

MATH 1210-027 Calculus I

Xuesong Bai (a.k.a. Maverick)

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Class Hours: Tuesday and Thursday, 06:00PM - 08:00PM

Class Room: CSC 208

Lab Hours: Section 028: Thursday, 04:35PM-05:25PM; Section 029: Wednesday, 06:00PM-06:50PM.

Lab Room: JTB 120 (both sections)

Learning Assistant: Elizabeth M Goodwin

Office Hours: TBA; also on Zoom or by appointment

Office Room: JWB 211

Text

Calculus with Differential Equations, by Varberg, Purcell, and Rigdon (9th edition). For information on purchasing the textbook, go to <http://www.math.utah.edu/schedule/bookInfo/>

Course Information

Math 1210 Calculus I. This is a 4 credit course.

Prerequisite

“C” or better in (((MATH 1050 AND 1060) OR MATH 1080 OR (MATH 1060 AND Accuplacer CLM score of 80+))
OR AP Calc AB 3+
OR Accuplacer CLM 90+
OR ACT Math 28+
OR SAT Math 630+
OR Department Consent.

Course Description

Functions and their graphs, differentiation of polynomial, rational and trigonometric functions. Velocity and acceleration. Geometric applications of the derivative, minimization and maximization problems, the indefinite integral, and an introduction to differential equations. The definite integral and the Fundamental Theorem of Calculus.

Expected Learning Outcomes

Upon successful completion of this course, a student should be able to:

1. Take limits of algebraic and trigonometric expressions of the form $0/0$ (that simplify), non-zero number over 0, including limits that go to (positive or negative) infinity, limits that don't exist and limits that are finite.
2. Use and understand the limit definitions of derivative for polynomial, rational and some trigonometric functions; understand the definition of continuity and consequences.
3. Differentiate all polynomial, rational, radical, and trigonometric functions and compositions of those functions; perform implicit differentiation and compute higher order derivatives.
4. Use differentiation to find critical points and inflection points, the signs of the first and second derivatives, and domain and limit information to determine vertical and horizontal asymptotes. Then use all of that information to sketch the graph of $y = f(x)$.
5. Apply differentiation to optimization, related rates, linear approximation, and problems involving differentials.
6. Compute indefinite integrals and find antiderivatives, including finding constants of integration given initial conditions.
7. Compute definite integrals using the definition for simple polynomial functions. Compute definite integrals using the power rule, basic u-substitution, and the Fundamental Theorems of Calculus.
8. Apply the definite integral to compute area between two curves, volumes of solids of revolutions, arc length, surface area for surfaces of revolution, and work problems.

Grading

The following are the grade components and the percentage each contributes to a student's final grade:

- **Homework Assignments (12.5%)** - Roughly three textbook sections are due most **Fridays, by 11:00PM** (including weeks of exams, but not the week following). The homework will typically cover material covered up to and including the preceding Monday. If you click on a homework assignment in the Assignments tab in Canvas, you will see the list of assigned

problems. **Homework assignments must be submitted to Gradescope**, and the link for each assignment can be found in the Gradescope tab in Canvas. Three of the problems will be selected for grading by the grader, each graded out of 5 points. There will also be 5 points given for completion. Three lowest homework scores will be dropped. **No late homework will be accepted, unless accompanied by a doctor's note or other verification of extenuating circumstance.**

- **Labs (12.5%)** - Every Thursday a Learning Assistant- (LA) directed lab section will be held. These lab sections will have smaller class sizes, consisting of working on lab worksheets in groups. The LA will be there to help guide students through the problems. The worksheets will typically be due at the end of the lab period. One third of the lab grade (about 4% of the total course grade) will be given for attendance, the remaining grade (about 8% of the total course grade) will be based on the quality of the lab reports. Two lowest lab scores will be dropped.
- **Midterm Exams (50%, 16.6% each)** - Three 50-minute midterm exams will be given on select Fridays. A practice exam will be posted a week prior to the midterm that will cover the same material. Dates of the midterm exams will be **Thursday Sep. 16th, Thursday Oct. 21st, and Thursday Nov. 18th.**
- **Final Exam (25%)** - A two-hour comprehensive exam will be given. As with the midterms, a practice final will be posted a week prior. Our final exam is scheduled for **Tuesday, Dec. 14th 6:00PM - 8:00PM in CSC 208.**

Students with university excused absences (band, debate, student government, intercollegiate athletics) should make alternate arrangements with me as soon as possible if the absence interferes with any course components.

Grading Scale

Final course letter grades will be determined as follows: If X is your course percentage weighted according to the above, then $\{X \geq 88\% \Rightarrow A, X \geq 85\% \Rightarrow A-, X \geq 82\% \Rightarrow B+, X \geq 73\% \Rightarrow B, X \geq 70\% \Rightarrow B-, X \geq 67\% \Rightarrow C+, X \geq 58\% \Rightarrow C, X \geq 55\% \Rightarrow C-, X \geq 52\% \Rightarrow D+, X \geq 43\% \Rightarrow D, X \geq 40\% \Rightarrow D-, X < 40\% \Rightarrow E\}$.

The instructor retains the right to modify this grading scheme during the course of the semester; students will be well notified of any adjustments.

Exam Policies

Exams (midterm and final) will be closed book and closed notes. **Calculators, laptops, and any other electronic devices will not be allowed.** They may be used on homework, but you should still write out all the details of your computation. It is in your best interest not to become too dependent on electronic devices since they will not be allowed on exams.

Additional Resources

- **Tutoring Center & Computer Lab**- There is free tutoring in the T. Benny Rushing Mathematics Student Center (room 155, the lower level between JWB and LCB), as well as a computer lab. For more information see <http://www.math.utah.edu/undergrad/mathcenter.php>
- **Private Tutoring**- ASUU Tutoring Center, 330 SSB. There is also a list of tutors at the math department office JWB 233.
- **Departmental Videos**- The math department has a full set of lecture videos which you are welcome to use to supplement our course material. These can be found at <http://www.math.utah.edu/lectures/>

Tentative schedule and weekly learning goals

The schedule is tentative and subject to change.

Week 01, 08/23 - 08/27: 1.1-1.3

- Lab: algebra review

Week 02, 08/30 - 09/03: 0.7, 1.4, 1.5

- Lab: limit basics
- **Friday Sep. 3rd is the last day to drop**

Week 03, 09/06 - 09/10: 1.6, 2.1, 2.2

- Lab: limits and infinities

Week 04, 09/13 - 09/17: 2.3 & Midterm 1

- **Midterm 1 on Thursday, September 16**
- Lab: exam review

Week 05, 09/20 - 09/24: 2.4-2.6

- Lab: derivative as a limit

Week 06, 09/27 - 10/01: 2.7-2.9

- Lab: derivative rules

Week 07, 10/04 - 10/08: 3.1-3.3

- Lab: linearization and differentials

Week 08, 10/11 - 10/15: Fall break

Week 09, 10/18 - 10/22: 3.4 & Midterm 2

- **Midterm 2 on Thursday, October 21**
- Lab: exam review

Week 10, 10/25 - 10/29: 3.5-3.7

- Lab: optimization

Week 11, 11/01 - 11/05: 3.8-4.1

- Lab: graphing functions & MVT

Week 12, 11/08 - 11/12: 4.2-4.4

- Lab: antiderivatives and applications

Week 13, 11/15 - 11/19: 4.5, 4.6 & Midterm 3

- **Midterm 3 on Thursday, November 18**
- Lab: exam review

Week 14, 11/22 - 11/26: 5.1-5.2

- Lab: evaluating definite integrals

Week 15, 11/29 - 12/03: 5.3-5.4

- Lab: applications of integration

Week 16, 12/06 - 12/10: 5.5 & Final review

- Lab: final exam review

Week 17, 12/13 - 12/17: Final Exam

- **Final exam on Tuesday, December 14**

Disclaimer

The syllabus is not a binding legal contract. It may be modified by the instructor according to changes in future situations. Students will be given reasonable notice of the modifications.

Appendix

Academic dishonesty

Academic dishonesty is strictly not tolerated and subject to an automatic E in this course; your enrollment in this course indicates that you understand and will follow my and University policies regarding academic dishonesty. As defined in the University Code of Student Rights and Responsibilities, academic misconduct includes, but is not limited to, cheating, misrepresenting one's work, inappropriately collaborating, plagiarism, and fabrication or falsification of information. It also includes facilitating academic misconduct by intentionally helping or attempting to help another student to commit an act of academic misconduct.

Student Responsibilities

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. You have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, collusion, fraud, theft, etc. Students should read the Code carefully and know you are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee. <http://regulations.utah.edu/academics/6-400.php>

University leadership urges all faculty, students, and staff to model the vaccination, testing, and masking behaviors we want to see in our campus community. These include:

Vaccination

Get a COVID-19 vaccination if you have not already done so. Vaccination is proving highly effective in preventing severe COVID-19 symptoms, hospitalization and death from coronavirus. Vaccination is the single best way to stop this COVID resurgence in its tracks. Visit <http://mychart.med.utah.edu/>, <http://alert.utah.edu/covid/vaccine>, or <http://vaccines.gov/> to schedule your vaccination.

Masking

While masks are no longer required outside of Health Sciences facilities, UTA buses and campus shuttles, CDC guidelines now call for everyone to wear face masks indoors.

Testing

If you are not yet vaccinated, get weekly asymptomatic coronavirus tests. This is a helpful way to protect yourself and those around you because asymptomatic individuals can unknowingly spread the coronavirus to others. Saliva based testing is available at alert.utah.edu/covid/testing

Self-Reporting

All of us, including faculty, students, and staff, must self-report if we test positive for COVID-19 via this website: <https://coronavirus.utah.edu/>.

The following five items are standard syllabus items not directly related to Covid. Note, however, that some of the services described may be available only on a modified or limited basis due to the Covid pandemic. Check online or call the relevant unit for up to date information.

The Americans with Disabilities Act

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020, <https://disability.utah.edu/>. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Addressing Sexual Misconduct

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted on the basis of your sex, office for equal opportunity and affirmative action including sexual orientation or gender identity/expression, you are encouraged to report it to the University's Title IX Coordinator; Director, Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, <https://oeo.utah.edu/contact-us/index.php> or to the Office of the Dean of Students, 270 Union Building, 801-581-7066, <https://deanofstudents.utah.edu/>. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to police, contact the Department of Public Safety, 801-585-2677(COPS), <https://police.utah.edu/>.

Campus Safety

The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677).

You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu

University Counseling Center

The UCC staff is committed to supporting the mental health needs of our campus community. Their phone number is 801-581-6826. Their hours are Monday-Friday, 8:00am-5:00pm. For after-hours emergencies, contact the 24/7 Crisis Line: 801-587-3000. More information is at <https://counselingcenter.utah.edu/>.

Office of the Dean of Students

The Office of the Dean of Students is dedicated to being a resource to students through support, advocacy, involvement, and accountability. It serves as a support for students facing challenges to their success as students, and assists with the interpretation of University policy and regulations. To contact the Office of the Dean of Students, please email deanofstudents@utah.edu or call 801-581-7066. There is more information at <https://deanofstudents.utah.edu/> .