.

NO late homework will be accepted, *regardless* of the reason

Course Websites

You can access the course website through *BrightSpace* (lecture site) or directly. The current direct link is

<https://www.math.stonybrook.edu/~azinger/mat320-spr24/>.

All homework assignments, exam information, and a lot more will also be posted on the course website. *Please visit it at least twice a week.* After Midterm I, the MAT 319 homework assignments and other information will be posted on

https://math.stonybrook.edu/~dimitriosnt/teaching/MAT319_spring2024/teaching_MAT319_spring2024.html

Your grades will be available through *BrightSpace*. Please check them regularly and notify the TA(s) of any inaccuracies quickly. Any issue with a midterm grade must be resolved within 2 weeks of the date of the midterm; any issue with a problem set grade must be resolved within 2 weeks of the problem set due date. There will be *no* changes to the grades after these deadlines.

Course Description

MAT 319/20 are proofs-oriented courses rigorously treating the key topics of one-variable calculus: sequences and series, limits, continuity, differentiations, and integration. The two courses run together through Midterm I as MAT 319 and split right after it. After Midterm I, MAT 320 will cover similar topics to 319, but from the perspective of *metric spaces* whenever possible. The notion of *metric space* is essential for pursuing advanced study in pure mathematics and also plays important roles in more theoretically flavored subfields of other disciplines (such as physics, computer science, and economics). It is less relevant for many computationally involved subfields, including some in applied mathematics.

The first part of the course (Chapters 1,2 of the required book) combines the sequence/series portion of MAT 127/132 with formal mathematical proofs; after that, the topics get even harder. It would be extremely difficult to pass this course without fulfilling the two prerequisites ahead of time (especially the first one). If the university's electronic safeguards somehow failed to prevent you from registering for MAT 319 without fulfilling either of the prerequisites, you need to leave the course on your own and take it later. Otherwise, the failure of the safeguards may be corrected after you have done some work for this course.

Based on the results of Midterm I and of the first five problem sets and on your preference (as specified on the midterm), you may be transferred into MAT 320 shortly after Midterm I. If you are expecting to finish your degree soon and/or are intending to pursue a career in math education or in a more applied field, MAT 319 may be the more suitable choice for you. If you are still early in your studies at SBU and are hoping to make it into a decent PhD program in pure mathematics right after SBU, you need to do well enough on Midterm I to qualify for MAT 320 and to do well in it, *regardless* of how much effort this will take. Successful completion of MAT 320 might also strengthen applications to PhD programs in some other fields. Please feel free to discuss with the instructors which course might be more suitable for you as it gets closer to Midterm I.

The *required* textbook is a compromise book well suited for both MAT319 and 320. If you have had difficulty with more abstract mathematical concepts in the past and/or would like to see more detailed explanations, you might find the *supplementary MAT 319* textbook useful. If you are in the first or second year of studies at SBU and are seriously considering graduate study in pure mathematics afterward, you are strongly encouraged to acquire the *supplementary MAT 320* textbook and *work through* the corresponding sections in it, *in addition* to the assigned sections in the required textbook.

Grading Policy Details

Midterm I will be the same for MAT 319 and 320. Midterm II and the final exam will be different and will be held in different locations. The problem sets after Midterm I will likewise be different. The letter grades for the semester in the two courses will be assigned independently.

There will be **no make-up exams**

If you have a *legitimate* and *well-documented* reason for missing a midterm exam, your score on the final exam (scaled relative to maximum scores) will be substituted instead. If you miss Midterm I, you will not be considered for transfer to MAT 320. You must advise the course instructor(s) of your legitimate absence from a midterm and provide supporting documentation as soon as possible; each of these must be done as soon as possible even if it is not possible to do them at the same time. Depending on circumstances “as soon as possible” may be months before the exam or immediately after. Having a conflict with another class is not a legitimate excuse. Since LIRR is notoriously unreliable and road traffic is notoriously unpredictable, any travel disruption of these kinds is not a legitimate excuse either.

Bonus for MAT 320, after Midterm I: 1-10 pts (maybe more in extraordinary circumstances) will be added to the corresponding homework score for pointing out typos/mistakes/errors in the textbook, any course notes, and lectures/recitations. Straightforward typos/miswordings will be worth 1pt each; mistakes/errors of mathematical substance will be worth more, depending on their depth and subtlety. Anything already corrected in an erratum is not eligible for the bonus. Only the first person to bring up an issue will receive the bonus.

About Homework Assignments

You *cannot* learn mathematics without working on exercises. Nearly all of the assigned problems will be fairly routine exercises from the textbook. In addition to working on the assigned problems, you should actually do *all* of the problems in the textbook; just looking at them and deciding that you know how to do them is not enough. This will be time-consuming at first, but if you actually figure out what is going on in each section, the exercises will take you minutes to do. This should greatly help you on the exams.

Starting on the homework as soon as possible after each class should save you a lot of time and help pass the course. Try to do every homework problem by yourself first, not “with friends”. If you can’t figure out at least half of the problems *completely* by yourself, you are very unlikely to do sufficiently well on the exams to pass this course. If you are unable to do a problem, even after re-reading the relevant sections from the textbook, then discuss it with someone (other students, course instructors/TAs, MLC tutors, etc.). Make sure to study the proofs and solutions to examples detailed in the required textbook (as some of your homework and exam problems might be similar to these) and any solutions posted on the course webpage (even if you can do all homework problems); this may help you on the exams.

Please read the assigned sections in the textbook thoroughly and *before* the lecture. Each section contains a number of examples that are worked out in detail. Try to do these examples yourself before going through the book’s explanation; this might help with the homework problems. *You will be responsible for the material contained in the assigned sections of the textbook, whether or not it is directly covered in lecture.* Please do not attempt the homework exercises until you have read the corresponding section in the book.

Since it is not possible to spend much time for review in each lecture, you are expected to be familiar with the material covered in the preceding lectures. Please keep up with the class; it will be harder to catch up later.

Homework Policy Details

The full policies concerning the homework will be rigidly enforced, with **NO EXCEPTIONS**.

- (1) Once the TA starts the recitation in which a HW assignment is due, he will no longer accept this assignment. The TA has no discretion in this matter; please do not even ask him to break the explicit instructions he has been given. Late homework will **not** be accepted under *any* circumstances; you will not receive a response to any email asking for an extension. If there is *any* chance of you arriving late to the recitation at which a homework is due or if you will be out of town when it is due, you can turn it in (give to the instructor/TA or slip under the TA's office door) at least 3 hours before it is due (which you are always welcome to do). If something completely unexpected comes up, then you'll benefit from the *lowest HW score dropped* policy. Since the HW counts for 20% of the total grade, it is quite possible for a late HW to affect your letter grade at the end of the semester; so *hand in your homework before it is due*.
 - (2) No homework will be accepted via email. Your solutions must be on paper, stapled *before* they are handed in, and have your first and last names, recitation number (R01 or R02), **SBU ID number**, and HW number in the upper-right corner of the first page. If your solutions are not stapled, you may receive credit for the problems on only one of the sheets that has your name on it (whichever one the grader sees first, not necessarily the one with the highest number of points). If any part of your identifying information is missing, you may receive no credit for the homework at all.
 - (3) The textbook problems in your solutions must be written in the relative order they are listed on the assignment (though you can still skip problems). The non-textbook problems must likewise be done in the relative order they are listed on the assignment and attached either before or after the textbook problems. The graders *will* disregard any problem done out of order. For example, if you write up the solutions in the order #1,2,6,3,4,5, the solutions for #3,4,5 will be disregarded.
 - (4) Partial credit will usually be awarded for partially correct solutions, but the solutions will generally be evaluated only until the first *conceptually* irrelevant statement on each question (part of a problem). On the other hand, if you are unable to do part of a problem, you can take its statement as given when doing later parts of the same problem.
 - (5) The solutions must be *typed and printed* out on a properly working printer. The only exceptions to this rule are:
 - (a) any problems requiring the use of a fill-in form, such as 5.1 and 5.2 on HW1;
 - (b) the identifying info in the upper-right corner of the first pages and any figures/pictures with associated labels;
 - (c) any hand-written solutions that are as easy to read as typed solutions would be.
- Any solutions not in compliance with this rule will not be graded. Typing up the solutions will make it a lot easier for you to proofread and modify them, which should help with your scores on the homework and the exams.
- (6) You are encouraged to discuss any aspects of this class, including your solutions to the homework exercises, with others. However, you **must write your own solutions** to the problem sets. Copying solutions from others or obtaining them online, through free sources or fee-based "tutoring" services, would constitute academic dishonesty, which the instructors are *required* to report to the Academic Judiciary. If you get caught, the consequences will be pretty severe. Even if you do not get caught, you are unlikely to benefit from this, as your scores on the exams will likely suffer.

Caution on the G/P/NC Option

The purpose of this grading option is to encourage exploration of courses that are not directly required for one's degree. It can have unfortunate repercussions if used improperly for courses in which a C is needed for the degree. Before you choose to G/P/NC MAT 319/320 at C+ or higher, please consider whether repeating this course (and potentially delaying your graduation) if you get a C in it is preferable to getting a C on your transcript and being done with MAT 319/320. As you might also be aware, many courses fill up before it is possible to register for them for a second attempt; this could exacerbate any problems arising from improper use of the G/P/NC option even further.

Student Accessibility Support Center (SASC)

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website:

[https://ehs.stonybrook.edu/
programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities](https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities)

and search for *Fire Safety and Evacuation and Disabilities*.

Academic Integrity

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology and Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the Academic Judiciary website at

http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.