

# Introduction Engineering

to

Aeronautical

Syllabus Number

2B108

Special Subjects

Elective 2 credit

YONEDA, Hiroshi

## 1. Course Description

For each of the following topics, theories will be studied and problem-solving exercises will be assigned: the history of aviation technology, standard atmosphere, outer space, types of aircrafts and the structures, lift and drag, flaps, parasitic drag, engine thrust, turbofan engine, engine performance, aircraft capabilities, stall speed, required thrust, ascent performance, cruising range, static stability and dynamic stability, longitudinal and lateral stability, flight control, aircraft instrumentation, navigation and guidance, structural design and strength, and material science.

## 2. Course Objectives

In this course, the student is expected to gain a vast knowledge of fast-paced aviation engineering, along with the basic concepts of aerodynamics, aviation engineering, propulsion engineering, stability control, structural strength, and material science, all of which will be helpful in expanding the student's knowledge base.

## 3. Grading Policy

It depends on the final exam (100%). Besides the attendance rate, there are requirements to take the final exam. Read the following "Note".

The automatic scoring of LMS exercises is part of the feedback, and in the 14th lecture gives an emphasis on feedback throughout the lecture.

## 4. Textbook and Reference

Textbook

室津義定 『航空宇宙工学入門』ISBN-13: 978-4627690325

Lectures will be given by projecting lecture materials (power points) on the screen, including necessary parts of the textbook. 森北出版

## 5. Requirements(Assignments)

Read the textbook thoroughly in advance. The next lecture materials will be posted on the LMS, so read in advance. (1.5 hours)

As a review, have LMS exercises submitted within one week after the lecture. I set it so that you can try several times, so I think that you can review while checking your own understanding situation by trying while reviewing. (1.5 hours) The final exam will be based on this test. In addition, the final exam can not be taken if you do not submit it properly, so read the following "Note" carefully.

## 6. Note

Students can not take the web test at the end of the term if the number of submitted LMS tests for understanding check after lecture is not more than two thirds of the total number of LMS tests.

## 7. Schedule

- [1] History of the airplane.
- [2] (Cont.) History of the airplane, the basis of the atmosphere.
- [3] Aircraft configuration, lift and drag (1): circulation and lift.
- [4] Lift and drag (2): Two-dimensional wing, aerodynamic force acting on three-dimensional wing, classification of drag, high lift device, high-speed aerodynamics.
- [5] Propulsion (1): Jet engine thrust.
- [6] Propulsion (1): continuation of Jet engine thrust, Propulsion (2): Propeller thrust.
- [7] Airplane performance.
- [8] Airplane performance (Review), Airplane stability and control (1): Static stability and Dynamic stability, Longitudinal stability.
- [9] Airplane stability and control (2): Longitudinal stability sequel, Lateral and directional stability, Aircraft motion mode, Maneuverability.
- [10] Measurement, control and navigation (1): Aircraft control devices, Instruments with aneroid.
- [11] Measurement, control and navigation (2): Gyro instruments, other instruments, GPS etc.
- [12] Structure and strength.
- [13] Aircraft operation and control.
- [14] Supplementary explanation of important points.
- [15] Summary, Examination