Linear Algebra

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.

   All lessons from the first to the 15th are based on self-learning given on the LMS.

   This subject is related to the clause 1 of the diploma policy of the Department of Information Science Correspondence Course.

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 final examination will be evaluated. The acceptance line is the accuracy rate of 60% in the final examination.

   It is required to answer all the quizzes given on the LMS and to take the accuracy rate of 60% in all the quizzes before taking the final examination.

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　"Linear Algebra"　Iwanamishoten (2019) in Japanese.（ISBN 9784000298841）
   S.Ishihara and S.Asano　"Introduction to Linear Algebra"　Shokabo (1995) in Japanese.（ISBN 978-4-7853-1093-6）

5. Requirements(Assignments)

   Answering all the quizzes prepared on the LMS is required before taking the final examination. Also, answering the practice exercises prepared on the LMS is required.

   Preparation of 'figures and equations' and 'vectors' on a high school level is also required.

6. Note

   It is prohibited for students to refer the textbook and notebook in the final 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 matrix
[6]   Inverse matrix : Inverse transformation of linear transformation
[7]   Determinant : Definition of determinant
[8]   Determinant : Properties of determinant
[9]   Determinant : Expansion of determinant, Determinant of the product of matrices
[10]   Inverse matrix and Simultaneous linear equations : Inverse matrix of the n-dimensional square matrix
[11]   Inverse matrix and Simultaneous linear equations : Cramer's formula, Sweep method
[12]   Linear independency of vectors : Simultaneous homogeneous linear equations
[13]   Linear independency of vectors : Linear independent and dependent, vector products
[14]   Diagonalization and Eigen value : Eigen value, Diagonalization
[15]   Diagonalization and Eigen value : Symmetric matrix, Orthogonal matrix