

科目ナンバリング		U-LAS12 10019 LE57					
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 講師 林 聖勳			
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	2026・前期		曜時限	火1		配当学年	主として2回生 対象学生 理系向
<b>[授業の概要・目的]</b>							
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.							
<b>[到達目標]</b>							
<ul style="list-style-type: none"> <li>- Follow the historical progression in our understanding of electromagnetic laws.</li> <li>- Understand the meaning of physical properties in electromagnetism.</li> <li>- Apply the laws electromagnetism to solve practical problems.</li> </ul>							
<b>[授業計画と内容]</b>							
<ol style="list-style-type: none"> <li>1. Mathematics review: Coordinate systems, fields, gradient, divergence, curl [2 week].</li> <li>2. Electrics review: Coulomb's force, dipoles, electric potential, Gauss's law [2 weeks].</li> <li>3. Magnetics review: Ampere's law, Faraday's law [2 weeks].</li> <li>4. AC circuits: Resistive, inductive, and capacitive load [1 week].</li> <li>5. Maxwell's equations: Electromagnetic radiation, interference, diffraction [4 weeks].</li> <li>6. Electromagnetic properties in substances and at boundaries [2 weeks].</li> <li>7. Finite element analysis for electromagnetism and its applications [1 weeks].</li> </ol> <p>Final examination [1 week]. Feedback session [1 week].</p>							
<b>[履修要件]</b>							
Fundamental Physics B course.							
<b>[成績評価の方法・観点]</b>							
<p>Evaluation will be based on:</p> <ul style="list-style-type: none"> <li>- Class Participation (20%): Student participation will be asked in solving problems and discussing theories and their application.</li> <li>- Homework (30%): Typical problems will be assigned, which you can solve by applying the laws and methods learnt during lectures.</li> <li>- Final examination (50%): You will be tested with a series of problems that combine previously studied cases and original cases.</li> </ul>							
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, 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』 (Cambridge University Press) ISBN:1009397753 (Amazon link: <https://www.amazon.co.jp/Introduction-Electrodynamics-David-J-Griffiths/dp/1009397753>)

### [授業外学修 (予習・復習) 等]

For smooth progress of the class, I recommend that students refer to the reference book or textbooks on 'Fundamental Physics' to understand the terminologies related to class in advance. Students can review the contents of the class using the lecture notes, and take-home assignments will be given to help them understand.

### [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)]

理学部