

1. **Course Number and Title:** MATH2510 Calculus I
2. **Course Description:** Limits, derivatives, integration and applications of the derivative, applications of integrals, integration techniques, logarithmic, exponential, trig and inverse trig functions.
3. **Credit Hours:** 4
4. **Course Prerequisites:** MATH1400 (a grade of C or better), an ACT score of 28, or Instructor's permission.
5. **Course Dates:** August 15, 2024 to May 24, 2025
6. **Course Times:** B-days 3rd period 11:30-12:45
7. **Course Location:** Meridian Medical Arts Charter High School
8. **Instructor:** Mr. David Winkelman

9. Required Text and Other Learning Resources:

Thomas, George B. Jr., Weir, Maurice D., Hass, Joel. *Thomas' Calculus* 13th ed.

Addison-Wesley, Pearson: ISBN 978-0-321-58799-2

The majority of my students use TI 83 and TI 84 calculators. Calculators will be checked out; you are responsible for returning them at the end of the year in approximately the same condition in which you received yours.

10. Course Overview: During this year-long course, students will explore limits, derivatives, integrals and their applications. The students will be required to complete assignments on time and be prepared to discuss them the following period. Below is the sequence of topics that will be covered:

Limits and Their Properties

- ❖ Finding Limits Graphically and Numerically
- ❖ Evaluating Limits Analytically
- ❖ Continuity and One-Sided Limits
- ❖ Infinite Limits

Differentiation

- ❖ The Derivative
- ❖ Basic Differentiation Rules and Rates of Change
- ❖ The Product and Quotient Rules and Higher-Order Derivatives
- ❖ The Chain Rule
- ❖ Implicit Differentiation
- ❖ Related Rates

Applications of Differentiation

- ❖ Extrema on an Interval
- ❖ Rolle's Theorem and the Mean Value Theorem
- ❖ Increasing and Decreasing Functions and the First Derivative Test
- ❖ Concavity and the Second Derivative Test
- ❖ Optimization Problems

- ❖ Newton's Method

Integration

- ❖ Antiderivatives and Indefinite Integration
- ❖ Area
- ❖ Riemann Sums and Definite Integrals
- ❖ The Fundamental Theorem of Calculus
- ❖ Integration by Substitution
- ❖ Numerical Integration

Logarithmic, Exponential and other Transcendental Functions

- ❖ The Natural Logarithmic Function: Differentiation
- ❖ The Natural Logarithmic Function: Integration
- ❖ Inverse Functions
- ❖ Exponential Functions: Differentiation and Integration
- ❖ Bases other than e and Applications
- ❖ Inverse Trigonometric Functions: Differentiation
- ❖ Inverse Trigonometric Functions: Integration

Integration Techniques, L'Hopital's Rule, and Improper Integrals

- ❖ Basic Integration Rules
- ❖ Integration by Parts
- ❖ Trigonometric Integrals
- ❖ Trigonometric Substitution
- ❖ Indeterminate forms and L'Hopital's Rule

11. Course Objectives: Upon completion of this course, students should be able to do the following:

- ❖ Find and understand the concept of various limits of functions.
- ❖ Find, understand and apply the concept of the derivative of functions.
- ❖ Find, understand and apply the concept of the integral of functions.
- ❖ Understand and use theorems (e.g. Mean Value Theorem, Fundamental Theorem of Calculus, Intermediate Value Theorem, etc.)

12. Course Calendar: subject to change

Weeks 1 through 4: Limits and Their Properties

Weeks 5 through 9: Differentiation

Weeks 10 through 15: Applications of Differentiation

Weeks 16 through 17: Integration

Week 18: First Semester Final Review and Final

Weeks 19 through 21: Logarithmic, Exponential and other Transcendental Functions.

Weeks 22 through 24: Differential Equations

Weeks 25 through 27: Applications of Integration

Weeks 28 through 30: Integration Techniques, L'Hopital's Rule and Improper Integrals.

Exams will be given upon the completion of each chapter. Quizzes will be given throughout the chapter as a check for understanding. Homework will be assigned daily and will be due the next class period.

13. Grading Policy and Rubric: Homework, Quizzes and Assessments will determine the grade that is earned in this class. Homework is 10% of the grade, quizzes are 15% of the grade, assessments are 50% of the grade and the final exam is 25% of the grade. The grading scale is as follows:

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

14. Course Policies:

Assignments:

All assignments are to be done and turned in at the beginning of the following class session. **Late Assignments will not be accepted.**

Exam Schedule and Make-ups:

Exams will be announced several class meetings in advance. Missing an exam with an unexcused absence will result in a zero for that exam. If you are going to miss an exam, you must make arrangements with the instructor prior to the exam. There are **NO** retakes allowed.

If you have an **Excused** absence, then you will have two(2) class days to complete the missing work. It would be beneficial to you to get the assignments in advance and try to complete them prior to your return to avoid falling behind.

Attendance and Lateness:

Lateness is inexcusable. The school tardy policy will be followed. Attendance is crucial in a mathematics class. Missing even one class period can put you behind. If for some reason you need to be absent, let the instructor know in advance so that we can arrange a list of assignments and topics that you will be missing. Also, make sure to get the absence excused.

Academic Dishonesty:

Students that are caught cheating will receive a zero for the given assignment. Cheating may result with an F in the class or possibly removal from the class.

Items you are expected to bring to class:

Writing utensils of various types: pencil, red pen are not optional.
Textbook
Calculator
Notebook
Graph paper

The instructor reserves the right to change this syllabus.