Course nu	umb	ber U-LAS10 10008 LE55												
Course title (and course title in English)	Lir Lir	near A near A	lgebra with Exercises A lgebra with Exercises A			A A	Instru name and d of affi	Instructor's name, job title, and department of affiliation			Graduate School of Science Professor, COLLINS, Benoit Vincent Pierre			
Group	atural Sciences Field(Class						Classifi	cation)	Mat	lathematics(Foundations)				
Language of instruction		English				Old g	Group B		Number of credits 3			3		
Number of weekly time blocks		2		Class sty	le Le	cture ace-to-face course)				Year/semesters		2025 • First semester		
Days and periods	N	Mon.3 • Tue.		2 Targe		t year N	lainly 1st	year students	Eli	Eligible students		For science students		
[Overview	ı an	nd pu	rpose	of the c	ourse	]								

Calculus and linear algebra form the essential mathematical background necessary for understanding and developing modern science and technology. In this lecture, basics of Linear Algebra required for further pursuing of studies majored in science are explained.

In the Linear Algebra A class, students will learn to manipulate concretely vectors, matrices, and systems of linear equations.

### [Course objectives]

The goal of this class is to learn to manipulate concretely vectors, matrices, and systems of linear equations. In addition to learning linear algebra, students can learn how to discuss and present mathematical topics in English through this course.

### [Course schedule and contents)]

This subject is composed of two interrelated parts: Lecture and Exercises. The exercises sessions will take place basically once in two weeks, their purpose being to deepen the students' understanding of the contents of the lecture sessions through active participation in problem solving and through regular submission of reports.

In the course outline below, the order in which the given items will be presented is not fixed and depends on the background and understanding of enrollees.

1. Fundamental concepts (1 week)

-numbers, sets, mappings, basic notions of mathematical logic

2. Vectors in the plane and 2x2 matrices (2 weeks)

-matrix and vector calculus, matrix inverses, Cayley Hamilton theorem

-linear transformations of the plane (rotation, reflections, etc) and matrices

-linear systems of equations and matrices

3. Concrete vector spaces and matrices (5-7 weeks)

-vectors, vector calculus, linear span

-matrices, matrix calculus (addition, scalar product, product)

-examples of matrices (2-3 weeks)

-elementary operations on matrices, rank, invertible matrices, inverse matrix

-solving linear equations, structure of solutions (3-4 weeks)

4. Determinant (4-6 weeks)

-row/column substitution and signature; definition of determinant and properties (3-4 weeks)

Continue to Linear Algebra with Exercises A(2)

#### Linear Algebra with Exercises A(2)

-computation of determinant, Cramer's rule, volume and determinant (1-2 weeks)

Total: 14 classes, 1 Feedback session

#### [Course requirements]

None

# [Evaluation methods and policy]

Students will be evaluated based on their performance in both the lecture and the exercises sessions.

\* Lecture will be graded based mainly on the final examination.

\* Exercises will be evaluated based mainly on submitted reports and participation in class.

The details of the evaluation system will be given by the lecturer at the first lecture.

#### [Textbooks]

Not used

[References, etc.]

# (References, etc.)

Jim Hefferon <sup>II</sup> Linear Algebra and Its Applications <sup>II</sup>

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Website:

http://joshua.smcvt.edu/linearalgebra/

## [Study outside of class (preparation and review)]

To be announced.

[Other information (office hours, etc.)]

It is advisable to attend the lecture "Calculus with Exercises A" in parallel. Moreover, it is recommended to register for "Linear Algebra with Exercises B" in the second semester.

Students are welcome to ask questions during, at the beginning or at the end of the class. The instructor encourages students to arrange an appointment with him if they have questions.