

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 are also included. The 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.

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:

Attendance Policy:

Attendance is required at each class meeting. Participation in University sanctioned activities or in military duties and situations where the institution's policy on inclement weather is applicable are considered excused absences. However, non-attendance does not relieve a student of the responsibility for work covered or assigned. The instructor will keep a record of attendance for each student.

Required Materials:

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

ALEKS PPL: There is a lot of background material that you will need to remember in order to be successful in Calculus I. To help you succeed, the College of Basic and Applied Sciences (CBAS) is providing you with free access to ALEKS Placement, Preparation, and Learning (PPL). ALEKS

PPL is a nationally normed assessment which identifies areas of algebra and trigonometry that you need help with in order to get ready for Calculus I. The Department of Mathematics is requiring that you take the ALEKS Initial Assessment in your first week of Calculus I in order to create your personalized Learning Module. Your Learning Module will then help you quickly review key algebra and trigonometry concepts. You must complete your Learning Module by mid-term.

ALEKS Assessments are scored on a 0 – 100 point scale; ALEKS interprets a score of 76 or higher as indicating preparation for Calculus I. Your class grade from ALEKS PPL will therefore reflect how close you ultimately come to that goal. As you work through your Learning Module, you may retake your Assessment up to four times in order to improve your score.

For much more information and the link you will use to get started in ALEKS, please click on [ALEKS for CALCULUS](#).

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. Find 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.

General Education Mathematics Goal and Learning Outcomes:

Goal:

The goal of mathematics is to expand students' understanding of mathematics beyond the entry-level requirements for college and to extend their knowledge of mathematics through relevant mathematical modeling with applications, problem solving, critical thinking skills, and the use of appropriate technologies.

Learning Outcomes:

Upon completion of this course, students will demonstrate the ability to:

- Use mathematics to solve problems and determine if the solutions are reasonable.
- Use mathematics to model real world behaviors and apply mathematical concepts to the solution of real-life problems.
- Make meaningful connections between mathematics and other disciplines.
- Use technology for mathematical reasoning and problem solving.
- Apply mathematical and/or basic statistical reasoning to analyze data and graphs.

Course Requirements:

In order to accomplish the learning outcomes of this course, the learner is required to:

- Attend class lectures
- Participate in class activities
- Read and study assignments
- Solve assigned problem sets
- Complete test, quizzes, homework, etc.
- Complete a comprehensive final exam

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
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Incomplete grades are given rarely and only in extenuating circumstances. Page 56 of the MTSU [Undergraduate Catalog](#) states: “The grade I indicates that the student has not completed all course requirements because of illness or other uncontrollable circumstances, especially those which occur toward the end of the term. Mere failure to make up work or turn in required work on time does not provide the basis for the grade of “I” unless extenuating circumstances noted above are present for reasons acceptable to the instructor.” Please refer to the Undergraduate Catalog for the complete Incomplete Grade Policy.

Important Dates:

Last Day to drop without a grade:

Last Day to drop with a W:

Final exam Time and Date:

Math Tutoring Lab (MTL):

Math tutoring for this course is available as a free service to MTSU students in KOM 252.

Tutoring is conducted by Graduate Teaching Assistants (GTAs), work study students, and a faculty coordinator. The lab is closed on weekends and scheduled MTSU holidays. The hours of operation are posted in the lab. More information is available at

<http://mtsu.edu/math/students.php#tutoring>.

Academic Integrity/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.

Students guilty of academic misconduct are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions (including suspension from the university), which may be imposed through the regular institutional procedures as a result of academic misconduct, the instructor has the authority to assign an “F” or zero for an activity or to assign an “F” for the course. Students accused of plagiarism will be immediately reported to the Director of Student Academic Ethics.

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 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.

Lottery Scholarship Policy:

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 if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).

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.

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.

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!

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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