MATHS1101 - Calculus I. Summer 2024.

Basic info.

Instructor : Baiqing Zhu. email : bz2393@columbia.edu

Class room : 337 Seeley W. Mudd Building Class times : Tu Th 9:00 am - 12:10 pm.

Office hours and rooms : Tu Th 3:00 pm - 4:00 pm (or by appoinment) at Mathematics 528.

TA: TBD

Textbook. *CALCULUS: EARLY TRANSCENDENTALS*, 9th edition, by James Stewart, Daniel Clegg, and Saleem Watson. Please make sure that you have the right edition of the textbook!

Course overview.

- Limits and derivatives of functions.
- Differentiation rules.
- Applications of differentiation.
- Integrals and applications.

Learning objectives.

Understand the basic concepts of limit and continuity of functions. Familiar with the operations of differentiation. Applying the differentiation to solve problems in the real world. Understand the concept of definite integrals. Fundamental theorem of calculus.

Exams and homework.

- Homework (30%) : It will be assigned every Tuesday and Thursday. The homework assigned on Tuesday (resp. Thursday) will be due next Tuesday (resp. Thursday). Homeworks will be submitted via Canvas and graded on Gradescope.
- Midterm exams (30%): we have one **in-person** midterm which will take **1.5 hours**. It's now (tentatively) scheduled on **Thursday June 6th** during normal class hours.
- Final exam (40%): we have **in-person** final exam which takes **2 hours**. It's now scheduled on **Thursday June 27th** during normal class hours.

Course policies.

Late work. Each written assignment will have a grace period of 12 hours past their due date and a late due date. Work submitted after the grade period, but before the late due date will incur a penalty of 20% per day calculated from the end of the grade period. There will be no credit granted to any written assignment that is not submitted past the late due date noted in the course syllabus without advance notice and permission from the instructor.

Collaborations. While you are welcome to collaborate with your peers with your homework, you must attempt all problems on your own and your submitted solutions must be written out individually. Submissions which are copied or suspiciously similar may be rejected. A substantiated violation of the code of academic integrity may result to serious academic disciplinary action.

Tentative class plan and assigned exercises.

Date	Topic	Sections
Tu 5/21	Functions, New functions from old. Trigonometric functions, Exponential function, inverse functions, logarithms.	§1.1, 1.2, 1.3 §1.4, 1.5
Th 5/23	Derivative: motivation. Informal definition of limit. Limit laws. Squeeze theorem. Continuity, asymptotes.	§2.1, 2.2, 2.3 §2.5, 2.6
Tu 5/28	Definition of derivative. Derivative as a function. Triple Integrals. Derivative of polynomials. Product and quotient rules.	§2.7, 2.8 §3.1, 3.2
Th 5/30	Derivatives of trigonometric functions. Chain rule, implicit differentiation.	§3.3 §3.4, 3.5
Tu 6/4	Derivative of the logarithm. Applications. Related rates, linear approximation.	§3.6, 3.7, 3.8 §3.9, 3.10
Th 6/6	**1st Midterm**; Maximization. Mean value theorem.	 §4.1, 4.2
Tu 6/11	Second derivative, convexity, second derivative test. L'Hospital's rule. L'Hospital's rule, more graph sketching.	§4.3, 4.4 §4.5, 4.6
Th 6/13	Optimization problems. Newton's method.	§4.7 §4.8
Tu 6/18	Antiderivatives. Definite integral: definition.	§4.9 §5.1
Th 6/20	The "area so far" function. The fundamental theorem of calculus. Evaluating definite integrals via the "net change theorem".	§5.3, 5.4 §5.5
Tu 6/25	Substitution rule. Areas between curves, average values. Review the whole class	§6.1, 6.5
We 6/26	Reading day	
Th 6/27	**Final Exam**	

Letter grade scale.

Grade	Percentage
A+	98-100%
A	93-97.9%
A-	90-92.9%
B+	87-89.9%
B	83-86.9%
B-	80-82.9%
C+	77-79.9%
C	73-76.9%
C-	70-72.9%
D	60-69.9%
F	59.9% and below

University policies and resources.

Academic Integrity. Columbia University expects its students to act with honesty and propriety at all times and to respect the rights of others. It is fundamental University policy that academic dishonesty in any guise or personal conduct of any sort that disrupts the life of the University or denigrates or endangers members of the University community is unacceptable and will be dealt with severely. It is essential to the academic integrity and vitality of this community that individuals do their own work and properly acknowledge the circumstances, ideas, sources, and assistance upon which that work is based. Academic honesty in class assignments and exams is expected of all students at all times.

Diversity Statement. It is our intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength and benefit. It is our intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture.

Accessibility. Columbia is committed to providing equal access to qualified students with documented disabilities. A student's disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process. For more information regarding this service, please visit the University's Health Services website: https://health.columbia.edu/content/disability-services.