

Mathematics 252  
**Calculus II (4)**  
(Effective Spring 2021)

**Prerequisite:** A grade of C or better in Mathematics 251-Calculus I.

**Catalog Description:** (Applies to the Math 251-252 sequence) Limits and continuity. Derivatives and integrals of polynomial, rational, exponential, logarithmic, trigonometric, and hyperbolic functions. Techniques of integration. Conics. Parametric and polar equations. Indeterminate forms and improper integrals. Infinite series, including Taylor series. Must be taken in sequence.

**Notes:**

1. This course requires the use of a graphing calculator. Computer algebra systems are prohibited.
2. Some instructors may require a computer supplement in addition to the course text.
3. All students in this course will take the Department of Mathematics and Statistics common final exam.

**Learning Outcomes for Major:** This course addresses one or more of the student learning outcomes for the major. Upon completion of his/her degree from the University of Tennessee at Martin with a major in mathematics, the graduate will be able to:

- i. apply mathematical concepts and principles to perform numerical and symbolic computations.
- ii. use technology appropriately to investigate and solve mathematical and statistical problems.
- iii. write clear and precise proofs.
- iv. communicate effectively in both written and oral form.
- v. demonstrate the ability to read and learn mathematics and/or statistics independently.

**Teaching Objectives:** The student will:

1. Use integrals in applications such as areas, volumes by washer and shell methods, work, average value, and others.
2. Continue to differentiate and integrate the elementary functions (algebraic, trigonometric, logarithmic, exponential) and apply their results.
3. Evaluate integrals using the standard techniques of integration such as integration by parts, partial fractions, trigonometric substitution, and other substitutions.
4. Evaluate integrals using tables, computer algebra systems, and approximation techniques
5. Use various tests to determine if improper integrals converge or diverge and to evaluate certain convergent improper integrals.
6. Solve basic calculus problems using parametric and polar equations.
7. Use the basic tests to determine if sequences and series converge or diverge and to evaluate or approximately evaluate convergent series.
8. Derive Taylor Polynomials and Taylor series and use them to approximate functions and their derivatives and integrals.

**Text(s):** Calculus: Volume 2 (1st Edition), OpenStax. ISBN: 978-1938168062 A free ebook of volume is available by clicking [here](#).

<b>Outline:</b>	Chapter	Title (Sections)	Days
	2	Applications of Integration (1–6)	11
	3	Techniques of Integration (1–7)	13
	5	Sequences and Series (1–6)	11
	6	Power Series (1–4)	7
	7	Parametric equations and polar coordinates (1–4)	7
		One period tests	5
		Total days	<hr/> 54

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