

# Basic Mathematics

Syllabus Number

4B102

Basic Major Subjects

Requisites 2 credit

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## 1. Course Description

The contents of the lectures are summarized as follows: (1) trigonometric functions (also called circular functions, angle functions or goniometric functions), (2) exponential and logarithmic functions, (3) sequence and series, (4) vector, and (5) complex number.

## 2. Course Objectives

The aim of this course is to understand the following items: (1) basic concepts of elementary functions (i.e., trigonometric functions, exponential function, logarithmic function, etc.), (2) how to calculate the limit of infinite sequence and the sum of infinite series, and (3) how to use vector and complex number.

## 3. Grading Policy

Students are evaluated by a term examination, some midterm examinations, and some quizzes.

## 4. Textbook and Reference

Textbook

No textbook. The original slides and video contents are used.

Reference

No reference. The original slides and video contents are used.

## 5. Requirements(Assignments)

The slides of the lecture should be read. The video contents of the lecture should be viewed.

## 6. Note

LMS is used in this course.

## 7. Schedule

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|------|--|
| [1]  | Introduction.  |
| [2]  | Trigonometric functions (1): Law of sines. Law of cosines.                                     |
| [3]  | Trigonometric functions (2): Compound angle formula. Inverse trigonometric functions.          |
| [4]  | Exponential and logarithmic functions (1): Basic concepts.                                     |
| [5]  | Exponential and logarithmic functions (2): Graphs.   |
| [6]  | The limit of sequence (1): The limit of infinite sequence. Infinite geometric sequence.        |
| [7]  | The limit of sequence (2): The sum of infinite series. d'Alembert's ratio test.                |
| [8]  | The limit of function (1): The limit of trigonometric, exponential, and logarithmic functions. |
| [9]  | The limit of function (2): Continuous functions. Differentiable functions. L'Hospital's rule.  |
| [10] | Vector (1): Basic concepts and notations.  |
| [11] | Vector (2): Inner product. Outer product.  |
| [12] | Complex number (1): Complex plane. Polar form.   |
| [13] | Complex number (2): De Moivre's theorem. Euler's formula.                                      |
| [14] | Advanced topics: Use of computer science.  |
| [15] | Summary and term examination.  |