科目ナン	バリン	グ												
授業科目名   Advanced Course of Electromagnetism-E2   担当者所属   工学研究科 特定准教授 BEAUCAMP, Ambony Tadeu												P , Anthony Tadeus Herve		
群	自然科学科目群				分野(分類)	物理:	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 🗆 🥫	マ		授業	形態	講義	<b>蟻(対面授業科目)</b>		
開講年度・ 開講期	<sup>年度・</sup> 2024・前期 曜時限 月			月3	]3			配当学年		 主として2回		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.

接対書   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   (参考書)	
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