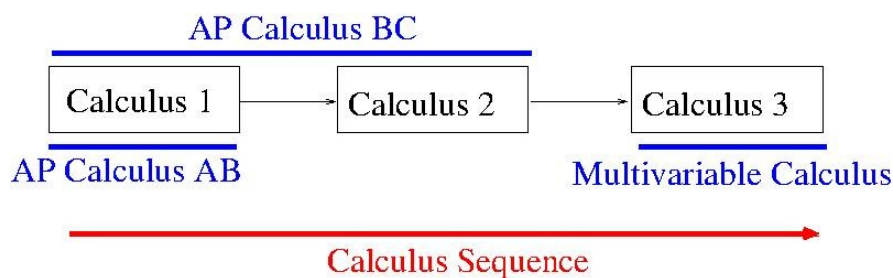


Summer 2021 AP Calculus AB (Calculus 1)

Syllabus

NOTE: The content of calculus proceeds in the sequence **Calculus 1,2 and 3.**

- **AP Calculus AB** is equivalent to Calculus 1.
- **AP Calculus BC** is equivalent to Calculus 1 and 2.
- **Multivariable Calculus** is equivalent to Calculus 3.



CONTACT

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WHEN AND WHERE?

Term: June 2 – Aug. 17 (excluding July 4-10 week)

Lecture: 7-9pm (CT), Wed. & Sat.

Homework Recitation: 5:30-6:30pm (CT), Fri. & Tue.

Format:

- 20 2-hour online zoom lectures + 20 1-hour online zoom recitations
- 20 homework assignments (1 after each lecture) + 4 take-home exams

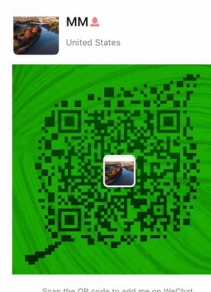
RESOURCES

Textbooks:

- [1] Dr. Xu's **lecture and review notes**: crafted with references to different resources; ready before each class in the Google classroom
- [2] Calculus Volume 1 within the OpenStax project (free online or order a print copy) <https://openstax.org/details/books/calculus-volume-1>
- [3] The Princeton Review, *AP Calculus AB Exam Premium Prep*, 2021

References:

- [4] R. Larson & B. Edwards, *Calculus Early Transcendental Functions*, Edition 6e
- [5] J. Stewart, *Essential Calculus Early Transcendentals*, 2nd Edition



COURSE DESCRIPTION

Calculus 1 is the first course in a generally 3-course sequence of calculus. Calculus 1 covers **differential and integral calculus** for algebraic, trigonometric functions and other transcendental **univariate** functions, with **applications** to curve sketching, optimization problems, area and volume. After this course, the students are expected to gain **clear understanding of various concepts and ideas in calculus** and **strong analytical problem-solving skills**.

TENTATIVE SCHEDULE

Unit 1: Limits and Continuity

1. Preview of calculus and limits
2. Calculation of limits and continuity
3. Limits and asymptotes

Unit 2: Derivatives

1. Definition of derivatives
2. Differentiation rules and derivatives of elementary functions
3. The chain rule
4. Derivatives of inverse functions

Unit 3: Applications of Derivatives

1. Implicit differentiation and related rates
2. Linear approximation and differentials
3. Maxima, minima and the MVT
4. Curve sketching
5. Optimization problems
6. L'Hopital's Rule

Unit 4: Integration

1. Antiderivatives and indefinite integrals
2. Definite integrals
3. The fundamental theorem of calculus
4. Substitution

Unit 5: Applications of Integration

5. Solving differential equations
6. Area problems
7. Volume problems