Linear Algebra

Syllabus Number 1A203
Basic Major Subjects
Elective Requisites 2 credit

WATANABE, Ryuji

1. Course Description

This course provides an introduction to linear algebra necessary in the following mathematical courses and specialized courses. The items are as follows: Matrix, linear transformation, inverse matrix, determinant, inverse matrix and simultaneous linear equations, diagonalization and Eigen values of matrix, and linear independency of vectors.

The classes consist of lectures and exercises. Students will give presentations on homework assignments in the classes.

This subject is related to the clause 2 of the diploma policy of the Department of Mechanical and Precision System.

2. Course Objectives

This course aims to improve the students' basic knowledge of mathematics used by scientists and engineers and to enhance their overall mathematical levels by solving mathematical problems so that they can study textbooks in specialized courses on their own.

3. Grading Policy

The term-end examination (80%) and presentations on homework assignments in the classes (20%) will be evaluated.

The acceptance line is accuracy rate of 60% in the above term-end examination and presentations on homework assignments.

4. Textbook and Reference

Textbook

Y.Tashiro "Engineering Mathematics: Linear Algebra (2nd edition)" Morikita Publishing (1999) in Japanese. (ISBN 4-627-04922-6)

Reference

M.Toda and N.Asano "Matrix and Linear Transformation" Iwanamishoten (1989) in Japanese. (ISBN 4-00-007772-4)

5. Requirements(Assignments)

Students are required to review the lectures and to do the homework assignments.

6. Note

It is recommended for students to access the homework assignments on the LMS.

It is prohibited for students to refer the textbook and notebook in term-end examination and makeup examination.

7. Schedule

[1] Matrix : Definition of matrix
[2] Matrix : Operation of matrix
[3] Linear transformation : Definition of linear transformation
[4] Linear transformation : Product of linear transformation
[5] Inverse matrix : Simultaneous linear equations, Inverse
[6] Inverse matrix : Inverse transformation of linear transformation
[7] Determinant : Definition of determinant, Properties of determinant
[8] Determinant : Expansion of determinant, Determinant of the product of matrices
[9] Inverse matrix and Simultaneous linear equations : Inverse matrix of the n-dimensional square matrix
[10] Inverse matrix and Simultaneous linear equations : Cramer's formula, Sweep method
[11] Diagonalization and Eigen value : Simultaneous homogeneous linear equations
[12] Diagonalization and Eigen value : Eigen value, Diagonalization
[13] Diagonalization and Eigen value : Symmetric matrix, Orthogonal matrix
[14] Linear independency of vectors : Linear independent and dependent, vector products
[15] Review, Term-end examination