

# Calculus 2

Syllabus Number

4B202

Basic Major Subjects

Elective 2 credit

ISOGAI, Takeshi

## 1. Course Description

This course provides the basis of differential and integral calculus to students who study information science. The course includes the following contents:

Partial derivative function, derivatives of composite function of many variables, Mean-value theorem, local maximum/minimum on the function of many variables, Implicit function theorem, multiple integral, repeated integral and integral by polar coordinate.

## 2. Course Objectives

The purpose of this course is to enable students to obtain basic knowledge about derivatives and integral of function of many variables, and to improve mathematical skills and the ability in order to consider problem solving.

## 3. Grading Policy

Evaluation will be conducted based on the results of the subject acquisition test (50%) and the results of the submission report (50%). However, it is a requirement for unit acquisition that students must pass the two reports and the score of the subject acquisition test will be 60 points or more.

We will provide feedback based on comments on the submission report.

## 4. Textbook and Reference

Textbook

Yoshihiro Tashiro Mathematics for Engineers Calculus (2nd edition) Morikita Shuppan (1999) ISBN 978-4-627-04932-1

Reference

Sonoko Ishimura Calculus That You Can Learn Easily Kyoritsu Shuppan (1999) ISBN 978-4-320-01633-0

## 5. Requirements(Assignments)

A lesson that deepens understanding of learning contents by reading the textbook based on the commentary for each "lecture" written in the sub text and solving the understanding degree test described in each "lecture". Especially after learning the [example] of the text carefully, please answer all the questions in the test. Other problems and exercises are posted in the text, so please solve them and deepen your understanding further.

## 6. Note

## 7. Schedule

- [1] Partial derivative 1: Multivariable function and its graph, Convergence, Limit value, Continuity of multivariable function
- [2] Partial derivative 2: Partial derivative coefficient, Partial derivative, High order partial derivative function
- [3] Differentiation method of composite function: Differentiation of composite function with two variables
- [4] Mean value theorem: Mean value theorem in two variables function
- [5] Local maximum and local minimum: local maximum and local minimum of functions with two variables, Determination of extreme values
- [6] Implicit function Theorem 1: Implicit function, Differentiation of implicit function, Implicit function theorem
- [7] Implicit function Theorem 2: Equation of tangent of curve represented by implicit function, Singular point
- [8] Conditional Extreme Problem: Conditional extreme, Lagrangian multiplier method
- [9] Multiple integral 1: Multiple integral, Definition of double integral, Region for integration
- [10] Multiple integral 2: Relationship between double integral and iterated integral
- [11] Iterated integral 1: Iterated integral, Exchange of integration order
- [12] Iterated integral 2: Iterated integral when the integral region is represented by inequality, Calculation of volume of solid by iterated integral
- [13] Integral by polar coordinates 1: Equation of curve in polar coordinates, Double integral by polar coordinates
- [14] Integral by polar coordinates 2: Calculation of improper integral by double integral using polar coordinates
- [15] Summary: Final exam (50 minutes).