INTER-AMERICAN UNIVERSITY OF PUERTO RICO

METROPOLITAN CAMPUS

FACULTY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF COMPUTER AND MATHEMATICS SCIENCES

SYLLABUS

I. GENERAL INFORMATION

Course title	**CALCULUS I**
Code and number	**MATH 2251**
Credits	**FIVE (5)**
Academic term	
Profesor	
Office hours	
Phone	**787-250-1912 EXT. 2230**
Email	

II. DESCRIPTION

Limit of a function, the derivative, Rolle's theorem and the mean value theorem: applications of the derivative. The definite integral, the fundamental theorem of the calculation. Derivatives and integrals of trigonometric functions and exponential and logarithmic functions. Applications of the defined integral. Topics of analytical geometry: the circle, the parabola, the ellipse and the hyperbola.

III. PROFILE OF COMPETENCES

The Bachelor of Arts in Mathematics Program is designed to develop general competencies, linked to core courses, which allows the student to:

• Integrate logical reasoning, analysis, problem solving, and mathematical processes in a variety of pure and applied contexts.

• Communicate mathematical knowledge correctly and creatively.

IV.OBJECTIVES

At the end of the course the student will be able to:

1. Understand the concepts of limit, derivatives and integrals.
2. Find limits, derivatives and integrals of algebraic and transcendental functions using the corresponding properties.

3. Apply the knowledge of limit, derivatives and integrals to the solution o problems.
4. Integrate the use of the calculation to the other disciplines.
5. Communicate appropriately using the relevant mathematical language.
6. Make proper use of available technology as a tool to help solve problems.
7. Appreciate the importance of calculation as part of your daily life and your professional life.

V.CONTENTS

A. Limits

1. Graphically and numerically
2. Analytically
3. Continuity and unilateral limits
4. Infinite limits

B. Differentiation

1. The derivative and the tangent line problem
2. Basic rules of differentiation and reason of change
3. Rules of the product and the ratio and derivatives of higher order
4. Chain rule
5. Implicit differentiation
6. Reasons for change related
7. Newton's method (optional)

C. Differentiation applications

1. Extremes in an interval
2. Rolle's theorem and the mean value
3. Increasing and decreasing functions, proof of the first derivative
4. Concavity and test of the second derivative.
5. Limits to infinity

6. Summary of plotting graphs
7. Optimization problems
8. Differentials
9. Commercial applications (optional)

D. Integration

1. Antiderivatives and the indefinite integral
2. Area
3. Riemann and the definite integral
4. The fundamental theorem of calculation
5. Integration by substitution
6. Numerical integration
7. Logarithmic function

E. Integration applications

1. Area between two curves
2. Volume: Disc method
3. Volume: Washer method
4. Arch length
5. Work

VI. ACTIVITIES

1. Active participation in conferences and discussions
2. Practice exercises in the classroom
3. Communication activities (reading and writing in the classroom)
4. Use of relevant technology to interpret and analyze functions.
5. Application troubleshooting
6. Collaborative learning

7. Reflective Journal, email, “three minutes papers”, “surveys”

8. Use different types of functions to model real situations.

VII. EVALUATION CRITERIA

Criterios	Puntuación	% de la nota final
Three partial exams	100 c/u	51%
Final Exam Cumulative	100	20%
Assignments	100	10%
Short Tests	100	10%
Evaluation activities designed by the teacher	100	9%
Total	**700**	**100%**

A. The grade curve will be:

90 - 100 A
80 - 89 B
65 - 79 C
55 - 64 D
0 - 54 F

VIII. SPECIAL NOTES

A. Auxiliary services or special needs

Students who requires auxiliary services or special assistance must request it at the beginning of the course or as soon as they know they need it, through the corresponding registration in the office of the professional counselor, Dr. María de los Ángeles Cabello, located in the Program of University Orientation, Ext. 2306. Email mcabello@metro.inter.edu

B. Honesty, fraud and plagiarism

The lack of honesty, fraud, plagiarism and any other inappropriate behavior in relation to academic work constitute major infractions sanctioned by the General Student Regulations. Major infractions, as provided in the General Student Regulations, may result in the suspension of the University for a defined period of more than one year or permanent expulsion from the University, among other sanctions.

C. Use of electronic devices

Cell phones and any other electronic device that could disrupt teaching and learning processes or alter the environment conducive to academic excellence will be disabled. The pressing situations will be addressed, as appropriate. The use of electronic devices that allow accessing, storing, or sending data during evaluations or examinations is prohibited.

D. Compliance with the provisions of Title IX

The Federal Higher Education Act, as amended, prohibits discrimination based on of sex in any academic, educational, extracurricular, athletic activity or any other program or employment, sponsored or controlled by a higher education institution regardless of whether it is performed inside or outside the premises of the institution, if the institution receives federal funds.
As provided by the current federal regulations, a Title IX Assistant Coordinator has been designated in our academic unit to provide assistance and guidance in relation to any alleged incident constituting discrimination based on sex or gender, sexual harassment or sexual assault. You can contact the Auxiliary Coordinator at telephone 787 250-1912, extension 2262, or email griverar@metro.inter.edu
The Normative Document titled Rules and Procedures to Address Alleged Violations of the Provisions of Title IX is the document that contains the institutional rules to channel any complaint filed based on this type of claim. This document is available on the website of the Inter-American University of Puerto Rico (www.inter.edu).

E. Course requirements

1. It is a requirement that the student have access to a computer with Internet and the MS Office applications programs, compatible with the IBM system.

2. If the course offering is online or hybrid with remote virtual meetings, the exams are answered guarded with RESPONDUS or RPNow. It is the student's responsibility to find out about it. To use the applications, you must have access to a computer with a camera and microphone and good Internet service. Respondus or RPNow does not work on mobile devices and neither does it work with satellite Internet. You should read more information in the General Information link on the Blackboard home page, in particular the links:

- Student authentication
- Authentication process as a student in distance courses
- "RPNow" for exams or tests guarded

Any questions in this regard the student should contact the professor or staff at the Center for Distance Learning and Technological Development (CAADT)

IX. EDUCATIONAL RESOURCES

1. M. Sharma - Calculus. GA EDUCO International Inc accessible through the Web site http://educosoft.comElectronic text: Larson, Ron & Edwards, Bruce (2013) Calculus, 10e.
2. Scientific calculator. You can use a graphing calculator.
   NO graphic calculator that has CAS (such as TI-89 or equivalent) is allowed.

X. REFERENCES

A. BIBLIOGRAPHY

Anton, Howard, I. Bivens, S. Davis. (2003) Calculus. Seventh edition. John Wiley & Sons.

Anton, Howard, S. Davis, I. Bivens. (2001). Calculus, Early Transcendental Brief Edition. John Wiley & Sons.

Finney R., Weir M., Giordano F. (2001). Calculus Tenth Edition. Addison Wesley.

Hille E. & Salinas S. (1997). Calculus Tenth edition. Addison Wesley.

Larson, Ron, Hostetler, Robert P., Edwards, Bruce A. (2003). Calculus-Early Transcendental Functions. Third edition, Houghton Miffin Company.

Smith R., Minton R. (2002). Calculus Second Edition Mc Graw Hill.

Stewart (2004) Calculus. Fifth Edition. Thomson - Brooks Cole.

B. INTERNET REFERENCES

- http: //archives.math.utk.edu.visual.calculus/
- http://archives.math.utk.edu/calculus/crol.html
- http://www.ima.umn.edu/~arnold/graphics.html
- http://www.math.temple.edu/~cow/
- http://www.calculus.org
- Kahn Academy - https://es.khanacademy.org/.
- Diferential calculus (https://es.khanacademy.org/math/differential-calculus) and Integral calculus (https://es.khanacademy.org/math/integral-calculus)
- Julio Profe.NET -
- Videos to support the Calculus course

http://julioprofe.net/courses_group/calculo/

- Strang, Gilbert. MITOPENCOURSEWARE. http://ocw.mit.edu/resources/res-18-005-highlights-of-calculus-spring-2010/
- Lawrence S. Husch and University of Tennessee, Knoxville, Mathematics Department. Visual Calculus 1995-2001 http://archives.math.utk.edu/visual.calculus
- Math Archives-Calculus Resources On-line http://archives.math.utk.edu/calculus/crol.html