Experiments in Mechanical Engineering1

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1. Course Description

This course is to understand mechanical engineering through experiments as follows:

Numerical experiment: Basic Analysis based on Finite Element Method
Experiment 1: Starting Friction of Rolling Bearing
Experiment 2: Test for Accuracy of Lathes
Experiment 3: Tensile Test for Metallic Materials
Experiment 4: Modeling and Experiment of Mechanical Phenomenon
Experiment 5: Heat Transfer in Double Pipe Heat Exchanger
Experiment 6: Measurement of Engine Vibration
Experiment 7: Pressure Loss in Piping System
Experiment 8: Experimental Modal Analysis and CAE Vibration Analysis

Students will learn knowledge, technique, and manner for DP2, DP3, DP4, and DP5.

2. Course Objectives

Students will perform experiments of material mechanics, fluid dynamics, thermal dynamics, mechanical dynamics, and machine element. Through experiments, students will deepen their understanding of theories learned in lectures. Moreover, students will learn safe manners, experiment methods, and use of experimental equipment and measuring instruments. In addition, students will learn the analysis of experimental data, graph making, and experimental consideration.

3. Grading Policy

Grading is determined with reports of each experiment. If the report is inadequate, it must be resubmitted. We will explain points that should be revised.

4. Textbook and Reference

Textbook
Japanese textbook: 機械・精密システム工学実験（産図テクスト）

5. Requirements(Assignments)

Students must review strength of material, fluid dynamics, thermal dynamics, mechanical dynamics, machine element, physics, and mathematics. In addition, students must study a textbook and handouts (1.5 hours).

6. Note

7. Schedule

Guidance
Basic lecture about experiment
Numerical experiment
First day of 1st experiment
Second day of 1st experiment
Third day of 1st experiment
First day of 2nd experiment
Second day of 2nd experiment
Third day of 2nd experiment
First day of 3rd experiment
Second day of 3rd experiment
Third day of 3rd experiment
First day of 4th experiment
Second day of 4th experiment
Third day of 4th experiment