NATIONAL UNIVERSITY OF SAN MARCOS

FACULTY OF MATHEMATICAL SCIENCES

SYLLABUS

1. GENERAL INFORMATION

1.1 Course name	:	Basic Mathematics
1.2 Code	:	MA100
1.3 Academic Program	:	Scientific Computing
1.4 Credits	:	5
1.5 Prerrequisites	:	None
1.6 Type of Course	:	Mandatory
1.7 Area of Studies	:	Estudios Generales
1.8 Number of Weeks	:	16
1.9 Hours per week	:	3 HT; 4 HP;
1.10 Cycle	:	I
1.11 Learning modality	:	Face to face
1.12 Academic Period	:	2026-I
1.13 Semester Start Date	:	
1.14 Semester End Date	:	

2. PROFESSORS

Meetings after coordination with the professor

3. INTRODUCTION TO THE COURSE

The course includes knowledge of Notions of Propositional Logic and set theory, Real number systems, Integers, the Principle of Mathematical Induction, and polynomials of one variable. Matrices, determinants, and their applications in problems involving living beings. Introduction to statistics.

4. GOALS

- Develop logical reasoning and critical thinking skills through the use of formal languages.
- Understand and apply the properties of number systems (real and complex) in problem solving.
- Manipulate polynomial and matrix structures to solve systems of equations and interpret results.
- Introduce basic concepts of statistics and probability for data analysis.

5. COMPETENCES

ABET-1) An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline. (Familiarity)

6. TOPICS

Unit 1: Logic and Sets (16 hours)	
Competences Expected: ABET-1	
Topics	**Learning Outcomes**
• Propositional logic: Connectives, truth tables, and validity. • Logical-mathematical quantifiers. • Set theory: Operations, relations, and functions. • Families of sets and Cartesian product.	• Formalize natural language statements into propositional language [Familiarizarse]. • Operate with sets using algebraic laws and Venn diagrams [Usar]. • Prove basic properties of sets and logical relations [Evaluar].
Readings : [**Lipschutz1991**], [**Rojo1995**]	

Unit 2: Number Systems (16 hours)	
Competences Expected: ABET-1	
Topics	**Learning Outcomes**
• The real number system: Field and order axioms. • Mathematical induction and Newton's binomial theorem. • Complex numbers: Binomial, polar, and exponential forms. • Roots of complex numbers and De Moivre's theorem.	• Identify the algebraic structure of real and complex numbers [Familiarizarse]. • Apply the principle of mathematical induction in proofs of summations [Usar]. • Solve equations in the complex number field using various representations [Evaluar].
Readings : [**Gentile1985**], [**Pinzon1973**]	

Unit 3: Polynomials and Matrices (16 hours)	
Competences Expected: ABET-1	
Topics	**Learning Outcomes**
• Polynomials: Division algorithm and roots of polynomials. • Matrices: Types, operations, and determinants. • Inverse matrix and rank of a matrix. • Systems of linear equations: Gauss-Jordan method.	• Recognize the structure of polynomial rings and matrix algebra [Familiarizarse]. • Use elementary row operations to calculate the inverse of a matrix [Usar]. • Model and solve systems of linear equations applied to contextual problems [Evaluar].
Readings : [**Gentile1984**], [**Rojo1995**]	

Unit 4: Statistics and Probability (16 hours)	
Competences Expected: ABET-1	
Topics	**Learning Outcomes**
• Descriptive statistics: Measures of central tendency. • Dispersion measures and graphical representation. • Probability concepts: Sample space and events. • Conditional probability and independence.	• Describe data sets using basic statistical indicators [Familiarizarse]. • Calculate probabilities of simple and compound events in random experiments [Usar]. • Interpret statistical results for decision making in scientific environments [Evaluar].
Readings : [**Peterson2005**]	

7. WORKPLAN

7.1 Methodology

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

7.2 Theory Sessions

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

7.3 Practical Sessions

The practical sessions are held in class where a series of exercises and/or practical concepts are developed through problem solving, problem solving, specific exercises and/or in application contexts.

8. EVALUATION SYSTEM

********* EVALUATION MISSING ********

9. BASIC BIBLIOGRAPHY