**Materia 1_1: Fundamentals of Mathematics**

| Materia: | Fundamentals of Mathematics | ECTS: | 10 |
|---|---|---|---|
| **Descriptores** | • Matrices and systems of linear equations. Gaussian method. Factorization of matrices. Vector spaces. Linear dependence and independence. Bases and coordinates. Change of basis matrices. Scalar product and induced norm Orthogonality. Real functions of real variable: elementary functions, limits, continuity and derivability, relative extrema. Calculus of primitives. Riemann integral. Improper integral. Introduction to differential equations.<br>• Eigenvalues and eigenvectors. Diagonalization of square matrices. Orthogonal diagonalization of symmetric matrices. DVS. Graph theory. Functions of several variables: Continuity, differentiability, Taylor polynomial, tangent plane, optimization. | | |
| **Objetivos generales** | This subject has the objective of introducing the fundamental mathematical notions to solve basic engineering problems. | | |
| **Competencia específica** | CE[1-1] - Apply basic mathematical procedures and tools to solve engineering-related problems. | | |
| **Resultados de aprendizaje** | • Calculate limits, derivatives, relative extrema, primitives, and integrals of real functions of real variable.<br>• Solve matrix systems of linear equations.<br><br>• Calculate bases and equations of subspaces and coordinates of vectors in different bases.<br>• Interpret whether a square matrix is diagonalizable.<br>• Calculate a diagonalization of a square matrix and an orthogonal diagonalization for symmetric matrices.<br>• Calculate partial derivatives of functions of several variables, their Taylor polynomial and their tangent plane.<br>• Solve simple differential equations, optimization problems and problems related to graphs. | | |
| **Métodos de evaluación** | • Evaluation: Written open-ended test and Problems<br>• Assessment instruments: Checklists and Rating Scales | | |