MATH 10b: METHODS AND TECHNIQUES OF CALCULUS (2)
Fall 2018

Section 1
Instructor: Keith Merrill
Office: Goldsmith 205
e-mail address: merrill2@brandeis.edu
Office hours: TBD

Instructors: Keith Merrill, Changxin Ding, Langte Ma, Zachary Larsen, Yu Xin.


Prerequisites. A grade of C- or above in Math 10a or a satisfactory score on the calculus placement exam at http://www.brandeis.edu/registrar/newstudent/testing.html#mathtest. You must also know the material in Section 4.8 of your textbook, which was covered in Math 10a.

Exams. There will be two midterm exams and a final exam.

• Exam 1: Tuesday, 10/2, 7:30-9:30 pm, location TBD.
• Exam 2: Tuesday, 10/30, 7:30-9:30 pm, location TBD.
• Final Exam: During Math Common Exams block, as scheduled by the registrar.

Midterm exams are in the evening since 10b is a multi-section course. If you have an academic conflict (such as a class, lab, or another exam) with a midterm, inform your instructor at least one week before the exam. If the conflict can’t be resolved, we will offer you a make-up exam.

Grades. Your grade in the course will be based on the following:

(1) Homework (10% of your grade)
   • Homework assignments will be collected once or twice a week.
   • Out of fairness to everyone, and because of the difficulty in getting late homework graded, no late homework will be accepted. But your three lowest homework grades will be dropped, so that only your best scores count.
   • You are absolutely encouraged to discuss homework problems with your classmates, but you must write up your own solutions. You may not use any solution manuals.

(2) Quizzes (10% of your grade)
   • Short quizzes will be given regularly.
   • The lowest 25% of your quiz grades will be dropped. Unexcused missed quizzes will count as zeros.

(3) Two midterm exams (each 25% of your grade)
(4) Final exam (30% of your grade)

Calculators. You should have access to a scientific calculator (an online one is OK). Calculators are not allowed during exams or quizzes. You do not need a graphing calculator.

LATTE. All course materials for Math 10b will be available online on LATTE. Log in at http://latte.brandeis.edu using your Unet username and password.

Math 10b Self-quizzes. There is a link called “Self-quizzes” on your Math 10b LATTE coursepage. The Math 10b self-quizzes cover all the material being studied in Math 10b. Complete solutions to each self-quiz are given. These self-quizzes are optional and for your use only, and have no effect on your grade.

OVER
Office hours. You are encouraged to use your instructor’s office hours whenever you have questions about the course material. If you can’t attend office hours, don’t hesitate to ask for an appointment at another time.

Evening help sessions. You are welcome to attend the Math Department’s evening help sessions whenever you have questions or would like help with problems. These are drop-in sessions that are available to students in Math 5a, 10a and 10b every Monday, Tuesday, Wednesday and Thursday evening anytime between 7:00 pm and 9:00 pm. Help sessions are held in Goldsmith 101 and will begin Tuesday, Sept 4.

Four-Credit Course (with three hours of class time each week). Success in this 4 credit hour course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class (readings, papers, discussion sections, preparation for exams, etc).

Students with disabilities. If you are a student who needs academic accommodations because of a documented disability you should contact Professor Keith Merrill and present your letter of accommodation as soon as possible. Professor Merrill’s email is merrill2@brandeis.edu. If you have questions about documenting a disability or requesting academic accommodations you should contact Beth Rodgers-Kay in the Office of Academic Services at 63470 or at brodgers@brandeis.edu. Letters of accommodations should be presented at the start of the semester to ensure provision of accommodations. Accommodations cannot be granted retroactively.

Academic Integrity. You are expected to follow the University’s policy on academic integrity, which is distributed annually as Section 4 of the Rights and Responsibilities Handbook (see http://www.brandeis.edu/studentaffairs/srcs/rr/index.html). Instances of alleged dishonesty will be forwarded to the Department of Student Development and Conduct for possible referral to the Student Judicial System. Potential sanctions include failure in the course and suspension from the University. If you have any questions about how these policies apply to your conduct in this course, please ask.

Learning Goals for Math 10b. Students in Math 10b will:

- Identify and apply key ideas and concepts, including:
  1. Understand the definition of the definite integral, and its interpretation in terms of area and net change.
  2. Understand the relationship between differential and integral calculus (The Fundamental Theorem(s) of Calculus).
  3. Learn to compute elementary integrals and to use the following techniques of integration: substitution, integration by parts and partial fractions.
  4. Understand improper integrals and learn to determine if an improper integral converges.
  5. Understand some of the applications of integration, including area, volume, arc length and average value of a function.
  6. Learn what a differential equation is, and how to solve simple differential equations (including separable equations).
  7. Understand the definition of an infinite series and how to test a series for convergence.
  8. Understand the definition of a power series and learn to find the interval of convergence of a power series.
  9. Learn to find the Taylor series of a function.
• Hone quantitative reasoning skills by solving problems that present familiar material in new ways.

• Practice breaking down a complicated problem into simpler pieces, solving those pieces, and reassembling them. This skill will help you in all your science courses.

• Gain confidence by employing a large number of techniques to solve commonly occurring types of problems.

**Topics covered in Math 10b (Integral Calculus)**

Order may change

Section 3.6 Inverse Trig Functions and their Derivatives
Appendix F Sigma Notation
Section 5.1 Areas and Distances
Section 5.2 The Definite Integral
Section 5.4 The Fundamental Theorem of Calculus (FTC I)
Section 5.3 The Fundamental Theorem of Calculus (FTC II)
Section 5.5 Integration by Substitution
Section 5.6 Integration by Parts
Section 5.7 Additional Techniques of Integration (Partial Fractions)
Section 5.9 Approximate Integration (Midpoint and Trapezoidal Rules)
Section 5.10 Improper Integrals
Section 6.1 More about Areas
Section 6.2 Volumes (Disks and Washers)
Section 6.4 Arc Length
Section 6.7 Applications to Economics and Biology
Section 7.1 Introduction to Differential Equations
Section 7.2 Solving Separable Differential Equations
Section 8.1 Sequences
Section 8.2 Introduction to Series
Section 8.3 The Integral Test
Section 8.4 Other Convergence Tests (Alternating Series Test and Ratio Test)
Section 8.5 Power Series
Section 8.6 Representations of Functions as Power Series
Section 8.7 Taylor and MacLaurin Series