科目ナンバリング	U-LAS10 10033 LE55				
授業科目名<英訳>	Linear Algebra B-E2 [For non-science majors] Linear Algebra B-E2 [For non-science majors]	担当者所属職名・氏名	工学研究科　講師　Tam Willy Nguyen		
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	2単位	週コマ数	1コマ	授業形態	講義（対面授業科目）
開講年度・開講期	2026・後期	曜時限	金2	配当学年	全回生	対象学生	全学向

[授業の概要・目的]

The rapid progress of computers has made it possible to analyze various social and natural phenomena using mathematical methods, and the importance of these methods is increasing.
This course is designed to provide liberal arts students with basic knowledge of linear algebra as a basis for learning such mathematical methods.
The Linear Algebra B [For non-science majors] is the consecutive course of Linear Algebra A [For non-science majors]. Linear Algebra B [For non-science majors] offers, the students the concepts and techniques that play a central role in linear algebra, based on the basic content of vectors and matrices learned in Linear Algebra A [For non-science majors].

[到達目標]

In Linear Algebra B [For non-science majors], students will understand essential ideas and techniques that play a central role in linear algebra, such as determinants, the basis of vector space, inner product, eigenvalues and eigenvectors, and diagonalization of matrices and become proficient in more advanced treatment of vectors and matrices.

[授業計画と内容]

The following subjects will be covered.
The number of lessons is 15, including feedback.
The order of the subjects is not fixed; the lecturer will decide according to the lecturer's lecture policy and the student's background and understanding of the subject. Real vectors and matrices will be covered mainly.

1. Determinants (Definition and characteristics of determinant (elementary transformation, product, relation with transpose, substitution, and sign), expansion of determinant, Cramer's rule) [4〜5 weeks]
2. Numerical vector space (linear independence, subspaces, basis and dimension, inner product, orthonormal basis, *direct sum, *orthogonal complementary space, *orthogonal matrix, *QR decomposition) [4-5 weeks]
3. Eigenvalues, eigenvectors, and diagonalization (eigenvalues and eigenvectors, matrix diagonalization, *matrix upper triangulation, *Cayley-Hamilton theorem, *diagonalization of a symmetric matrix by an orthogonal matrix, *positive definiteness of symmetric matrix, *square root of a positive symmetric matrix) [4-5 weeks]
4. Feedback [1 week].

Items marked with an asterisk (*) will be covered if time permits.
In addition to lectures on the above topics, there will be exercises (in-class exercises or homework) related to the topics.

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[履修要件]

Students are assumed to have a good understanding of high school mathematics except calculus.

[成績評価の方法・観点]

Students will be evaluated primarily on their performance in the final examination. The student's performance in exercises and homework may also be taken into account. The details of the evaluation system will be explained by the lecturer in the first lecture.

[教科書]

Instructions on the textbook will be given in class. For those topics for which no appropriate textbook is available, printed or electronic materials will be provided by the lecturer.

[参考書等]

（参考書）
授業中に紹介する

[授業外学修（予習・復習）等]

In order to learn mathematics, it is necessary to try to solve the exercises on your own, in addition to preparing and reviewing the lectures.

[その他（オフィスアワー等）]

[主要授業科目（学部・学科名）]