

# Exercises in Aerospace Engineering2

Syllabus Number

2F303

Basic Major Subjects

Requisites 1 credit

NAKAMIYA. Masaki

## 1. Course Description

In this course, students will work through exercises after a lecture given by the teacher. The contents in this course are basic and important things in the curriculum of Aerospace Engineering Department. Students are required to attend all the classes and to hand in the answer sheets of all exercises. Students are expected to acquire the knowledge and techniques of DP1 and DP2.

## 2. Course Objectives

Important contents to be learned in this course are:

- (1) Ordinary differential equation and statistics
- (2) English exercise
- (3) Fluid dynamics: non-compressible and compressible
- (4) Outline of rocket engineering: basics on rocket engines, design for high reliability
- (5) Design of aircraft structures: fracture mode, strength and design of shear joints.

The main objective is that students to acquire basic academic skills and abilities helpful in meeting real-world requirements and in passing various exams for qualifications, graduate schools and employment. In each content outlined above, the objective is to understand fundamentals and to be able to solve basic problems.

## 3. Grading Policy

Grading policy is based on exercise answers submitted at each class (100%). After submission, the answers are explained by the teacher. When a student did not attend a class, he/she should make contact with the teacher and receive instructions for exercise. The grading mark of each class is summed up to the total mark of this course. When the number of attendance and that of answer submission of a student are less than two-thirds of the number of classes, and when the total mark is not in the "pass" range, the student is "not qualified".

## 4. Textbook and Reference

### Textbook

Textbooks for this course are not specified. The schedule of the course is shown before the beginning of the semester. Students are required to bring appropriate textbooks, reference books and/or notebooks to the class that have been studied and are related to the contents to be learned. At the class, in most cases, students will receive hand-out materials.

### Reference

none

## 5. Requirements(Assignments)

Submission of answer sheets is the most important. Students who were absent from a class should make contact with the teacher to receive instructions.

## 6. Note

In this course, students will brush up the basics of aerospace engineering and other subjects such as mathematics and English.

## 7. Schedule

- (1) English: How to study English (Masaki NAKAMIYA)
- (2) Ordinary differential equations: Rotational motion of a rigid body (Masaki NAKAMIYA)
- (3) Fundamentals on statistics and probabilities: Standard deviation, Covariance matrix (Masaki NAKAMIYA)
- (4) Statistical analysis: Multi-variable analysis (Masaki NAKAMIYA)
- (5) Incompressible Fluid 1: Manometer, Pitot tube (Masaaki KAWAMURA)
- (6) Incompressible Fluid 2: Water Jet, Laminar Flow and Turbulent Flow (Masaaki KAWAMURA)
- (7) Incompressible Fluid 3: Air Drag, Wind Tunnel Test (Masaaki KAWAMURA)
- (8) Compressible Fluid: Rayleigh Pitot-tube Formula (Masaaki KAWAMURA)
- (9) Elements of rocket engineering 1: Rocket engineering in general (Hiroyasu MANAKO)
- (10) Elements of liquid-propellant rocket engine engineering 1: Engine1 (Hiroyasu MANAKO)
- (11) Elements of liquid-propellant rocket engine engineering 2: Engine2 (Hiroyasu MANAKO)
- (12) Elements of liquid-propellant rocket engine engineering 3: High reliability design (Hiroyasu MANAKO)
- (13) Aircraft structural design 1: Fracture mode and strength of shear joint (Takashi HIRAMOTO)
- (14) Aircraft structure design 2: Design of shear joint (Takashi HIRAMOTO)
- (15) Review and supplementary lectures or exercises (All teachers above)