

# AP Calculus BC Part 2 (Calculus 2, after AP Calculus AB)

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

 MM [www.xumath.org](http://www.xumath.org)  
United States

**CONTACT:** 214-907-8310(M), [meimei.shengxu@gmail.com](mailto:meimei.shengxu@gmail.com),  
**webchat ID:** tsinghua954251 (or scan the QR code)

**TO REGISTER:** <https://xumath.org>



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## WHEN AND WHERE?

**Term:** Aug 21, 2024 – Jan. 7, 2025

**Lecture Videos:** Available on Canvas on Wed.

**Recitation Videos:** Available on Canvas on Mon.

**Live Zoom Q&A:** Wed. 7:00pm-8:30pm (CT)

**Format:**

- 20 2-hour lecture videos + 20 1-hour homework recitation videos + 20 1.5-hour live zoom Q&A
- 20 homework assignments (to be graded) + 2 exams (to be graded)
- A student can request the video of a Q&A class if the student has to miss the class.

**Tuition:** \$690 (before July 22, 2024), \$720 (after July 22, 2024)

## WHO TEACHES?

**Dr. Sheng Xu:** Associate professor of math at Southern Methodist University

- Ph.D. from Cornell and post-doc at Princeton and Cornell
- 18 years and 15 math courses teaching experience
- Betty McKnight Spears Endowed Teaching Excellence Award in Math
- Recommendation by K12 students and parents in anonymous testimonials on <https://xumath.org>
- Author of an undergraduate textbook: *Introduction To Scientific Computing*, Taylor Francis

## COURSE INFO

**Syllabus, Sample Notes and Videos:** <https://xumath.org>

**Required Textbook:**

- [1] Customized notes by Prof. Xu (available before each class)
- [2] Calculus Volume 2 within the OpenStax project (free online or order print copies)  
<https://openstax.org/details/books/calculus-volume-2>

**References:**

- [3] R. Larson & B. Edwards, *Calculus Early Transcendental Functions*, Edition 6e, ISBN 1-285-77977-9
- [4] J. Stewart, *Essential Calculus Early Transcendentals*, 2<sup>nd</sup> Edition, ISBN 1-133-11228-5

# TOPICS

## **Unit 1: Techniques of Integration**

1. Integration by parts
2. Trigonometric integrals
3. Partial fractions
4. Other integration techniques
5. Improper integrals

## **Unit 2: Sequences and Series**

1. Sequences and series
2. Integral and comparison tests
3. Other convergence tests

## **Unit 3: Power Series**

1. Power series
2. Representing functions as power series
3. Taylor and Maclaurin series
4. Applications of Taylor's theorem

## **Unit 4: Parametric Equations and Polar Coordinates**

1. Parametric equations
2. Calculus of parametric curves
3. Polar coordinates
4. Areas and lengths in polar coordinates

## **Unit 5: Differential Equations**

1. Direction fields and numerical methods
2. Separable equations
3. The logistic equation