Course number	U-LAS12 10019 LE57		
Course title (and course title in English)	Advanced Course of Electromagnetism-E2 Advanced Course of Electromagnetism-E2	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Program-Specific Associate Professor,BEAUCAMP, Anthony Tadeus Herve
Group	Natural Sciences	Field(Classification)	Physics(Foundations)
Language of instruction	English	Old group	Group B
Number of credits	2		
Number of weekly time blocks	1	Class style	Lecture (Face-to-face course)
Year/semesters	2024 • First semester		
Days and periods	Tue.1	Target year	Mainly 2nd year students
Eligible students	For science students		

[Overview and purpose of the course]

Based on the knowledge you gained from the Fundamental Physics B course, this course will expand your understanding of electromagnetic theory. After a review of the basics of classical electromagnetism up-to Maxwell's equations, we will explore the subjects of electromagnetic wave propagation, interference and diffraction, as well as the derivation of electric and magnetic properties in substances and their boundaries.

[Course objectives]

- Follow the historical progression in our understanding of electromagnetic laws.
- Understand the meaning of physical properties in electromagnetism.
- Apply the laws electromagnetism to solve practical problems.

[Course schedule and contents)]

1. Mathematics review: Coordinate systems, fields, gradient, divergence, curl [2 weeks].
2. Electrics review: Coulomb's force, dipoles, electric potential, Gauss's law [2 weeks].
3. Magnetics review: Ampere's law, Faraday's law [2 weeks].
4. AC circuits: Resistive, inductive, and capacitive load [1 week].
5. Maxwell's equations: Electromagnetic radiation, interference, diffraction [4 weeks].
6. Electromagnetic properties in substances and at boundaries [2 weeks].
7. Metamaterials, Cherenkov radiation [1 week].

Final examination [1 week].
Feedback session [1 week].

[Course requirements]

Fundamental Physics B course.

[Evaluation methods and policy]

Evaluation will be based on:
- Class Participation (10%): Student participation will be asked in solving problems and discussing theories and their application.
- Homework (20%): Typical problems will be assigned, which you can solve by applying the laws and methods learnt during lectures (every 2 weeks).
- Quizzes (20%): Mini-exams, to check that you remember important laws and principles from previous lectures and study guides (every 4 weeks).
- Final examination (50%): You will be tested with a series of problems that combine previously studied

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cases and original cases.

[Textbooks]

Study guides will be provided every week (~20 pages per week), to help you expand your knowledge. The study guides closely match the week's topic, providing in-depth explanations, problem solving strategies, and summaries of key points.

[References, etc.]

（References, etc.）

David Griffiths 『Introduction to Electrodynamics』 （Pearson）ISBN:129-202-142-X（Amazon link: http://www.amazon.co.jp/Introduction-Electrodynamics-4th-David-Griffiths-ebook/dp/B00HR7MXAY）

[Study outside of class (preparation and review)]

Study guides will be provided every week (~20 pages per week), to help you expand your knowledge. The study guides closely match the week's topic, providing in-depth explanations, problem solving strategies, and summaries of key points.

[Other information (office hours, etc.)]

Questions can be sent by email, and will be answered either electronically or by appointment (depending on the case).