THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY | HKUST Summer School

PHYS 1114 – General Physics II

School:	**School of Science**
Subject Area:	**Physics**
Course Credit:	**3**
Instructor:	**SAN Yik Chuen**
Pre-requisite/co-requisite:	**Details Here**

Notes:

- The syllabi provided here is for reference only and may be subject to changes and adjustments as determined by the course instructors.

The Hong Kong University of Science and Technology

PHYS1114 Syllabus (Summer 2026)

Course Title: General Physics II

Course Code: PHYS1114

Credit Points: 3

Pre-requisite: (PHYS 1111 OR PHYS 1112 OR PHYS 1312) AND (level 3 or above in HKDSE Mathematics Extended Module M1/M2 OR MATH 1012 OR MATH 1013 OR MATH 1020 OR MATH 1023)

Exclusion: PHYS 1154 (prior to 2014-15), PHYS 1314

Lecture Hours: 9:30 – 12:20 on Mondays and Wednesdays

Tutorial Hours: 14:00 – 15:20 on Mondays (T1)
14:00 – 15:20 on Mondays (T2)

Instructor

Name: SAN Yik Chuen

Email: phycsan@ust.hk

Office: Rm 4433

Office hour: By appointment

Course Description

This course targets students who have learned the most basic knowledge in physics in high school. Students with more advanced physics background should consider taking PHYS 1314. This course employs a calculus-based approach. Key topics include Coulomb's law, electric field and potential, Gauss' law, capacitance, circuits, magnetic force and field, Ampere's law, electromagnetic induction, AC circuit, Maxwell's equations, electromagnetic waves, geometric optics, interference and diffraction.

Intended Learning Outcomes (ILO)

On successful completion of this course, students are expected to be able to:

1. Classify the nature of electric and magnetic fields, which occur in numerous applications in industry and technology, as well as and in every day's life.
2. Describe visible light as part of the electromagnetic wave spectrum
3. Apply the wave nature of light to describe natural phenomena
4. Perform simple calculations by applying the basic concepts of electromagnetism and optics
5. Use scientific language to explain phenomena in the physical world
6. 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.

Assessment	Contribution to Overall Course grade (%)	Due date
Homework	10%	Every Tuesday, 11:59pm
Tutorial	5%	In tutorial session
Midterm	40%	July 13
Final Exam	45%	Aug 5

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 Tutorial Exercises Midterm Exam Final Exam	ILO 1 – 6	These tasks assess students' ability to comprehend and explain physical situation in scientific language (ILO 5), and to apply knowledge of electromagnetism, electromagnetic waves, optics (ILO 1, 2, 3, 4) together with techniques in calculus to solve problems (ILO 6).

Grading Rubrics

Problems in Homework, Midterm and Final Exam are graded based on correctness of the answers.

Tutorial Participation is graded in each tutorial session with the following rubrics:

Point	Performance
0	No show
0.8	Completing classwork with mistakes
1.0 (max)	Completing classwork without mistakes

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, going beyond core requirements to achieve learning goals. *Typical overall course grade: 80% - 100%
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. *Typical overall course grade: 60% - 80%
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 learning goals. *Typical overall course grade: 40% - 60%
D	Marginal Pass	Has threshold knowledge of core subject matter and potential to achieve key professional skills. Benefits from the course and has the potential to develop in the discipline. *Typical overall course grade: 30% - 40%
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. *Typical overall course grade: below 30%

*The final grade will be assessed using criterion-referencing and the difficulties of the assessment will be considered when determining the range of overall course grade in each final grade, such that the final grade reflects the criteria that students achieved in the course. Thus, the range of overall course grades of each final grade may vary semester to semester depending on the difficulties of the assessment, including homework, tutorial exercises and exams.

Course AI Policy

In this course, except for examinations, you are allowed to use generative artificial intelligence (AI) to aid you for learning purposes. However, you must give proper credit for any use of generative AI. Direct copying and pasting of answers provided by AI tools is strictly forbidden.

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

Submission of assessments including homework assignments and tutorial exercises will not be considered. Zero mark will be given for late submissions of the tasks.

Make-up Exam Policy

Make-up exams are not provided except for extenuating circumstances (e.g. medical conditions), in which case proper documentation/proof is required. Students who miss exams without proper reasonings will receive zero points for that exam.

Required Texts and Materials

Textbook:	University Physics with Modern Physics Vol. 2, Young Freedman, Pearson, 15th edition (international)
Online resources:	MasteringPhysics, Lecture Notes on Canvas

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.

Course Content

Class	Date	Content	Textbook Chapter
1	June 15	Electric Charge (Lecture Note 1) - electric charge distribution - electric force and Coulomb's law Electric Field (Lecture Note 2) - electric field lines - calculation for different charge distributions - electric dipoles	21.1 - 21.3 21.5 - 21.7
2	June 17	Gauss's Law I (Lecture Note 3) - electric flux - relation to Coulomb's law - equilibrium charge distribution of conductors Gauss's Law II (Lecture Note 4) - electrostatic shield and the Faraday cage - application to calculating electric fields due to symmetric charge distributions	22.1 - 22.3, 22.4, 22.5

3	June 22	Electric Potential I (Lecture Note 5) - electric potential energy - electric potential Electric Potential II (Lecture Note 6) - calculate electric potential from electric field - equipotential surfaces - calculate electric field from electric potential	23.1, 23.2 23.3 - 23.5
4	June 24	Capacitance and Dielectrics I (Lecture Note 7) - capacitor and capacitance - capacitors in series and parallel - energy storage in capacitors Capacitance and Dielectrics II (Lecture Note 8) - dielectrics - molecular model of induced charge - Gauss's law in dielectrics	24.1 - 24.3 24.4 - 24.6
5	June 29	Current, Resistance, and EMF (Lecture Note 9)	25.1 - 25.5 (25.6 excluded)

		- microscopic view of current in a conductor - Ohm's law, ohmic and non-ohmic materials - resistivity and resistance -electromotive force - power delivery and dissipation in a direct current circuit Direct-Current Circuits (Lecture Note 10) - Kirchhoff's rules to deal with complex circuits - RC circuit, its charging, discharging, power delivery and dissipation	26.1, 26.2, 26.4 (26.3, 26.5 excluded)
	July 1	No Lecture	
6	July 6	Magnetic Field and Magnetic Forces I (Lecture Note 11) - magnetic field - visualizing magnetic field using magnetic field lines - magnetic flux and the Gauss's law in magnetism - charged particle motion in magnetic field	27.1 - 27.4 27.5 - 27.7 (27.8, 27.9 excluded)

		Magnetic Field and Magnetic Forces II (Lecture Note 12) - Lorentz force and its applications - force of a current carrying conductor in a magnetic field - torque on a current loop in a magnetic field - magnetic moment as current loop or bar magnet	
7	July 8	Sources of Magnetic Field I (Lecture Note 13) - magnetic field due to a moving charge - magnetic field due to a current, the Biot-Savart law - definition of Ampere - magnetic field due to a coil Sources of Magnetic Field II (Lecture Note 14) - Ampere's law and its applications - magnetic materials, dia-, para-, and ferro-magnetism	28.1 - 28.5 28.6 - 28.8
Midterm Exam	July 13	Class 1 - 6 (Lecture Note 1 - 12)	Ch. 21 - 27

8	July 15	Electromagnetic Induction I (Lecture Note 15) - Faraday's law of induction - Lenz's law - simple generators and motors Electromagnetic Induction II (Lecture Note 16) - nature of induced electric field - displacement current and the generalization of Ampere's law - Maxwell's equation	29.1 - 29.3 29.5 - 29.7, (excluding sessions 29.4 and 29.8)
9	July 20	Inductance (Lecture Note 17) - self-inductance and inductors - magnetic flux and energy in inductors - R-L, L-C, and L-R-C circuits Alternating Current (Lecture Note 18) - phasor diagrams in AC circuits - response of resistor, inductor, and capacitor - power delivery and resonance in an L-R-C circuit	30.2 - 30.6 (excluding session 30.1) 31.1 - 31.5 (excluding session 31.6)
10	July 22	Electromagnetic Waves (Lecture Note 19)	32.1 - 32.3, 32.5 (excluding part of

		- nature of EM wave - speed of EM wave in vacuum - standing EM wave The Nature and Propagation of Light (Lecture Note 20) - dispersion of visible light and the formation of rainbow - polarization of light - light scattering and common phenomena in the atmosphere	sessions 32.2, 32.4) 33.1, 33.4-33.6 (excluding sessions 33.2, 33.3, 33.7)
11	July 27	Interference I (Lecture Note 21) - constructive and destructive interference - Young's double slit - power transfer in an interference pattern Interference II (Lecture Note 22) - interference in thin films - Michelson interferometer - Michelson-Morley experiment (optional)	35.1 - 35.3 35.4, 35.5
12	July 29	Diffraction I (Lecture Note 23)	36.1 - 36.3

		- diffraction pattern from a single slit - Huygens's principle - intensities in single slit diffraction pattern and double slit interference pattern Diffraction II (Lecture Note 24) - diffraction pattern from multiple slits - diffraction grating - diffraction pattern from circular aperture	36.4, 36.5, 36.7 (excluding sessions 36.6, 36.8)
13	Aug 3	Review Session	
Final Exam	Aug 5	Final Examination	