

Calculus Two, MATH 2414

Meeting Times: 9:00-10:30 am MWF in RBN 4032

Last day to withdraw: Tuesday, July 29, 2025

Instructor: Nathan Smith

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Office Hours: Tentatively 10:30-11:30 M-F, other times by appointment.

Text: No text, we will be using open online resources, available on canvas.

Course Topics: A study of differentiation and integration of transcendental functions, polar coordinates, techniques of integration, sequences, series, and improper integrals.

Student Learning Outcomes: By the end of the course students should be able to:

1. Apply the ideas of definite integrals to solve problems of areas under curves and between curves, volumes of cylindrically symmetric objects, work done by a constant or variable force, and aother assorted applications.
2. Describe the meaning of an improper integral and apply the concepts of limit, convergence, and divergence to evaluate some classes of improper integrals.
3. Define sequences and series and determine their convergence or divergence.
4. Find Taylor series to represent elementary functions and apply Taylor polynomials to the integration of functions not integrable by conventional methods.
5. Apply the ideas of polar coordinates to find areas, lengths of curves, and representations of conic sections.
6. Persuasively communicate mathematical ideas using clear and concise mathematical language, including terminology, notation, and grammar.

Grading: There will be three tests, tentatively July 3, July 18, and August 1, as well as a comprehensive final exam, August 8. Each of these will be 20% of your final course grade. We will also have quizzes every Monday and Wednesday, as well as every Friday we are not taking a test. Collectively these will count for 15% of your final course grade. The remaining 5% will be based upon completion of online homework assignments.

Attendance: In order for a student to be successful at meeting the student learning outcomes listed above the student must be present. I will be posting things we do in class on

canvas for students who need to miss class to access. Obviously if you are ill with coronavirus or tuberculosis or something you shouldn't be coming to class and we'll need to make accommodations, but I have no intention of broadcasting every class on canvas this semester.

Student Academic Conduct: It is your responsibility to learn the material in this course for your own benefit. You should not let this discourage you from working together on your homework but in the end what you turn in should reflect your understanding, not just be copied from someone else. *During the tests, a code of honor will apply under which students are to work alone and neither give help to others nor receive help from any sources.* Students are also expected to help enforce this code. Students are encouraged to obtain a copy of *A Student Guide to Conduct and Discipline at UT Tyler*, available in the Office of Student Affairs.

Artificial Intelligence: UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course (see below) is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy.

For this course, you may not use AI tools to produce anything turned in for a grade.

University Policies: We will follow all University policies concerning Withdrawing from Class, Final Exams, Incomplete Grades, Grade Appeals, Disability/Accessibility Services, Military Affiliated Students, Academic Honesty and Academic Misconduct, FERPA, Covid, Absences, and Campus Carry. See canvas for details (<https://uttyler.instructure.com/courses/34488/pages/university-policies-and-information>).

Course Outline

- u-sub review
- Chapter 2
 - Area between curves
 - volumes by slicing
 - volumes by shells
 - arc length
 - applications (mass/density, work, hydrostatic force)
 - moments, centers of mass
 - integrals, exponential functions, logs
 - expon growth/decay
 - hyperbolic functions
- Chapter 3
 - integration by parts
 - trig integrals
 - trig sub
 - partial fractions
 - improper integrals
- Chapter 5
 - sequences
 - series
 - integral tests for convergence/divergence
 - comparison tests for convergence/divergence
 - alternating series test
 - ratio and root tests
- Chapter 6

- power series and functions
- properties of power series
- taylor series

- Chapter 7

- Parametric equations
- calc of parametric curves
- polar coords
- area and arc-length in polar coords

Tentative Schedule

Mon.	Tue.	Wed.	Thu.	Fri.
6/23 (2.1) Area between curves	6/24 (2.2) Volumes by slicing	6/25 (2.3) Volumes by shells	6/26 (2.4) Arc length/sfc. area	6/27 (2.5) Applications
6/30 (2.6) Moments & centers of mass	7/01 (2.7) Log and exponential functions, growth/decay	7/02 (2.8) Exponential Growth/Decay	7/03 TEST ONE	7/04 HOLIDAY
7/07 (2.9) Hyperbolic Functions	7/08 (3.1) Integration by Parts	7/09 (3.2) Trig integration	7/10 (3.3) Trig sub	7/11 (3.4) Partial Fractions
7/14 (3.7) Improper Integrals	7/15 (5.1) Sequences	7/16 (5.2) Series	7/17 (5.3) Divergence and Integral Tests	7/18 TEST TWO
7/21 (5.4) Comparison Tests	7/22 (5.5) Alternating Series	7/23 (5.6) Ratio/Root Tests	7/24 (6.1) Power Series	7/25 (6.2) Power Series
7/28 (6.3) Taylor Series	7/29 (6.4) Taylor Series	7/30 (7.1) Parametric Equations	7/31 (7.2) Parametric Curves	8/01 TEST THREE
8/04 (7.3) Polar Coords	8/05 (7.4) Area/Arc Length in Polar	8/06 Catch Up Day	8/07 Catch Up Day/Review	8/08 FINAL EXAM