Exercises in Mechanical EngineeringA

Syllabus Number 1E302

Special Subjects
Elective 2 credit

ONO, Takenori

1. Course Description

In this course, exercises and lectures are given in the area of mechanics of materials and vibration. The course will make students aware of the key points in these areas and to be able to solve problems in certain simple structural forms and mass-spring-dashpot systems.
In this class, it acquires knowledge, technology and ability about diploma policy 2 and 3 and 4 and 5.

2. Course Objectives

The studies on mechanics of materials, vibration, fluid dynamics and thermodynamics are essentials in mechanical engineering. In order to play an active part as a mechanical engineer, it is necessary to have firm knowledge of these studies. Moreover, in graduate school entrance examinations and the civil service examination in mechanical engineering, problem solving skills are required.
This course aims to teach fundamentals in mechanics of materials and vibration. Throughout the course, practical problem solving skills in these areas are studied.

3. Grading Policy

The evaluation of this subject is average of the results of the field of strength of materials and mechanical dynamics. In each field,
・Test and questions from lecturing classes : 75%
・Final test : 25%
The first assurance test is not an object of the scholastic evaluation.

4. Textbook and Reference

Textbook
Jyuhachi Oda et al Exercises strength of materials Saiensusya
ISBN978-4-7819-0315-6
Hideki Sato et al Exercises mechanical dynamics Saiensusya
ISBN978-4-7819-0813-7

5. Requirements(Assignments)

Before class, you must watch a video uploaded in LMS for the next lesson, and please review it using textbooks for around one hour.
Make preparation which takes the following course by solving the exercises - the exercises in the textbook and so on.

6. Note

A class is carried out assuming attendance of strength of materials 1,2 and mechanical dynamics 1,2.
Please bring the text of strength of materials 1,2 and mechanical dynamics 1,2 if possible.
Please bring a scientific calculator every lecture.

7. Schedule

[1] Guidance, assurance test (strength of materials, mechanical dynamics)
[2] Tension and complession, thermal stress
[3] Simple truss, Shear
[4] Shear force and bending moment of beams
[5] Bending stress of beams, Second moment of area on standard shapes
[6] Deflection of beams and its excercises
[7] Distortion
[8] Combined stress, Final test (strength of materials)
[9] Basic of dynamics
[10] Basic of vibration
[11] Free vibration for one degrees of freedom by no damped system
[12] Free vibration for one degrees of freedom by damped system
[13] Forced vibration for one degrees of freedom by no damped system
[14] Forced vibration for one degrees of freedom by viscous damping system
[15] Free vibration for two degrees of freedom, Final test (mechanical dynamics)