

Draft syllabus 5/27/21 – subject to change

This is a draft of the syllabus for this course, made available to give you a sense of the course's structure and expectations. At this point it should be fairly stable, but some sections may still be changed or filled in later. If you have any questions about the course, please don't hesitate to reach out to me at alexsemendinger@brandeis.edu.

Math 10a-1: Techniques of Calculus (a)

Contact Details

Alex Semendinger

Email: alexsemendinger@brandeis.edu

Personal and course Zoom IDs available on Latte.

Meeting Times/Locations

Mon/Tues/Wed/Thurs 9:00 AM – 11:00 AM, on Zoom

Office hours TBA / by appointment

Course Description

Calculus is one of the greatest intellectual achievements of humankind. The beautiful idea at the heart of this subject allows us to explore both the infinite and the infinitesimal. This gives us the tools to model and analyze phenomena that change – which is to say, practically everything!

Course Prerequisite(s):

A solid working knowledge of precalculus. You can check whether your precalculus knowledge is sufficient by [taking the online math placement self-test](#). You can take our Math 5a (Precalculus) course to learn these skills.

Learning Goals:

1. Identify and apply the key ideas and skills of Differential Calculus.
2. Transfer familiar concepts to unfamiliar contexts.
3. Hone your problem-solving skills.
4. Develop and leverage a learning community for math.

Textbook: [Calculus, Volume 1, by Strang, Herman, et. al.](#) Available for free online. We will be covering most of chapters 2-5 (see table below for full details).

Materials: Assignments will be scanned and submitted online; [Adobe Scan](#) works well for this. Some method of sharing your writing (e.g. an iPad, Microsoft Surface, Wacom tablet, etc.) is encouraged for groupwork, but not required.

Credit Hours:

This is a four-credit course, compressed down to one calendar month. Just as success in a regular semester-long course entails a minimum of nine hours of study time per week, success in this course will

entail a minimum of around **35 hours of study time per week** (including readings, problem sets, preparation for quizzes and exams, etc.).

Course Requirements

Attendance

Attendance at all (or nearly all) course meetings is expected. Zoom sessions will be recorded, but watching the recordings later is not a complete substitute for attending class. If you need to miss a class for any reason, please try to let me know in advance.

Homework

The only way to learn calculus is by doing a lot of problems. There will be six homework assignments in total, with due dates provided in the table below. Some subset of the homework problems will be graded for correctness, with the rest graded for completion.

Exams

There will be two midterm exams (on Monday, June 14 and Tuesday, June 22), as well as a final exam on July 1 from 9 am - noon. The final exam will not be cumulative. Exams will be proctored on Zoom during the usual class time; no notes, textbooks, online resources, or outside help of any kind will be permitted. If you will be unable to attend class on the date of one of the exams, please let me know as soon as possible so we can make alternative arrangements.

Participation

Your participation grade will be based on in-class quizzes, completed individually or in groups. Participation also entails keeping up with textbook readings, showing up to class regularly, keeping your video on during Zoom meetings when possible, raising questions when ideas become unclear, and contributing to group work.

Evaluation and Grading

Your final grade will be composed of your homework, participation, and exam grades with the following weights.

Exams: 50% (two midterms and a final, each weighted equally)

Homework: 35%

Participation: 15%

Course Plan

Be aware that this course will cover all of the same material as a typical semester-long course over the span of one month. Each week of our class will be comparable to three weeks of a typical semester course. This makes it extremely important that you keep up with the material and ask for help quickly if you're not understanding something.

This is an

Date	Section(s)	Topic	Work to submit
<i>Week 1</i>	<i>Chapter 2</i>	<i>Limits and continuity</i>	
6/1	2.1	Introduction / Preview of calculus	
6/2	2.2/2.3	The limit of a function / The limit laws	
6/3	2.4	Continuity	
<i>Week 2</i>	<i>Chapter 3</i>	<i>Derivatives and derivative rules</i>	
6/7	3.1/3.2	Defining the derivative / The derivative as a function	HW 1: 2.1-2.4
6/8	3.3/3.4	Differentiation rules / Derivatives as rates of change	
6/9	3.5/3.6	Derivatives of trig functions / The chain rule	
6/10	3.8/3.9	Implicit differentiation / Derivatives of exp and log functions	HW 2: 3.1-3.6
<i>Week 3</i>	<i>Chapter 4</i>	<i>Applications of derivatives</i>	
6/14		MIDTERM ONE (sections 2.1 – 3.6)	
6/15	4.1 / 4.3	Related rates (cont.) / Maxima and minima	
6/16	4.5/4.6	Derivatives and the shape of a graph / Limits at infinity and asymptotes	HW 3: 3.8, 3.9, 4.1, 4.3
6/17	4.7	Applied optimization problems	
<i>Week 4</i>	<i>Chapters 4/5</i>	<i>Applications of derivatives / Integration</i>	
6/21	4.8 / 4.10	L'Hôpital's Rule / Antiderivatives	HW 4: 4.5-4.7
6/22		MIDTERM TWO (sections 3.8 – 4.7)	
6/23	5.1	Approximating areas	
6/24	5.2	The definite integral	HW 5: 4.8, 4.10, 5.1
<i>Week 5</i>	<i>Chapter 5</i>	<i>Integration / Review</i>	
6/28	5.3/5.4	Fundamental Theorem of Calculus / Net change theorem	
6/29	5.5/5.6	Integration by substitution / exp and log integrals	HW 6: 5.2-5.6
6/30		Review	
7/1		FINAL EXAM (sections 4.8 – 5.6; not cumulative)	

Accommodations

Brandeis seeks to create a learning environment that is welcoming and inclusive of all students, and I want to support you in your learning. Live auto transcription is available for all meetings or classes hosted on Zoom and you can turn it on or off to support your learning. Please [check for Zoom updates](#) to take advantage of this new feature. To learn more, visit the [Zoom Live Transcription webpage](#). For questions, contact help@brandeis.edu

If you think you may require disability accommodations, you will need to work with Student Accessibility Support (SAS) (781-736-3470, access@brandeis.edu). You can find helpful student FAQs and other resources on the [SAS website](#), including guidance on how to know whether you might be eligible for support from SAS. If you already have an accommodation letter from SAS, please provide me with a copy as soon as you can so that I can ensure effective implementation of accommodations for this class. In order to coordinate exam accommodations, ideally you should provide the accommodation letter at least 48 hours before an exam.

Important Policies and Resources

Academic Integrity

Every member of the University community is expected to maintain the highest standards of academic integrity. A student shall not submit work that is falsified or is not the result of the student's own effort. Infringement of academic integrity by a student subjects that student to serious penalties, which may include failure on the assignment, failure in the course, suspension from the University or other sanctions. Please consult [Brandeis University Rights and Responsibilities](#) for all policies and procedures related to academic integrity. Students may be required to submit work via TurnItIn.com or similar software to verify originality. A student who is in doubt regarding standards of academic integrity as they apply to a specific course or assignment should consult the faculty member responsible for that course or assignment before submitting the work. Allegations of alleged academic dishonesty will be forwarded to the Department of Student Rights and Community Standards. Citation and research assistance can be found at [Brandeis Library Guides - Citing Sources](#).

Breaks

Class meetings of 90 minutes include a 10-minute break, while class meetings of 180 minutes include two breaks, at the instructor's discretion.

Course Materials/Books/Apps/Equipment

If you are having difficulty purchasing course materials, please make an appointment with your Student Financial Services or Academic Services advisor to discuss possible funding options, including vouchers for purchases made at the Brandeis Bookstore.

LATTE

[LATTE](#) is the Brandeis learning management system. Login using your UNET ID and password. For LATTE help, contact Library@brandeis.edu.

Library

[The Brandeis Library](#) collections and staff offer resources and services to support Brandeis students, faculty and staff. Librarians and Specialists from Research & Instructional Services, Public Services, Archives & Special Collections, Sound & Image Media Studios, MakerLab, AutomationLab, and Digital Scholarship Lab are available to help you through consultations and workshops.

Privacy

To protect your privacy in any case where this course involves online student work outside of Brandeis password-protected spaces, you may choose to use a pseudonym/alias. You must share the pseudonym/alias with me and any teaching assistants as needed. Alternatively, with prior consultation, you may submit such work directly to me.

Student Support

Brandeis University is committed to supporting all our students so they can thrive. If a student, faculty, or staff member wants to learn more about support resources, the [Support at Brandeis](#) webpage offers a comprehensive list that includes these staff colleagues you can consult, along with other support resources:

- The [Care Team](#)
- [Academic Services](#) (undergraduate)
- [Graduate Student Affairs](#)
- Directors of Graduate Studies in each department, School of Arts & Sciences
- Program Administrators for the Heller School and International Business School
- [University Ombuds](#)
- [Office of Equal Opportunity](#).