

Aerodynamics 2

Syllabus Number

2A310

Special Subjects

Elective 2 credit

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1. Course Description

Students learn following contents in this class.

1. features of viscous fluid
2. fundamental equation of viscous fluid
3. viscous flow
4. low Reynolds number flow
5. high Reynolds number flow
6. force a body is received from viscous fluid

Students can acquire knowledge about DP2 in this class.

2. Course Objectives

Goal of this class is that students can try to comprehend and explore fluid phenomenon caused by viscosity by their describing of motion of viscous flow and estimating of received force a body is received from viscous fluid.

3. Grading Policy

Attendance more than two thirds, midterm exam (50%) and term end exam (50%).
The students will get simple explanations after these exams.

4. Textbook and Reference

Reference
ISBN978-4842504780
ISBN978-4782841044
ISBN978-4785323141
ISBN978-1259251344

5. Requirements(Assignments)

Review fluid dynamics, elementary dynamics, infinitesimal calculus and differential equation thoroughly.
Read the text within the contents of the next lecture and write in a notebook for preparation in order to comprehend meaning of technical terms (1.5 hours).
After the lecture will be ended, review the notebook teacher explains in the class (1.5 hours).

6. Note

7. Schedule

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| [1] | features of viscous fluid |
| [2] | fundamental equation of viscous fluid (1) : continuity equation |
| [3] | fundamental equation of viscous fluid (2) : equation of motion (Euler equation) |
| [4] | fundamental equation of viscous fluid (3) : equation of motion (Navier-Stokes equation) |
| [5] | viscous flow (1) : Reynolds number |
| [6] | viscous flow (2) : Reynolds number and low of similarity |
| [7] | viscous flow (3) : Couette flow, Poiseuille flow |
| [8] | Summary of the former part, Midterm exam |
| [9] | low Reynolds number flow (1) : motion of sphere in a very late viscous flow |
| [10] | low Reynolds number flow (2) : motion of cylinder in a late viscous flow |
| [11] | high Reynolds number flow (1) : boundary layer theory |
| [12] | high Reynolds number flow (2) : separation of boundary layer |
| [13] | high Reynolds number flow (3) : laminar flow and turbulent flow |
| [14] | force a body is received from viscous fluid : drag coefficient and lift coefficient |
| [15] | Summary, Term end exam |