

SYLLABUS



FACULTY OF ENGINEERING SEPTEMBER 2024-FEBRUARY 2025

COURSE NAME			CODE:	19276
LINEAR ALGEBRA - GROUP: 2				
PROGRAM		CIVIL ENGINEERING NETWORK		
SEMESTER		LEVEL 1	INSTRUCTION TIER	BASIC, THEORICAL FUNDAMENTS,
COURSE CREDITS		3	DEILVERY MODE:	PRESENTIAL

COORDINATOR(S):

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COURSE DESCRIPTION:

Descriptive summary regarding the purpose, methodological strategy, and fundamental content of the course.

The subject of Linear Algebra is fundamental for the students of Civil Engineering, as it provides the mathematical tools necessary to understand and solve complex problems in various areas of engineering. This course covers the essential concepts of linear systems and applications through a generalized treatment of vectors, systems of linear equations, vector spaces and linear transformations, which allows through abstraction and/or geometric interpretation, manage operations and perform calculations for future applications in the context of civil engineering.

COURSE REQUIREMENTS

This course has no co-requisites

This course has no prerequisites

COURSE OBJECTIVE(S):

General and specific objectives of the course in relation to the program's outcome profile.

General Objective: Develop in the student the ability to understand and apply the fundamental concepts and definitions of linear algebra, to solve mathematical and engineering problems, encouraging analytical and critical thinking in the context of civil engineering.

Specific objectives:

1. Solving systems of linear equations, linear transformations and problems of characteristic value to model and analyze civil engineering problems by promoting the use of mathematical language and corresponding notation.
2. Understand fundamental concepts and definitions of linear algebra by achieving development of reasoning capacity, argumentative rigor and relating geometric, algebraic and abstract approaches.

ACHIEVEMENT OF COURSE LEARNING OUTCOMES, INDICATOR(S), AND EVALUATION STRATEGY(IES)

Course Learning Outcomes (CLOs) of the corresponding Curricular Organization Unit (COU), Indicators and Evaluation Strategies of the Course, referencing the Student Outcomes (SO) and Curricular Organization (CO) of the Program.

COURSE LEARNING OUTCOMES	INDICATORS	EVALUATION STRATEGIES
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COURSE LEARNING OUTCOMES	INDICATORS	EVALUATION STRATEGIES
RdA1. Ability to solve engineering approaches by applying mathematics	• It solves systems of linear equations, linear transformations and problems of characteristic value, by managing operations and properties of vectors, matrices and determinants. • It applies definitions and concepts of vector, space and vector subspace, linear combination, linear independence, base and dimension for approach and problem solving related to civil engineering applications.	• Workshops and group/individual work to consolidate knowledge and develop skills for problem solving and application of definitions • Workshops and group/individual work to consolidate knowledge and develop skills for problem solving and application of definitions • Individual evaluations of partial character to validate knowledge and skills for problem solving and application of definitions • Individual evaluations of partial character to validate knowledge and skills for problem solving and application of definitions

CONTENTS

Module Title.

1. LINEAL ECUAMENT SYSTEMS
2. ALGEBRA DE MARTRICES
3. DETERMINANTS
4. VECTORIAL SPACE AND LINEAL TRANSFORMATIONS
5. INTERNAL PRODUCT AND ORTOGONALITY
6. OWN VALUES AND OWN VECTORS

RESOURCES OR OTHER REFERENCES REQUIRED FOR THE COURSE LEARNING

Books, journals, digital databases, newspapers, internet addresses, and other relevant and current information sources.

MAIN

1. Algebra Lineal y sus aplicaciones, David Lay (4ª ed.)
2. Introducción al Algebra Lineal, Howard Anton (5ª ed.)

ADDITIONAL

1. Introducción al Algebra Lineal, Roland Larson y Bruce Edwards (1ª ed.)
2. Algebra Lineal, Bernard Kolman y David Hill (8ª ed.)
3. Algebra Lineal: Una Introducción Moderna, David Poole (Cuarta Edición)