UCLouvain

linfo1112

2026

Algebra

5.00 credits	30.0 h + 30.0 h	Q2

Teacher(s)	Craeye Christophe ;Vitale Enrico ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	This course assumes that the student already masters the skills of end of secondary allowing to translate a problem into a system of equations with several variables and to solve it.
Main themes	The course focuses on : · the understanding of mathematical tools and techniques based on a rigorous learning of concepts favored by highlighting their concrete application; · the rigorous manipulation of these tools and techniques in the context of concrete applications. **Matrix calculation** · Transposition. · Operation on matrices. · Rank and resolution of a linear system. · Inversion. · Determinan. **Resolution of linear equation systems** · Matrix writing of a system of linear equations. · Basic operations on the lines. · Elimination of Gauss-Jordan. · LU Factoring. · Implementation of Linear Equation System Resolution Algorithms. **Linear algebra** · Vectors, vector operations. · Vector spaces (vector, independence, base, dimension). · Linear applications (applications to transformations of the plan, kernel and image). · Eigenvectors and eigenvalues (including applications).
Learning outcomes	**At the end of this learning unit, the student is able to :** Given the learning outcomes of the "Bachelor in Computer science" program, this course contributes to the development, acquisition and evaluation of the following learning outcomes: · S1.G1 · S2.2 Students who have successfully completed this course will be able to: · model concrete problems using matrices and vectors; · solve concrete problems using matrix calculation techniques (in particular the resolution of linear systems); · reason using correctly the mathematical notation and methods keeping in mind but exceeding a more intuitive understanding of the concepts; · apply methods of linear algebra to a wide field of problems, beyond matrices and vectors.
Evaluation methods	Written exam and implementation assignments carried out during the semester (5% of the mark).
Teaching methods	The course is given in the form of lectures and practical work sessions. The implementation assignments are supervised by the course assistants. A partial, optional but dispensatory questioning takes place halfway through.
Content	Matrix calculation · transposition, · matrix operation, · rank, · inversion,

	• determining Solving Systems of Linear Equations • Matrix writing of a system of linear equations • Basic row operations • Gauss method • Orthogonality and QR factorization • Implementation in Python language of algorithms for solving systems of linear equations Linear algebra • vectors, operations on vectors, • vector spaces (vector, independence, basis, dimension), Euclidean space, • linear applications (applications to plane, kernel and image transformations), • eigenvectors and eigenvalues (including linear operators)
Inline resources	Available on Moodle: Course slides Syllabus Statements and solutions to exercises and assignments Old exam questions, with solutions
Other infos	To review your prior knowledge, you can use the site https://www.auto-math.be
Faculty or entity in charge	INFO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Computer Science	SINF1BA	5		🔍