

科目ナンバリング		U-LAS10 10008 LE55									
授業科目名 <英訳>		Linear Algebra with Exercises A Linear Algebra with Exercises A				担当者所属 職名・氏名		理学研究科 教授 COLLINS Benoit Vincent Pierre			
群	自然科学科目群			分野(分類)	数学(基礎)			使用言語	英語		
旧群	B群	単位数	3単位	週コマ数	2コマ	授業形態	講義(対面授業科目)				
開講年度・ 開講期	2024・前期		曜時限	月3・火2		配当学年	主として1回生	対象学生	理系向		
【授業の概要・目的】											
<p>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.</p> <p>In the Linear Algebra A class, students will learn to manipulate concretely vectors, matrices, and systems of linear equations.</p>											
【到達目標】											
<p>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.</p>											
【授業計画と内容】											
<p>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.</p> <p>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.</p> <ol style="list-style-type: none"> <li>1. Fundamental concepts (1 week) <ul style="list-style-type: none"> <li>-numbers, sets, mappings, basic notions of mathematical logic</li> </ul> </li> <li>2. Vectors in the plane and 2x2 matrices (2 weeks) <ul style="list-style-type: none"> <li>-matrix and vector calculus, matrix inverses, Cayley Hamilton theorem</li> <li>-linear transformations of the plane (rotation, reflections, etc) and matrices</li> <li>-linear systems of equations and matrices</li> </ul> </li> <li>3. Concrete vector spaces and matrices (5-7 weeks) <ul style="list-style-type: none"> <li>-vectors, vector calculus, linear span</li> <li>-matrices, matrix calculus (addition, scalar product, product)</li> <li>-examples of matrices (2-3 weeks)</li> <li>-elementary operations on matrices, rank, invertible matrices, inverse matrix</li> <li>-solving linear equations, structure of solutions (3-4 weeks)</li> </ul> </li> <li>4. Determinant (4-6 weeks) <ul style="list-style-type: none"> <li>-row/column substitution and signature; definition of determinant and properties (3-4 weeks)</li> <li>-computation of determinant, Cramer's rule, volume and determinant (1-2 weeks)</li> </ul> </li> </ol> <p>Total : 14 classes, 1 Feedback session</p>											
<div style="text-align: right;">Linear Algebra with Exercises A(2)へ続く</div>											

## Linear Algebra with Exercises A(2)

### 【履修要件】

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### 【成績評価の方法・観点】

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.

### 【教科書】

使用しない

### 【参考書等】

（参考書）

Jim Hefferon 『Linear Algebra and Its Applications』

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Website:

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

### 【授業外学修（予習・復習）等】

To be announced.

### 【その他（オフィスアワー等）】

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.