

**MIAMI-DADE COMMUNITY COLLEGE  
INTERAMERICAN CAMPUS**

**Mathematics Department**

**MAC 2311 – CALCULUS I**

**COURSE SYLLABUS AND COMPETENCIES**

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<b>Ref. #:</b>	780648	<b>Time:</b>	MWF 10:00 – 11:20 am
		<b>Room:</b>	1127

**Textbook:** Thomas' CALCULUS (Early Transcendentals) 12th Edition  
Weir/Hass/Giordano  
ISBN 0-321-58876-0

**Course Description:**

Calculus I integrates concepts of Analytic Geometry with concepts of limits, continuity, differentiation, and integration of the most important algebraic and transcendental functions. Applications of these concepts are used to solve problems.

**Pre-requisite:** MAC 1140 and MAC 1114 or MAC 1147 with a C or better or equivalent.

**Testing and grading policy :** There will be five tests worth 100 points each and a comprehensive mandatory Final Exam. HW will be posted online and will count as extra credits up to 10 points each. HW is due the same day of the corresponding test. The lowest grade among all five tests will be dropped. **There will be no makeups.** The Final Exam may **NOT** be dropped. Your final grade will be based on the average of your four best test scores and the Final Exam. I may assign the seating during any of the tests or Final Exam.

**Grading formula :** (sum of four best test scores with extra credits included+ final exam) / 5

**Grading scale:**

90 – 100 = A  
80 – 89 = B  
70 – 79 = C  
60 – 69 = D  
0 – 59 = F

**Attendance:**

Attendance is highly encouraged. Students are responsible for all material covered in class. Students who attend and do not appear on the class roll will be asked to report to the Registrar's Office to obtain a paid/validated schedule.

**Math Lab:**

The math lab is located in room 1214. It is highly recommended.

**Withdrawal Policy:**

If you decide to withdraw from this course, it is your responsibility to do so in order to receive a grade of "W". Drop/Withdraw should be conducted through the office of the registrar. However, I periodically purge my class roster. If you are continuously absent and do not inform me of a reason, you may be purged from the class.

**Cell phones, iPhones, iPods and Beepers:**

Beepers and cell phones and iPods must be on silent or be turned off before class.

**Calculators:**

You will need a scientific calculator. If you have a graphing calculator, you are encouraged to use it; however, you will not be allowed to use it on exams.

**Make-ups:**

Make-ups will only be given for extreme circumstances. If you miss an exam for any reason, you may substitute this missing grade with the grade you receive on the final exam. At most one make-up will be given during the semester.

**Incompletes:**

Incompletes will be given only in very limited circumstances. The student must have a passing average and have a serious personal illness, family death, or unexpected crisis.

**CLASSROOM BEHAVIOR:**

*Beepers, cellular phones and any electronic devices must be turned off before class.*

*Please, be prompt.* Late arrivals are very disturbing for the instructor and disruptive to fellow students. You should plan to leave enough time to allow for traffic, parking, inclement weather, etc.

**Cheating:** Cheating will not be tolerated in this course. Any student caught will receive an automatic F in the course.

**Course Outline** (*Subject to change*):

*I reserve the right to make changes in the test dates as needed. Any changes will be announced in class as early as possible*

**TENTATIVE BREAKDOWN OF EXAMS.**

Exam 1: 2.1, 2.2, 2.3, 2.4, 2.5, 2.6

Exam 2: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6

Exam 3: 3.7, 3.8, 3.9, 3.10, 3.11

Exam 4: 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.8

Exam 5: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 6.1, 6.2

Final Exam: Cumulative

**Week 1**

Introduction

2.1 Rates of Change and Tangents to Curves

**Week 2**

2.2 Limit of a Function and Limit Laws

2.3 The Precise Definition of Limit

2.4 One-Sided Limits

**Week 3**

2.5 Continuity

2.6 Infinite Limits and Vertical Asymptotes

**Week 4**

Review

**Exam 1**

3.1 Tangents and the Derivative at a Point

**Week 5**

3.2 The Derivative as a Function

3.3 Differentiation Rules for Polynomials, Exponentials, Products and Quotients

3.4 The Derivative as a Rate of Change

Week 6

3.5 Derivatives of Trigonometric Functions

3.6 The Chain Rule

*Review*

Week 7

**Exam 2**

3.7 Implicit Differentiation

Week 8

3.8 Derivatives of Inverse Functions and Logarithms

3.9 Inverse Trigonometric Functions

3.10 Related Rates

Week 9

3.11 Linearization and Differentials

*Review,*

Week 10

**Exams 3**

4.1 Extreme Value of Functions

4.2 The Mean Value Theorem

Week 11

4.3 Monotonic Functions and the First Derivative Test

4.4 Concavity and Curve Sketching

4.5 Indeterminate Forms and L'Hôpital's Rule

Week 12

4.6 Applied Optimization Problems

4.8 Antiderivative

*Review,*

Week 13

**Exam 4**

5.1 Area and Estimating with Finite Sums

5.2 Sigma Notation and Limits of Finite Sums

Week 14

5.3 The Definite Integral

5.4 The Fundamental Theorem of Calculus

5.5 Indefinite Integrals and the Substitution Rule

Week 15

5.6 Substitution and Area Between Curves

6.1 Volumes using Cross-Sections

6.2 Volumes using Cylindrical Shells

Week 16

*Review*

**Exam 5**

*Review*

Week 17

**Cumulative Final Exam**

## Course Competencies:

### Competency 1:

The Student will demonstrate knowledge of limits by:

- a. computing limits at a point and at infinity algebraically
- b. finding limits using L'Hôpital's Rule
- c. Applying the definition of continuity
- d. Determining where a function is continuous or discontinuous

### Competency 2: The Student will demonstrate knowledge of differentiation by:

- a. defining the derivative of a function as a limit
- b. finding the derivative of a function using the definition
- c. finding the equation of the line tangent to a curve at a point using a derivative
- d. finding the rate of change of a function using a derivative
- e. finding derivatives of polynomials, trigonometric, exponential, logarithmic, and hyperbolic functions using differentiation rules
- f. finding derivatives using the chain rule
- g. implicitly differentiating equations
- h. computing higher order derivatives
- i. determining maximum and minimum points of a function and intervals where it increases or decreases
- j. determining points of inflection of a function and intervals where it is concave upward or concave downward
- k. using the first and second derivative tests to find local extrema
- l. applying Rolle's theorem and the mean value theorem
- m. solving optimization problems
- n. solving problems involving related rates

### Competency 3: The Student will demonstrate knowledge of integration by:

- a. finding antiderivatives involving polynomial, trigonometric, inverse trigonometric, exponential, logarithmic, and hyperbolic function techniques
- b. evaluating a definite integral as a limit of a Riemann sum
- c. computing the average value of a function over an interval
- d. computing definite integrals using the fundamental theorem of calculus
- e. solving applied problems using definite integrals
- f. finding indefinite integrals with a change of variables
- g. finding the area or region under and between curves
- h. finding the volume of solids of revolution

**Miami Dade College/InterAmerican Campus  
Mathematics Department**

**How do the course objectives relate to the Miami Dade College Learning Outcomes?**

What follows below is a list of the ten learning outcomes that have recently been agreed upon by Miami Dade College faculty and administrators.

As graduates of Miami Dade College, students will be able to:

1. Communicate effectively using listening, speaking, reading, and writing skills.
2. Use quantitative analytical skills to evaluate and process numerical data.
3. Solve problems using critical and creative thinking and scientific reasoning.
4. Formulate strategies to locate, evaluate, and apply information.
5. Demonstrate knowledge of diverse cultures, including global and historical perspectives.
6. Create strategies that can be used to fulfill personal, civic, and social responsibilities.
7. Demonstrate knowledge of ethical thinking and its application to issues in society.
8. Use computer and emerging technologies effectively.
9. Demonstrate an appreciation for aesthetics and creative activities.
10. Describe how natural systems function and recognize the impact of humans on the environment.

Each course taken at the college addresses some of these learning outcomes. MAC2311, addresses outcomes 1, 2, 3, 4, 5, 8, 9.