![True Blue Core — MTSU logo]

![MT Mathematics logo]

Mathematics

Math 1910 Course Syllabus

Course Title:
Calculus I

Course Description:
An introduction to calculus with an emphasis of functions, multidisciplinary applications of calculus, and theoretical understanding of differentiation and integration. Topics include the definition of the derivative, differentiation techniques, and applications of the derivative. Calculus topics related to trigonometric, exponential, and logarithmic functions also included. Course concludes with the fundamental theorem of calculus; the definition of anti-differentiation and the definite integral; basic applications of integrations; and introductory techniques of integration.

This course satisfies the True Blue Core Quantitative Literacy requirement and meets specific requirements for programs as outlined in the MTSU Undergraduate Catalog.

Quantitative Literacy (Quant Lit) (3 hours)
- For all catalogs 2024-2025 and beyond, this course meets the True Blue Core (TBC) curriculum requirement for Quantitative Literacy (Quant Lit). To learn more about TBC requirements: https://w1.mtsu.edu/truebluecore/core.php.
- For all catalogs prior to 2024-2025, this course meets the general education curriculum requirements for Mathematics (3 hours). To learn more about general education requirements for catalogs prior to 2024-2025: https://w1.mtsu.edu/gen_ed/requirements.php.
- **The TBC outcome for Quantitative Literacy:** Students demonstrate the ability to interpret, represent, calculate, apply, and analyze numerical data in a variety of settings, and will make assumptions and communicate those assumptions based on quantitative information.

Course Prerequisites:
This course requires a grade of C or better in Math 1730 or its equivalent. Familiarity with graphing calculators (TI-83, 84, etc) is required. You may not use graphing calculators with symbolic manipulation software (DERIVE, MAPLE, etc.) on exams.

Instructor Information:

Instructor:
Office:
E-mail/Phone:
Office Hours:
Webpage:

Required Materials:
Textbook: Calculus: Early Transcendentals (With WebAssign Access), 9th Edition, by James Stewart

Course Purpose:
This is a course on differential calculus with an introduction to integral calculus. It is the first in a sequence of three courses designed to provide the computational tools necessary for continued work in physics, engineering, and more advanced mathematics. All three must be completed to gain thorough exposure to all the standard calculus topics.

Learning Outcomes:
Upon completion of this course with a passing grade, the student will have:

1. Interpret a function from an algebraic, numerical, graphical and verbal perspective and extract information relevant to the phenomenon modeled by the function.
2. Verify the value of the limit of a function at a point using the definition of the limit.
3. Calculate the limit of a function at a point numerically and algebraically, using appropriate techniques including l'Hospital's rule.
4. Find points of discontinuity for functions and classify them.
5. Understand the consequences of the intermediate value theorem for continuous functions.
6. Interpret the derivative of a function at a point as the instantaneous rate of change in the quantity modeled and state its units.
7. Interpret the derivative of a function at a point as the slope of the tangent line and estimate its value from the graph of a function.
8. Sketch the graph of the derivative from the given graph of a function.
9. Given a table of function values, approximate the value of the derivative at a point using the forward difference quotient and the centered difference quotient.
10. Compute the value of the derivative at a point algebraically using the (limit) definition.
11. Derive the expression for the derivative of elementary functions from the (limit) definition.
12. Be able to show whether a function is differentiable at a point.
13. Compute the expression for the line tangent to a function at a point.
14. Interpret the tangent line geometrically as the local linearization of a function.

15. Compute the expression for the derivative of a function using the rules of differentiation including the power rule, product rule, and quotient rule and chain rule.
16. Compute the expression for the derivative of a composite function using the chain rule of differentiation.
17. Differentiate a relation implicitly and compute the line tangent to its graph at a point.
18. Differentiate exponential, logarithmic, and trigonometric and inverse trigonometric functions.
19. Obtain expressions for higher order derivatives of a function using the rules of differentiation.
20. Interpret the value of the first and second derivative as measures of increase and concavity of a function.
21. Compute the critical points of a function on an interval.
22. Identify the extrema of a function on an interval and classify them as minima, maxima or saddles using the first derivative test.
23. Use the differential to determine the error of approximations.
24. Understand the consequences of Rolle's Theorem and the Mean Value theorem for differentiable functions.
25. Fine the anti-derivative of elementary polynomials, exponential, logarithmic and trigonometric functions.
26. Interpret the definite integral geometrically as the area under a curve.
27. Construct a definite integral as the limit of a Riemann sum.
28. Approximate a definite integral using left sum, right sum, midpoint and trapezoidal rules.
29. Interpret the indefinite integral as a definite integral with variable limit(s).
30. Interpret differentiation and anti-differentiation as inverse operations (Fundamental Theorem of Calculus, part 1).
31. Interpret the anti-derivative as a definite integral with variable limit and implement this expression on graphing platforms.
32. Evaluate a definite integral using an anti-derivative (Fundamental Theorem of Calculus, part 2).
33. Use substitution to find the anti-derivative of a composite function.
34. Apply basic optimization techniques to selected problems arising in various fields, such as physical modeling, economics and population dynamics.

Course Requirements:

In order to complete this course successfully, the learner is required to:
- Attend class lectures
- Participate in class activities
- Read and study class assignments
- Solve assigned problem sets
- Successfully complete quizzes and tests
- Use technology where appropriate
- Take a comprehensive final exam

If you do not take the final exam, you cannot pass the course.

Sections to Be Covered:

Chapter:	Sections Covered:
2	2.1 – 2.8
3	3.1 – 3.9
4	4.1 – 4.5, 4.7, 4.9
5	5.1 – 5.5

Course Evaluation:

Grading Scale:

Percentage	Grade
90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
Below 60	F

Final Exam:
The final examination is a Mathematics Department, two-part comprehensive exam given to all students enrolled in MATH 1910. Part 1 is a Mathematics Department developed portion consisting of 16 multiple-choice questions. Part 2 is an individual instructor designed portion. Students are required to take the final examination at the official University-scheduled date and time. Official final examination dates and times are determine by class meeting time and are listed on the University Registrar's homepage: https://www.mtsu.edu/registration/registration-guide/).

The final examination is closed book. Examination pamphlets and scratch paper are provided by the exam proctor.

Unexcused absences for the final examination result in a course grade of F.

MATH 1910-D (online sections) requires a proctored final examination to be taken at the MTSU Testing Center or an approved alternate testing site. Individual instructors may require additional proctored assessments.

Note: Students are required to bring the following materials to the final examination: (1) a large scantron, Form No. 4521, (2) a TI 83 or 84 Plus graphing calculator, and (3) a #2 pencil.

Important Dates:

Last Day to drop without a grade:
Last Day to drop with a W:
Final exam Time and Date:

Drop/Withdrawal Policy and Dates:

Please note the Drop Policy and Withdrawal Procedures as they are stated in the Current Registration Guide. A grade of "I" will be given only in accordance with the University Policy. No grade of "W" will be assigned after the official drop date except in situations involving extreme extenuating circumstances beyond the student's control. In particular, a "W" will not be granted merely because the student is failing. Students should be aware that missing the official drop date and thereby receiving an "F" can have ramifications on financial aid.

General conduct in class:

The instructor has primary responsibility for control over all classroom behavior and can direct the temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or conduct which otherwise violates the general rules and regulations of MTSU.

Judicial Statement / Academic Misconduct:

Please review the [information on Academic Integrity and Misconduct](). Academic integrity is a hallmark of Middle Tennessee State University. We expect students to present original work for all academic assignments turned in for credit and appropriately credit all sources used. Academic misconduct includes, but is not limited to:

1. Plagiarism: The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper attribution. This includes self-plagiarism, which occurs when an author submits material or research from a previous academic exercise to satisfy the requirements of another exercise and uses it without proper citation of its reuse.
2. Cheating: Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. This includes unapproved collaboration, which occurs when a student works with others on an academic exercise without the express permission of the professor. It also includes purchasing assignments or paying another person to complete a course for you.
3. Fabrication: Unauthorized falsification or invention of any information or citation in an academic exercise.

Going online and using information without proper citation, copying parts of other students' work, creating information to establish credibility, or using someone else's thoughts or ideas without appropriate acknowledgment is academic misconduct. If you have a question about an assignment, please ask me to clarify. All cases of academic misconduct will be reported to the Director of Student Academic Ethics and may result in failure on the test/assignment or for the course.

Grade Appeals

[University Policy 313, Student Grade Appeals](#), provides an avenue for MTSU students to appeal a final course grade in cases in which the student alleges that unethical or unprofessional actions by the instructor and/or grading inequities improperly impacted the final grade.

Free Tutoring:

Take advantage of our FREE tutoring service and learn how to study, get help with understanding difficult course material, receive better test grades, or simply improve your grade point average. Tutoring is available in *study skills* and *learning strategies* that includes sessions on time management, notetaking, when and where to study, and memory principles. Tutoring is also available in over 200 courses including biology, history, computer information Systems, physics, math, psychology, chemistry, economics, recording industry, and many more. The central location for tutoring is the Tutoring Spot, located in Walker Library, but is also conducted at various other campus sites.
For available tutoring opportunities, visit
http://mtsu.edu/studentsuccess/tutoring.php#on. For questions, call the Tutoring Spot at 615-904-8014.

Hope (Lottery) Scholarship Information:

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.
If you drop this class, withdraw, or stop attending this class, you may lose eligibility for your lottery scholarship, and you may not be able to regain eligibility.
For additional Lottery rules, please refer to your [Lottery Statement of Understanding form](#) or contact your [MT One Stop Enrollment Counselor](#).

Make-Up Policy:

Make-ups will not be given for anything other than in-class exams, and only with the instructor's prior consent (emergencies accepted). A University approved excuse must be provided in order to be given a make-up exam and, depending on circumstances, the instructor has the right to not give a make-up exam.

Mental Health:

As a college student, you may experience a range of challenges and issues that can interfere with your physical and mental well-being, hinder your academic experience, and negatively impact your daily life. Some of these experiences may include overwhelming depression/sadness, anxiety, high levels of stress, use of alcohol/drugs, difficulty sleeping, difficulty concentrating, and/or loss of motivation. These challenges and issues can lead to thoughts of self-harm and suicide. If you or any of your classmates are experiencing these issues, it is important to reach out and ask for help. Discuss your situation with a friend, a family

member, your instructor, or an academic advisor. Remember: Everyone struggles. It's okay to talk about it. Ask for help. YOU ARE NOT ALONE!

Outreach and Support Programs

The MTSU community is committed to the academic achievement of each student, and we know that struggling to address basic needs can affect a student's ability to perform academically. If you are having trouble finding a safe and stable place to live or enough food to eat, please contact Danielle Rochelle (615-898-2808 or Danielle.Rochelle@mtsu.edu), come by the MTSU Food Pantry at the MT One Stop, or speak with your instructor to get the assistance and resources you need.

Reasonable Accommodations for Students with Disabilities:

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website and/or contact the DAC for assistance at 615-898-2783 or dacemail@mtsu.edu.

Student Resources

Frequently Used Student Resources

Technical Support

Students who experience technical problems including, but not limited to, logging into their course, timing out of their course, using the course web site tools, should be encouraged to contact the MTSU Help Desk online (24/7) or at 1-615-898-5345.

Title IX

Students who believe they have been harassed, discriminated against or been the victim of sexual assault, dating violence, domestic violence or stalking should contact a Title IX/Deputy Coordinator at 615-898- 2185 or 615-898-2750 for assistance or review MTSU's Title IX website for resources. MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX website for contact information and details.

The True Blue Pledge

I am True Blue

As a member of this diverse community, I am a valuable contributor to its progress and success. I am engaged in the life of this community. I am a recipient and a giver. I am a listener and a speaker. I am honest in word and deed. I am committed to reason, not violence. I am a learner now and forever. I am a BLUE RAIDER. True Blue!

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