Measuring Engineering

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1. Course Description
In this course, International System of units, engineering system of units, measurement and error, accuracy of measurement and significant figure, method of least squares, and the method of measuring vibration will be studied.
During lecture, students will acquire knowledge, technology, and ability of diploma policy 2 and 3 and 4.

2. Course Objectives
This course aims to provide exercises in fundamentals of measurement and error that student will need to learn in order to play an active part as a mechanical engineer.

3. Grading Policy
・Term-end examination : 65%
・Short examination : 20%
・Print and the problem to have let out while lecturing : 15%
Students aren't dealt with for the grades when not attending a lecture more than 2/3. The papers of small test will be returned after being graded and discussed during class. The answers will be uploaded in the LMS.

4. Textbook and Reference
Textbook
Kazue Nishihara　Fundamentals of measurement systems engineering
　Morikita Publishing co.,Ltd.
ISBN978-4-627-66443-2

5. Requirements(Assignments)
The materials for each lesson will be uploaded on the LMS in advance, and the answers to the problem exercises performed during the lesson will be uploaded on the LMS until the next lesson.
Please prepare and review the lecture for about 3 hours each time.

6. Note
Please bring a scientific calculator to every lecture.
If you're absent from lecture, please study and revise the topics taught on that day.

7. Schedule
[1]   Unit and dimension, SI (International System of Units)
[2]   Measurement error and significant figure
[3]   Error in the calculation process, precision of the measurement
[4]   Way of expression for precision, indirect measurement and error
[5]   Least squares method
[6]   Probable error
[7]   Short examination, method of averages
[8]   Commentary of the short examination and summary of the first half
[9]   Least squares method by quadrics
[10]   Interpolation of data
[11]   Regression analysis and correlation
[12]   Analysis of variance
[13]   F-distribution
[14]   Fast Fourier transform (FFT), vibration and acoustic measurement
[15]   Term-end examination and summary