

Electric Circuits 1

Syllabus Number

3E105

Basic Major Subjects

Elective Requisites 2
credit

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1. Course Description

The electric circuits are indispensable to understand electronics and to design electronic circuits. Mathematical active models of resistance, coil and capacitor in electric circuits are understood. The issues of practice are solved in the lecture. In this lesson, students will acquire knowledge, techniques, and attitudes about DP4E while doing group work. This lesson is related to DP4E

2. Course Objectives

It's important to analyze mathematically behavior of the electric physical quantity in the junction point of circuits.

It's the objectives to understand electric characteristics of the circuitry and to learn the mathematical analysis.

The objectives of the students in this lesson are to be able to follows: (1) Students learn basic theory of direct current circuit and Kirchhoff's law and theorems such as Thevenin's theorem.

(2) Students can explain phasor display and complex number display of sinusoidal alternating current.

(3) Students can calculate the impedance of the AC circuit.

3. Grading Policy

Students will be evaluated at 60% regular report and 40% report only if all reports are submitted. Feedback and added explanations about points to be corrected when returning the report.

4. Textbook and Reference

Textbook

Masaru Nishimaki / Takeaki Mori / Toshihiko Arai Foundations of Electric Circuits.

It is also used for electric circuit 2.

Mori Kita Publication ISBN 978-4-627-73253-7

5. Requirements(Assignments)

Students who are planning to take electronics basic experiment 2 or electronics experiments should take this lecture.

6. Note

Students should prepare a scientific calculator.

7. Schedule

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| [1] | [1st] Circuit elements and their basic properties 1
Resistance, Capacitor: Please prepare to understand Ohm's law and calculate voltage and current value. |
| [2] | [2nd] Circuit elements and their basic properties 2
Capacitors, coils, etc.: Understand the behavior of circuit elements. |
| [3] | [3rd] DC circuit
Parallel circuit, series circuit: Understand the fundamentals of DC circuit and prepare to be able to calculate voltage and current value. |
| [4] | [4th] Analysis of DC network (1) Resistance dividing method |
| [5] | [5th] Analysis of DC network (2) Kirchhoff's law 1
Please understand Kirchhoff's law and prepare to be able to calculate the current value. |
| [6] | [6th] Analysis of DC network (3) Kirchhoff's law 2
Problem exercises and applications |
| [7] | [7th] Analysis of DC network (4) Principle of superposition |
| [8] | [8th] Analysis of DC network (5) Thevenin's theorem |
| [9] | [9th] Intermediate exam · Summary of the first half |
| [10] | [10th] AC circuit (1) Difference between direct current and alternating current |
| [11] | [11th] AC circuit (2) Sinusoidal AC and phasor |
| [12] | [12th] AC circuit (3) AC circuit element |
| [13] | [13th] AC circuit (4) Impedance of coil and capacitor |
| [14] | [14th] AC circuit (5) Impedance of series circuit |
| [15] | [15th] Test, Summary |