

# Experiments Engineering1

in

# Automotive

Syllabus Number

1L303

Basic Major Subjects

Elective Requisites 2  
credit

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## 1. Course Description

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

Numerical experiment: Basic Analysis based on Finite Element Method

Common experiment 1: Heat Transfer in Double Pipe Heat Exchanger

Common experiment 2: Experimental Modal Analysis and CAE Vibration Analysis Automotive experiment 1: Automobile failure diagnosis and driving mode fuel consumption / exhaust emissions measurement

Automotive experiment 2: Engine and body vibration measurement experiment

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 engineering of automobile. 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

Reference

機械・精密システム工学実験 産図テキスト

## 5. Requirements(Assignments)

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

## 6. Note

## 7. Schedule

- |      |   |
|------|---|
| [1]  | Guidance                                |
| [2]  | Basic lecture about Experiment          |
| [3]  | Numerical experiment                    |
| [4]  | First day of 1st common experiment      |
| [5]  | Second day of 1st common experiment     |
| [6]  | Third day of 1st common experiment      |
| [7]  | First day of 2nd common experiment      |
| [8]  | Second day of 2nd common experiment     |
| [9]  | Third day of 2nd common experiment      |
| [10] | First day of 1rd automotive experiment  |
| [11] | Second day of 1rd automotive experiment |
| [12] | Third day of 1rd automotive experiment  |
| [13] | Fourth day of 1rd automotive experiment |
| [14] | Fifth day of 1rd automotive experiment  |
| [15] | Sixth day of 1rd automotive experiment  |