

# Laboratory Engineering

in

# Fundamental

Syllabus Number

3A204

Basic Major Subjects

Requisites 1 credit

HAMADA, koichi

## 1. Course Description

Students will learn the followings in this course,

- (1) Basic measurement techniques in electronics
- (2) Fundamentals of programming for data processing and control
- (3) Software control of hardware.

## 2. Course Objectives

In this laboratory, we shall conduct fundamental experiments for engineering students.

The experiments are designed to make students learn the experimental basics of electrical, information and mechanical engineering, which are the major constituents of today's engineering sciences.

Students should acquire a firm understanding of the above basics in this laboratory since an understanding of the basics will enable the further study in the laboratories in subsequent semesters.

## 3. Grading Policy

In experiments #1-#6, you will be graded by your submitted reports.

In experiments #8-#14, you will be graded by your accomplishments at the end time of each experiment.

The overall grade is calculated from the above results.

## 4. Textbook and Reference

Textbook

Texts for experiments are uploaded to LMS.

## 5. Requirements(Assignments)

Prior to each experiment, read the corresponding text carefully and understand the experimental procedure (~1.5hr).

When writing your report, review the principles and methods of the experiment and inspect thoroughly the obtained data (1.5hr~).

## 6. Note

You need to prepare report paper, graph paper, calculator, writing instruments and rulers.

## 7. Schedule

- |      |   |
|------|---|
| [1]  | Introduction  |
| [2]  | Learn the basic usage of multimeter.                  |
| [3]  | Write report #1.                                      |
| [4]  | Measure DC voltage, current, resistance in a circuit. |
| [5]  | Write report #2.                                      |
| [6]  | Measure AC voltage, current, resistance in a circuit. |
| [7]  | Write report #3.                                      |
| [8]  | Report improvement class                              |
| [9]  | Microcontroller basics                                |
| [10] | GNU Octave basics                                     |
| [11] | GNU Octave programming                                |
| [12] | Control by GNU Octave                                 |
| [13] | Digital measurement by GNU Octave                     |
| [14] | Analog measurement by GNU Octave                      |
| [15] | Additional experiments                                |