Principle of Electricity

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1. Course Description

The following contents will be learned.
(1)Basic electrical quantity, basic properties of circuit elements, type of power supply, DC circuits, and AC circuits.
(2)Single phase AC, symmetric three phase AC, and AC power.
(3)Magnetic circuits, electromagnetic induction law, and electromagnetic coupling circuits.
(4)Examples in automobiles.
In this lesson, knowledge, techniques, and attitudes regarding DP 2 and DP 3 will be acquired.
Lessons are primarily lecture-style, but pair work will be carried out as appropriate according to the contents of the each lesson.

2. Course Objectives

Students can apply electrical basic knowledge of direct current, alternating current, and magnetic basic knowledge to concrete cases in automobiles and others.

3. Grading Policy

Your grade in the class will be decided on the evaluate with 100% of the result of the final exam. An explanation will be given after the end of the final exam.

4. Textbook and Reference

Textbook
NISIMAKI Masao, MORI Takeaki, ARAI Toshihiko   Electric circuit fundamentals 3rd edition   Morikita Publishing Co., Ltd.

5. Requirements(Assignments)

(1) As preparations for next lesson, please check the meaning of the proper noun and the contents of the relationship shown in the contents of the lesson, and come to the class. (90 minutes)
(2) As a review, please solve exercises applied to the items instructed during the lesson, so that you can can cope with works in pair as appropriate in the next lesson. (90 minutes)

6. Note

Students are advised to understand the sine and cosine of trigonometric functions and complex numbers fully . Also, if you are not good at solving simultaneous equations, you need a scientific calculator that can solve a three-dimensional linear simultaneous equations.

7. Schedule

[1]   Basics of electric circuits and circuit elements.
[2]   Basics of DC circuits.
[3]   DC circuits network.
[4]   Kirchhoff's law.
[5]   Method of analysis of DC circuits by using the electric current law of Kirchhoff's law.
[6]   Method of analysis of DC circuits by using voltage law of Kirchhoff's law.
[7]   Basics of AC circuits.
[8]   Single phase AC and three phase alternating current of sinusoidal alternating current.
[9]   AC circuits element and impedance.
[10]   Complex number display of impedance in AC circuits.
[11]   Complex number display of voltage and current in AC circuits.
[12]   Analysis method in complex number display of AC circuits.
[13]   Law of electromagnetic induction.
[14]   Electromagnetic coupling circuits.
[15]   Exercises in pairs and summary.