The Hong Kong University of Science and Technology

UG Course Syllabus Template

Honors General Physics II

PHYS 1314

3 credits

(Grade A- or above in PHYS 1111 OR PHYS 1112 OR Grade B- or above in PHYS 1312) AND (Level 5 or above in HKDSE Mathematics Extended Module M1/M2 OR MATH 1013 OR MATH 1020 OR MATH 1023)

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Course Description

This course will provide the students with a solid foundation of electricity and magnetism. While covering the same syllabus as PHYS 1114, PHYS1314 is a more in-depth version and intended for students who wish to take more advanced physics courses in the future. Offering a general physics class, we will teach an observation-based approach and physical concepts will be introduced through in-classroom experiments.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Classify the origin, nature, and related phenomena of electric fields
2. Develop the concept of static electric currents to explain the origin, nature, and related phenomena of magnetic fields
3. Expand electro- and magnetostatics by dynamic effects to describe electromagnetic induction
4. Apply concepts of electrodynamics to describe the characteristics of electric circuits
5. Apply Maxwell's equations to describe the existence and properties of electromagnetic waves
6. Apply the wave nature of light to describe natural phenomena that occur when light interacts with media and interfaces
7. Use calculus to analyze and solve physical problems

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

Homework: The lecture will be accompanied by a weekly homework problem set. Solutions to the homework problem must be submitted as soft copy online through Canvas and will be graded.

Exams: This class conducts midterm and final exams to assess the student's knowledge.

Assessing student performance

We use holistic rubrics to assess the student performance for *all* assignments in this course.

We reward the physical understanding of problems and the development of physical intuition beyond the mere ability to solve a problem mathematically. We will apply the following criteria to grade both the homework and exam assignments.

Points for short Q	Points for long Q	Description
0	+1	Possible bonus for exceptional performance, e.g., perfect solution presented in logical manner, signs of deep physics insight, creative approach to the problem
3	7-9	Practically correct with only small careless mistakes, e.g., didn't carry over a factor of 2, recusing a sign error in the final answer by arguing what the correct sign should have been based on physical intuition
2	4-6	Showing clear understanding on the physics and/or how the approach the problem but committed substantial mistakes, e.g., wrong overall sign opposing physical intuition, got all physics right but screwed up badly on the math
1	1-3	Reasonable attempt but not quite correct, e.g., writing down some relevant equation without showing how they can be used to solve the problem, didn't proceed beyond the very first steps of solving the problem
0	0	No sign of understanding (including no attempt)

Assessment Task	Contribution to Overall Course grade (%)	Due date
Homework	15%	Weekly submission
Midterm exam	35%	31/03/2025 *
Final exam	50%	29/05/2025 *

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Homework	ILO1-7	The goal of the homework is to promote a continuous engagement of

		the student with the lecture content and to deepen the understanding of the core concepts.
Midterm	ILO1,2,7	The midterm assesses the students' competence in their physical understanding of electro- and magnetostatics and their ability to use mathematical methods to solve physical problems.
Final	ILO1-7	The final assesses the students' competence in their physical understanding of the entire course syllabus with a focus on electromagnetic induction and electromagnetic waves, as well as their ability to use mathematical methods to solve physical problems.

Grading Rubrics

[Detailed rubrics for each assignment will be provided. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.]

Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	Shows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

The use of AI to solve the homework assignments is prohibited unless specific AI-focused homework assignments are requested.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Resubmission Policy

Not applicable.

Required Texts and Materials

The course material is based on the textbook Young and Freedman, University Physics, Chapter 21-36 and D.J. Griffith, Introduction to Electrodynamics.

The original lecture notes presented during lecture and tutorials will be uploaded to Canvas. Both textbooks are available as e-books through the University library.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.