

**MATH C2220 - Calculus II: Early Transcendentals****Catalog Description****Transfer Status:** CSU/UC**Prerequisite:**

Calculus I: Early Transcendentals (MATH C2210), or equivalent, or placement as determined by the college's multiple measures assessment process.

**Unit(s):** 4.00**Lecture:** 68.00 Contact hours/136.00 Out of class hours/204.00 Total hours/4.00 Unit(s)**Total:** 68.00 Contact hours/136.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

**Course Description:** A second course in differential and integral calculus of a single variable. Topics include applications of integration, techniques of integration, infinite sequences and series, and the calculus of parametric and polar equations. This course is primarily intended for Science, Technology, Engineering, and Mathematics (STEM) majors. (C-ID MATH 220).

**Objectives**

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

1. Apply integration to find areas and volumes.
2. Evaluate definite and indefinite integrals using a variety of integration formulas and techniques.
3. Use integration to solve applications such as work or length of a curve.
4. Evaluate improper integrals.
5. Represent functions as power series.
6. Graph, differentiate, and integrate functions in polar and parametric form.
7. Determine convergence of sequences and series.

**Course Content****Topic Titles / Suggested Time Topic****Lecture****Topics****Lec Hrs**

|   |       |
|---|-------|
| 1. Applications of integration to areas between curves and volumes, including volumes of solids of revolution   | 68.00 |
| 2. Techniques of integration, including integration by parts, trigonometric substitution, and partial fraction decomposition  |       |
| 3. Numerical integration, including trapezoidal and Simpson's rules   |       |
| 4. Improper integrals   |       |
| 5. Additional applications of integration, such as work, arc length, area of a surface of revolution, moments and centers of mass, separable differential equations, growth and decay |       |
| 6. Introduction to sequences and series   |       |
| 7. Multiple tests for convergence of sequences and series   |       |
| 8. Power series, radius of convergence, interval of convergence   |       |
| 9. Differentiation and integration of power series  |       |
| 10. Taylor series expansion of functions  |       |
| 11. Parametric equations and calculus with parametric curves  |       |
| 12. Polar curves and calculus in polar coordinates  |       |

**Total Hours: 68.00****Methods of Instruction**

- A. Collaborative Group Work
- B. Discussion
- C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- D. Lecture

## Methods of Evaluation

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- A. Students should demonstrate their mastery of the learning objectives and their ability to devise, organize, and present complete solutions to problems.

Examples of potential methods of evaluation include, but are not limited to, exams, quizzes, homework, classwork, technology-based activities, laboratory work, projects, and research demonstrations.

Methods of evaluation are at the discretion of local faculty.

## Examples of Assignments

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### Reading Assignments

1. Read section in the textbook on solids of revolution and be able to determine when the disk method or shell method is the appropriate method to use.
2. Read the section in the textbook on improper integrals and be able to distinguish between the two basic types.

### Writing Assignments

1. Assume you are explaining the steps to a fellow student who is having trouble and describe the process of finding a Taylor polynomial degree four about  $x = 1$  for  $f(x)=\ln(x)$ .
2. Write down the process you would go through to solve the improper integral of  $1/(x+1)$  with a lower limit of  $-1$  and an upper limit of  $2$ .

### Out-of-Class Assignments

1. Review the section in the textbook on partial fractions and solve the problems assigned by the instructor showing all steps.
2. Review the section in the textbook on Work Problems and solve the problems assigned by the instructor showing all work.

## Recommended Materials of Instruction

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Briggs, W., et al. (2021). *Calculus: Early Transcendentals*. Pearson, 3rd. 9780134763644.

Hass, J., et al. (2023). *Thomas' Calculus: Early Transcendentals*. Pearson, 15th. 9780137728626.

Stewart, J., et al. (2021). *Calculus: Single Variable Calculus Early Transcendentals*. Cengage, 9th. 9780357022269.

### Zero Cost Textbook

Strang, G., Herman, E., et al. (2016 & Web 2025). *Calculus Volume 2*. OER: OpenStax. <https://openstax.org/details/books/calculus-volume-2/>

### Other Learning Materials

A college level textbook designed for science, technology, engineering and math majors, and supporting the learning objectives of this course. Texts used by individual institutions and even individual sections will vary.

## Minimum Qualifications

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Mathematics (Masters Required)

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