UCLouvain

linfo1112

2023

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, • determinant **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 1 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.
Evaluation methods	Written exam and implementation assignments carried out during the semester (approximately 15% 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, resolution of a linear system,

	• inversion, • determining Solving Systems of Linear Equations • Matrix writing of a system of linear equations • Basic row operations • Gauss-Jordan elimination • 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 maps)
Faculty or entity in charge	INFO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Data Science : Statistic	DATS2M	5		🔍
Bachelor in Computer Science	SINF1BA	5		🔍