Introduction to Mechanical Engineering

Syllabus Number 2A106
Basic Major Subjects
Elective Requisites 2 credit

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1. Course Description

This course introduce basic matters and principles which are directly linked to "creation of things" that were not dealt with in science and mathematics studied in high school. By understanding these items, students will understand the outline of mechanical engineering.
In this lecture, students will acquire knowledge of DP1.

2. Course Objectives

Mechanical engineering covers the field of entire machines. Aircraft and rockets handled in the aerospace are one of them. It is difficult to understand a wide range of mechanical engineering in a short period of time, but in the lecture, students will learn basic items necessary of making (creating) a machine. These are the items that become the basis of special lectures and research that will be involved in the future.
Specifically, in each lecture, important items are indicated as “Key Words”, so students aim to be able to understand and explain their meanings, importance, and usage.

3. Grading Policy

Grades are evaluated based on the results of the periodic test (80%) at the end of the term and the comprehension test (20%) to be carried out as appropriate. Answers and explanations of the comprehension test will be distributed after the examination.

4. Textbook and Reference

Textbook
T. Matsuo et al. Text easy to understand Mechanical engineering, 3rd edition,
ISBN 978-4627650336.
Morikita publishing company
Summary of important matters (Key Word) will be distributed.
Reference
K. Kadota New Machine Textbooks 2nd Edition,
ISBN 978-4274214608 Ohm Inc.
edited by the Japan Society of Mechanical Engineers General Mechanics Engineering,
ISBN 978-4888982160 Japan Society of Mechanical Engineers

5. Requirements(Assignments)

The content to be learned in the lecture is strongly linked with specialized subjects of aerospace engineering that everyone will learn in the future, so it is important to understand the basic matter thoroughly.

6. Note

7. Schedule

[1] Mechanical Engineering: Knowing the machine definition and history and understanding of the mechanics engineering system
[2] Mechanism: Learn the fundamental mechanism of moving a machine and the dynamics
[3] Machine material (1): Learn about typical of materials used in machinery, steel.
[4] Mechanical materials (2): Learn about nonferrous metal materials (aluminum alloy, titanium alloy and so on) and composite materials.
[5] Strength of Materials (1): Learn about material strength, stress and strain which are the basis of material mechanics
[6] Strength of Materials (2): Learn about the bending of beams and buckling of columns, which is the basic element constituting the mechanical structure
[7] Mechanical elements and mechanics: Learn the basic mechanisms for moving machines, and mechanical elements related to power transmission
[8] Machine elements and design: Learn about machine design concept, allowable stress, safety margin, and screws which are representative mechanical elements
[9] Machine drawing: Learn the third angle projection method which is the basis of the projection method, and fitting tolerance which is need to manufacture and assemble the machines
[10] Machining: Learn about machining methods related to manufacturing such as forging, casting, cutting, grinding, and special processing, etc.
[11] Dynamics of machinery: Learn about machinery moving mechanisms, reciprocating machines, rotating machines and understand the fundamentals of mechanical vibration
[12] Dynamics of machinery: Learn about machinery moving mechanisms, reciprocating machines, rotating machines and understand the fundamentals of mechanical vibration
[13] Fluid Dynamics and Fluid Machine: Understanding the motion of fluids used in machines through fluid machinery
[14] Control: Learn a representative control method in machinery, mainly about automatic control and sequence control
[15] Information processing: Learn computer-based technology such as CAD / CAM / CAE used for machine design