

## SYLLABUS

<b>TITLE:</b>	Precalculus II
<b>CODE:</b>	MAT 134
<b>PREREQUISITE:</b>	MAT 133
<b>CREDITS:</b>	3 credits   45 hours contact   1 term

### DESCRIPTION

The Pre-Calculus II course, is a continuation of Pre-Calculus I, it is a theoretical and practical course in mathematics for the Natural Sciences programs. It includes the study of functions such as systems of equations, sequences and series, trigonometric functions, analytical trigonometry, and complex numbers. The purpose of the course is to lay the analytical and geometric bases necessary for the study of differential and integral calculus.

### JUSTIFICATION

It is a required course in Natural Sciences programs, the student must acquire the concept of function and develop skills in the interpretation of the different functions, so that later he can understand the basic concepts of Calculus, which has applications in the fields of Physics, Chemistry, Biology and later courses in Mathematics.

### COMPETENCES

The course develops in the student the following competencies:

- **Critical Thinking**
- **Research and exploration**

## **OBJECTIVES**

At the end of the course, students will be trained to:

1. Evaluate trigonometric functions.
2. Represent the functions graphically.
3. Prove trigonometric identities.
4. Identify trigonometric formulas.
5. Solve trigonometric equations.
6. Solve triangles by applying the laws of sine and cosine.
7. Solve systems of equations.
8. Find the formula of a sequence according to its elements.

## **CONTENT**

- I. Systems of linear equations
  - A. Solution by elimination
  - B. Solution by augmented matrix
  - C. Cramer's Rule Solution
  - D. Applications of linear systems
  - E. Nonlinear systems
- II. Natural domain functions
  - A. Successions
    1. Arithmetic
    2. Geometric
  - B. Applications
- III. Trigonometric functions
  - A. The winding function
    1. Domain and value field
  - B. Circular functions
  - C. Properties
  - D. Graphics
    1. Amplitude
    2. Fundamental period
    3. Phase shift
  - E. Trigonometric functions of angle

- IV. Analytical trigonometry
  - A. Fundamental identities
  - B. Trigonometric formulas
  - C. Inverse trigonometric functions
  - D. Trigonometric equations
- V. Trigonometry of triangle
  - A. Change of notation from radians to degrees and from degrees to radians
  - B. Trigonometry of the right triangle
  - C. Polar coordinates
  - D. Laws of sine and cosine
  - E. Word problems
- VI. Complex numbers
  - A. Definition and properties
  - B. Operations and properties
  - C. Geometric representation
  - D. Complex number equations
  - E. Polar form
  - F. De Moivre's theorem
    - 1. Roots and powers of complex numbers
  - G. Complex zeros of polynomial functions

## **METHODOLOGY**

The following strategies of the active learning methodology are recommended:

- Flipped classroom
- Discussion of problems
- Collaborative learning
- Teamwork
- Procedure-oriented coaching and problem solving
- Demonstration and practical exercises
- Self-assessment and peer assessment
- Application of theorems and formulas
- Problem-based learning
- Graphs and functions

## EVALUATION

Participation	10%
Compositions	30%
Partial works	30%
Final project or exam	<u>30%</u>
<b>TOTAL</b>	<b>100%</b>

## LEARNING ASSESSMENT

The institutional assessment rubric is applied to the core activity of the course.

## BIBLIOGRAPHY

### TEXTBOOK

Sullivan, M. (2020). *Precalculus*. (11th edition). New Jersey: Prentice Hall.

### REFERENCES

Miller J., Gerken D. (2017). *Precalculus*. (1st edition) New York: McGraw-Hill Education.

Swokowski E. (2019). *Precalculus: Functions & Graphs*. (13th edition) New York:  
Addison Wesley.

### ELECTRONIC REFERENCES

<https://www.khanacademy.org/math/prec calculus>

<https://www.symbolab.com/>

<https://www.wolframalpha.com/>

Find more information resources related to the course topics on the library page  
<http://biblioteca.sagrado.edu/>

## REASONABLE ACCOMMODATION

To obtain detailed information on the process and the required documentation, you must visit the corresponding office. To guarantee equal conditions, in compliance with the ADA (1990) and the Rehabilitation Act (1973), as amended, all students who need reasonable accommodation services or special assistance must complete the process established by the Vice Presidency for Academic Affairs.

## **ACADEMIC HONESTY, FRAUD AND PLAGIARISM**

Any student who misses the policy of honesty, fraud and plagiarism is exposed to the following sanctions: received a grade of zero in the evaluation and/ or repetition of the work in the course, grade of F (\*) in the seminar: suspension or expulsion as established in the Academic Honesty Policy document (DAEE 205-001) effective August 2005.

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