

Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
ING207	Linear Algebra	3	2	2	0	3	5

Prerequisites	
Admission Requirements	

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	<p>Mathematical problems such as solving systems linear differentials (which occur in many areas physics such as mechanics or electronics) or analysis in principal components in statistics use the diagonalization of square matrices. Determine if a matrix is diagonalizable, and in this case, diagonalizing it is therefore the key to this course.</p> <p>In this context, the objectives of this course are:</p> <ul style="list-style-type: none">• Explain to students how the determinant of a matrix is defined using permutations and their signature, in particular in order to be able to define the characteristic polynomial.• Teach students to determine the specific elements of a matrix.• Demonstrate to the students the conditions of diagonalization of a matrix.• Explain to the students how to use diagonalization to solve linear systems.
Content	<ol style="list-style-type: none">1. Symmetric group: decomposition into products and signature of a permutation2. Determinants: definition, properties and calculation rules3. Determinants: determinants of "small" dimensions, classical determinants4. Diagonalization: Introduction and first examples5. Classical determinant applications6. Diagonalization: criterion of diagonalization (case of multiple eigenvalues)7. Diagonalization: diagonalization of "small" dimension matrices8. Partial Examination9. Diagonalization: calculation of the nth powers of a diagonalizable matrix10. Polynomials of matrices, canceling polynomials - Cayleigh Hamilton Theorem11. Application to the calculation of the nth powers of a matrix (diagonalizable or not)12. Application to linear recurrent sequences13. Application to differential systems (diagonalizable case)14. Practical studies
References	<ol style="list-style-type: none">1. Lectures notes and worksheets2. http://braise.univ-rennes1.fr/braise.cgi3. http://www.unisciel.fr

Theory Topics

Week	Weekly Contents
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