

Electromagnetic Wave Engineering

Syllabus Number

3E326

Special Subjects

Elective 2 credit

MURO KOICHI

1. Course Description

The aim of this course is to help students acquire an understanding of the fundamental principles of electromagnetism and radio-wave propagation. It also enhances the development of student's skill in designing a simple antenna through some experiments. Specifically, we will acquire necessary skills and knowledge on DP4E.

2. Course Objectives

The goals of this course are to:

- be able to understand and explain the relation between wavelength and frequency.
- be able to understand and explain horizontal radiation pattern.
- be able to understand and calculate gain of antennas.
- be able to understand and calculate line-of-sight distances.
- be able to understand and explain radio-wave propagation beyond VHF band.

3. Grading Policy

Your overall grade in the class will be decided based on the following:

- Mid-term examination: 40%
- Term-end examination: 40%
- A fraction of in-class contribution: 20%

4. Textbook and Reference

Textbook

The handout of each chapter will be posted on the course website.

The slide-sheets of each chapter will be posted on the course website after the lecture.

5. Requirements(Assignments)

- This course will be taught in Japanese.
- This course will be required the fundamental knowledge on trigonometric functions. In case of difficulties, it is recommended to ask without reserve any questions to instructor.

6. Note

7. Schedule

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| [1] | Guidance and the Basics of Waves |
| [2] | Horizontal Radiation Pattern of Antenna |
| [3] | Antenna Gain |
| [4] | Linear Antennas and Aperture Antennas |
| [5] | Experiment: Making a Simple Indoor TV Antenna |
| [6] | Feedback on Antenna |
| [7] | Mid-Term Examination and Summary |
| [8] | Radio-Wave Propagation beyond VHF Band |
| [9] | Propagation Loss in Free Space |
| [10] | Fading |
| [11] | Refraction of Radio Wave and Line-of-Sight Distances |
| [12] | Radio Ducting |
| [13] | Diffraction of Radio Wave |
| [14] | Feedback on Radio-Wave Propagation |
| [15] | Final Examination and Summary |