

Electronic Circuits 2

Syllabus Number

4D301

Special Subjects

Elective 2 credit

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1. Course Description

To understand the application examples of practical analog electronic circuits, you will need to study operational amplifiers, oscillation circuits, power supply circuits, etc. And you also need to study the basic measurement technique of electronic circuits, and the basic theory and measurement technique peculiar to high frequency. This subject corresponds to the diploma policy DP4.

2. Course Objectives

According to DP4, supposing to have the knowledge of Electronic Circuits 1, you will need to understand the application examples of practical analog electronic circuits, basic measurement technique for electronic circuits, and the basic theory and measurement technique peculiar to high frequency radio waves. You also need to be able to calculate basic problems of the above circuits.

3. Grading Policy

Students need to pass two reports in order to qualify for the final examination. The overall grade of this course will be decided based on the final examination. If the result of the final examination is 60 or more, you will pass.

Feedback will be given once the submitted reports are graded.

4. Textbook and Reference

Textbook

supervised by M. Iemura According to the themes in this course, the textbooks are as follows:

From 1 to 5: (Text) Nyu-mon dens-ikairo for analog circuits, ISBN: 4-274-20317-4.

Ohm-sha

From 9 to 15: (Subtext) Sub-textbooks are open to LMS.

Reference

You should refer to the sub-textbooks. The sub-textbooks contain introduction of reference books.

5. Requirements(Assignments)

For preparations of each class, students must read and organize the contents, and must do the example questions in the relevant part of the textbook (about 1.0 hour).

For reviews of each class, students must finish the corresponding exercises on the textbook and the two reports (about 2.0 hour).

To understand the principles of semiconductor physics and devices, and the operation of transistor amplifier circuits, you must build up your fundamental knowledge by trying doing the exercises by yourself. This course shows the actually used circuits. If you have the skill to assemble electronic handicrafts, you should try to design and assemble electronic circuits by yourself.

6. Note

In this course, we assume you have the knowledge of "Electronic Circuits 1." LMS will be used in this course.

7. Schedule

- [1] Fundamental concept of operational amplifier will be explained. The relevant part of the textbook is Sec. 12.1 of Text.
- [2] Applications of operational amplifier will be explained. The relevant part of the textbook is Sec. 12.2 of Text.
- [3] Negative feedback circuits will be explained. The relevant part of the textbook is Chapter 7 of Text.
- [4] Principle of oscillation circuits will be explained. The relevant parts of the textbook are Secs. 10.1 to 10.2 of Text.
- [5] Various oscillation circuits will be explained. The relevant parts of the textbook are Secs. 10.3 to 10.5 of Text.
- [6] Power supply circuits (rectifier and smoothing circuits, regulating power supply) will be explained. The relevant part of the textbook is the former part of Subtext for power supply circuits.
- [7] Power supply circuits (switching power supply, batteries, and uninterruptible power supply (UPS)) will be explained. The relevant part of the textbook is the latter part of Subtext for power supply circuits.
- [8] Electronic measurement devices (indication electric meters, shunt resistor, multiplier, multi-meters) will be explained. The relevant part of the textbook is the former part of Subtext for electronic measurement devices.
- [9] Electronic measurement devices (oscilloscopes, etc.) will be explained. The relevant part of the textbook is the oscilloscope part of Subtext for electronic measurement devices.
- [10] The concept of distributed constant circuits will be explained. The relevant part of the textbook is the distributed constant circuits part of Subtext for distributed constant circuits.
- [11] The concept of impedance matching and variables for distributed constant circuits will be explained. The relevant part of the textbook is the corresponding part of Subtext for distributed constant circuits.
- [12] Measurements for distributed constant circuits (network analyzer, etc.) will be explained. The relevant part of the textbook is the network analyzer part of Subtext for distributed constant circuits.

- [13] Measurement of voltage and current for high-frequency will be explained. The relevant part of the textbook is the corresponding part of Subtext for distributed constant circuits.
- [14] Measurement of power for high-frequency will be explained. The relevant part of the textbook is the corresponding part of Subtext for distributed constant circuits.
- [15] Measurement of frequency for high-frequency and standard signal generators will be explained. The relevant part of the textbook is the corresponding part of Subtext for distributed constant circuits.