Electromagnetic Wave Engineering

Syllabus Number 2B218

Special Subjects
Elective 2 credit

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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

[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