科目ナンバリング					
授業科目名 <英訳>	Advanced Course of Electromagnetism-E2 Advanced Course of Electromagnetism-E2	担当者所属 職名・氏名	工学研究科　特定准教授 BEAUCAMP, Anthony Tadeus Herve		
群	自然科学科目群	分野(分類)	物理学(基礎)	使用言語	英語
旧群	B群	単位数	2単位	週コマ数	1コマ	授業形態	講義（対面授業科目）
開講年度・開講期	2025・前期	曜時限	月3	配当学年	主として2回生	対象学生	理系向

[授業の概要・目的]

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.

[到達目標]

- 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.

[授業計画と内容]

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].

[履修要件]

Fundamental Physics B course.

[成績評価の方法・観点]

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 cases and original cases.

Advanced Course of Electromagnetism-E2(2)へ続く↓↓↓

Advanced Course of Electromagnetism-E2(2)

[教科書]

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.

[参考書等]

（参考書）

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）

[授業外学修（予習・復習）等]

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.

[その他（オフィスアワー等）]

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

[主要授業科目（学部・学科名）]