

# Computer and Visualization Method for Science and Engineering

Special Subjects  
Elective 2 credit

KAWAMURA, Masaaki

## 1. Course Description

It is very important to build programs by yourself not only to study by textbooks. In this class, students use Visual C++ which is a development tool of C++ that is added object oriented program to C. At first, students learn elementary operation of Visual C++ and programming method by making a dice game. Next, students deepen their understanding of programming by dealing with various physics and engineering simulations after students learn solutions of fundamental mathematics, ordinary differential equations and partial differential equations.

Students can acquire knowledge about DP1 and DP2 in this class.

## 2. Course Objectives

Goal of this class is that the students can obtain basic programing technique with C/C++, and can solve science and engineering problems with numerical simulations.

## 3. Grading Policy

Attendance (50%) and Report (50%).

The students will get feedback by progress check of the report in class.

## 4. Textbook and Reference

Textbook

ISBN978- 4822294236

ISBN978- 4526053597

## 5. Requirements(Assignments)

Review the contents of every classes to obtain the programing technique.

And participate in next class after confirming that the program can be compiled certainly.

## 6. Note

## 7. Schedule

- [1] Basic programing (1) :Development tool (Windows Application)
- [2] Basic programing (2) :Dice game programing (Design of main window)
- [3] Basic programing (3) :Dice game programing (Basis of programing)
- [4] Basic programing (4) :Dice game programing (Application of programing)
- [5] Basic programing (5) :Dice game programing (Summary)
- [6] Rudimentary mathematics (1) :Development tool (Console Application)
- [7] Rudimentary mathematics (2) :Quadratic equation
- [8] Rudimentary mathematics (3) :Ordinary differential equations (Euler's Method)
- [9] Rudimentary mathematics (4) :Ordinary differential equations (Runge-Kutta Method)
- [10] Rudimentary mathematics (5) :Ordinary differential equations (Problem 2), free fall 1
- [11] Rudimentary mathematics (6) :Ordinary differential equations (Problem 2), free fall 2
- [12] Physical phenomenon (1) :Partial differential equations (fundamental equation)
- [13] Physical phenomenon (2) :Partial differential equations (difference method)
- [14] Physical phenomenon (3) :Partial differential equations (Problem 3), Heat conduction equation 1
- [15] Physical phenomenon (4) :Partial differential equations (Problem 3), Heat conduction equation 2