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	The exam is a closed-book written exam lasting between 2 and 3 hours. Calculators and mobile phones are prohibited. The exam consists of two or three open-ended questions that test the ability to apply the techniques covered in lectures and practical sessions, as well as critical thinking skills. The answer key will be available on Moodle after the exam session ends and before the paper review session. The exam questions cover basic techniques (worth 14 points) and more advanced material (worth 6 points). Questions (or parts of questions) covering advanced material will be clearly identified on the exam form. A midterm exam will be held around week 8; this exam is mandatory, but students will receive bonus points of between zero and two. The use of Artificial Intelligence in the assessment activities for this course unit is strictly prohibited.

Teaching methods	The course is given in the form of lectures and practical work sessions.
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 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 Old exam questions, with solutions
Other infos	To review your prior knowledge, you can use the site https://www.auto-math.be Any use of artificial intelligence within the framework of this course must comply with the guidelines established by EPL.
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		🔍