Elective Course Description (2. Spring Semester)

Subject (English)	Electricity and Magnetism B	Semester	Spring	Day/Slot	
科目名 (日本語)	電磁気学 B				
Course Code		Course Numbering	TEI-ELM305	Period	Apr. – Aug.
Instructor (Post)	Assoc. Prof. Mark Sadgrove			Campus	
				Building	
Faculty	Department of Electrical, Information and Physics Engineering	Credits	2	Class Room	

Class subject	-

Object and summary of class

This is a year-long course for the foundation of the theory of electricity and magnetism. This course is divided into two semester courses, “Electricity and Magnetism A （E&M A）” and “Electricity and Magnetism B （E&M B）”. E&M A begins from the vector analysis. Then, the basic concepts of electric and magnetic fields in vacuum will be covered. In E&M B, the electric and magnetic fields in matter are first covered. Electromagnetic induction will also be covered and Maxwell’s equations will be derived to in order to reach the main goal of this lecture course, i.e., the electromagnetic wave, the existence of which Maxwell predicted from his equations.

Students will learn how mathematical tools can help them to understand a variety of electromagnetic phenomena, which are useful both in science and technology. Students are assumed to have taken introductory college-level physics and calculus courses including simple vector analysis. E&M A or an equivalent is a prerequisite to take E&M B. Homework exercises will normally be assigned at the end of each class and solved during the next class. Note that homework exercises will be due the following week before class.

Keywords	-

Goal of study

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Contents and progress schedule of class

1. Review of Electricity and Magnetism A
2. Electromagnetic plane waves in vacuum and matter
3. Electromagnetic radiation
4. Electromagnetic induction （Faraday’s law）
5. Dielectric materials and electric dipole moment
6. Magnetic materials
7. Summary

Preparation	-
Record and evaluation method	The course grades are basically determined by class participation, homework and the midterm and final examinations.
Textbook and references	E. M. Purcell, Electricity and Magnetism, Berkeley, Volume 2. D. J. Griffiths, Introduction to Electrodynamics, 3rd ed. R. P. Feynman, The Feynman Lectures on Physics, Volume 2. J. D. Jackson, Classical Electrodynamics, 2nd ed. J. A. Edminister, Electromagnetics, 2nd ed. （Textbook will be announced later, if necessary.）
Self study	-
In addition	-