

# Basic Mathematics

Syllabus Number

3F112

Basic Major Subjects

Requisites 2 credit

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## 1. Course Description

How is an exponential generalized to the exponential function done? How is an index to express the number of digits generalized to the logarithmic function done? How did the relation of angles and sides of the right-angled triangle transform into the trigonometric function, in which a graph has a wavy shape? In this course, students will understand these matters by studying whole steps without omitting middle, and will actually be able to use them through exercises.

## 2. Course Objectives

The exponential function, logarithmic function, and trigonometric function are important functions frequently used in natural science and engineering. The aim of this course is understanding and mastering the basic usage of these functions. Another aim is to be able to hypothesize the rough shape of a graph and an approximate value as well as the calculation rule.

## 3. Grading Policy

Students will be evaluated based on periodic test (80%) and report assignment (20%). The submitted report tasks will be corrected and returned.

## 4. Textbook and Reference

Textbook

Yoshihiro Tashiro Basic mathematics of engineering mathematics Morikita Shuppan Co., Ltd

## 5. Requirements(Assignments)

Always read the textbook before the next lesson. Note down the part which you don't understand. (About 1 hour). After class, please solve the exercises in the textbook as instructed (about 1 to 2 hours) and submit it as a report at the beginning of the next lesson. The number of the exercise that is an assignment will be posted on LMS after each lesson.

## 6. Note

Please bring and use a scientific calculator to solve the exercises during lesson.

Progress may be followed by degree of comprehension, so we will focus on the review subject and the next preparatory range in each lesson.

## 7. Schedule

- [1] Power and exponential law  
[Preparation] Read through the textbook p. 86-88, clarify the points that can not be understood and go to class.  
[Review] Solve problems 9.1 and 9.2 (p.88) and submit them as reports at the start of the next lesson.
- [2] Definition of exponential function by applying extended law of exponent
- [3] Exponential calculation (problem exercises)
- [4] Logarithm, the number of digits and common logarithm
- [5] Logarithm function as inverse function of exponential function
- [6] Logarithm calculation (problem exercises)
- [7] Summary of exponential and logarithm function  
[Problem Questionnaire] We ask the representative to write the answer on the designated problem on a blackboard.
- [8] General angles and trigonometric functions
- [9] Concept of triangular ratio, definition of trigonometric function
- [10] Trigonometric function relationship, trigonometric function graph
- [11] Trigonometric function equation, inequality
- [12] Trigonometric additive theorem, formula
- [13] Trigonometric formula, theorem
- [14] The characteristic of the triangle
- [15] Overall summary and review