

Computational science

Special Subjects
Elective 2 credit

SASAKI, Shigeru

1. Course Description

The aim of this course is to learn a basic theory of the finite element method (FEM) and how to make the FEM calculation program.

This course is related to diploma policy 3.

2. Course Objectives

By the end of the course, students should be able to do the following:

- acquire a basic solution of the finite element method through a one-element problem.
- acquire a basic solution of the finite element method through a multiple-element problem.
- write the fundamental FEM calculation program.

3. Grading Policy

Grading will be decided based on the final examination (80%) and reports (20%).

4. Textbook and Reference

Textbook

Fuji Fukumori, YOKU WAKARU YUUGENYOUSOHOU, OMUSYA (in Japanese)

The Learning materials are published on the LMS.

5. Requirements(Assignments)

The students are expected to review contents and short tests before starting new topics. It takes approximately one hour to finish this work.

6. Note

7. Schedule

- | | |
|------|---|
| [1] | Fundamentals of the computational science |
| [2] | Mathematical basics |
| [3] | Fundamentals of the numerical calculation |
| [4] | Fundamentals of the FEM (1) |
| [5] | Fundamentals of the FEM (2) |
| [6] | Fundamentals of the FEM (3) |
| [7] | Programming exercise(1) |
| [8] | Programming exercise(2) |
| [9] | FEM with the multiple-elements (1) |
| [10] | FEM with the multiple-elements (2) |
| [11] | FEM with the multiple-elements (3) |
| [12] | Programming exercise(3) |
| [13] | Programming exercise(4) |
| [14] | Practical FEM problem solving (1) |
| [15] | Practical FEM problem solving (2) |