INTER-AMERICAN UNIVERSITY OF PUERTO RICO

METROPOLITAN CAMPUS

FACULTY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF COMPUTER AND MATHEMATICS SCIENCES

SYLLABUS

I.

I. GENERAL INFORMATION

Course title	: PRECALCULUS
Code and number	: MATH 1500
Credits	: FIVE (5)
Requirements	: GEMA 1200
Academic term	:
Teacher	:
Office hours	:
Phone	: 787-250-1912 ext. 2230
Email	:

II. DESCRIPTION OF THE COURSE

Study of the functions, their algebra and the inverse function with emphasis on linear, polynomial and rational, exponential, logarithmic, trigonometric and inverse trigonometric functions. Study of the analytical trigonometry of complex numbers; of the systems of linear and nonlinear equations; of inequations; of matrices, determinants and polar coordinates. Requirement: GEMA 1200.

III. OBJECTIVES OF THE COURSE

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

1. Properly use knowledge of functions and their properties to solve problems and model real-life situations.

2. Plot graphs of the functions using the displacement and translation techniques.

3. Apply the properties of polynomial and rational functions to solve maximum and minimum problems.

4. Apply the properties of exponential and logarithmic functions in solving problems of growth and decrease.

5. Develop the fundamental skills of trigonometry and its applications in the sciences and other disciplines.

6. Communicate appropriately using the relevant mathematical language.

7. Integrate the use of available technology in a relevant manner.

8. Appreciate the importance of mathematics in your professional life and in your daily life.

This course covers the competencies of the Bachelor of Arts in Mathematics Program (111): 1, 3, and 4

IV. COURSE CONTENT

A. Functions and their graphs
- 1. Functions
  - a. Definition
  - b. Evaluation
  - c. Domain and scope
- 2. Function graphics
  - a. Odd and even functions
  - b. Increasing and decreasing functions
- 3. Graphics of special functions
- 4. Graphing techniques
- 5. Operations with functions

B. Polynomial and rational functions
- 1 The quadratic function
  - a. Vertex
  - b. Intersections with the axes
  - c. Graph
  - d. Applications
- 2. Polynomial functions
- 3. Rational functions
- 4. Real zeros
  - a. Synthetic division
  - b. Theorems of the residue and the factor
  - c. Rational zeros
- 5. Complex numbers

C. Exponential and logarithmic functions
- 1. Inverse functions
- 2. Exponential functions
  - a. Evaluation
  - b. Asyntotes and graphics
  - c. Applications
  - d. Base e
- 3. Logarithmic functions
  - a. Change to exponential form
  - b. Domain and asymptotes
  - c. Graph
- 4. Properties of logarithms
  - a. Base e
  - b. Base change
- 5. Exponential and logarithmic equations

D. Trigonometric functions
1. Angles and their measures
2. Trigonometric functions and the unit circle
3. Properties of trigonometric functions
    a. Basic identities
    b. Domain and scope
4. Sine and cosine graphs
    a. Domain and scope
    b. Intersections with the axes
    c. Amplitude, period and phase of displacement.
5. Tangent, cotangent, secant and cosecant graphs

E. Analytical trigonometry
1. Inverse trigonometric functions
2. Trigonometric identities
3. Formulas of addition and subtraction of angles
4. Double and half angle formulas
5. Trigonometric equations.
6. Trigonometric form of complex numbers

F. Applications
1. Trigonometry of the right triangle
2. Law of sines
3. Law of cosines

G. Analytical geometry
1. Polar coordinates

H. Systems of equations
1. Systems of linear equations 2X2
    a. Graphic
    b. Substitution
    c. Elimination
2. Systems of linear equations 3X3
3. Matrices
4. Determinants and rule of Cramer
5. Systems of non-linear equations
6. Systems of inequations

ACTIVITIES

- Active participation in conferences and discussions
- Practice exercises in the classroom
- Communication activities (reading and writing in the classroom)
- Use of relevant technology to interpret and analyze data.
- Solution of application problems
- Collaborative learning
- Use different types of functions to model real situations.

V. EVALUATION CRITERIA

	Score of the Final Score	
Three partial exams	100	51%
Departmental General Final Exam	100	20%
Assignments	100	10%
Short Tests	100	10%
Evaluation activities designed by the teacher, use of tutorials and assistance	100	9%
TOTAL	600	100%

The grade curve will be:

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

VI. SPECIAL NOTES

A. Auxiliary services or special needs

All students requiring auxiliary services or special assistance must request them at the beginning of the course or as soon as they acquire knowledge of their needs, through the corresponding register, in the Orientation Program.

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 on the basis of sex in any academic, educational, extracurricular, athletic 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 entitled **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).

VII. EDUCATIONAL RESOURCES

1. Texto: Precalculus, 5th ed, Educo International 2012
2. Scientific calculator. You can use a graphing calculator.
3. NO graphic calculator that has CAS (such as TI-89 or equivalent) is allowed.

VIII. BIBLIOGRAPHY

Stewart J. (2012). Precalculus - Mathematics for Calculus. Sixth edition. Thomson Editors. Mexico.
Blitzer R. (2014). Precalculus 5th Edition. Pearson. Prentice Hall. New Jersey
Dugopolski M. (2012). Precalculus: Functions and Graphs. Fourth Edison Addison- Wesley. New York
Larson, R (2014). Precalculus Ninth Edition. Brooks / Cole. Cengage Learning
Stewart J. (2012). Precalculus: Mathematics for Calculus. Fourth Edition. Brooks / Cole. California.

Sullivan (2016). Precalculus Plus My MathLab. Tenth Editio. Pearson. Addison-Wesley. New Cork
Schultz E, Briggs, W; Cochran L. (2014). Precalculus eText. Pearson. Addison-Wesley. New York

A. Electronic Reference

Khan Academy – Álgebra I: http://es.khanacademy.org/math/algebra
Khan Academy – Álgebra II: http://es.khanacademy.org/math/algebra2
Graphing Functions: http://www.analyzemath.com/Graphing.html
Graphing tool:
Padowan Grapher for Windows: http://www.padowan.dk/download/
Math problems solution tool: Mathway: https://www.mathway.com/