UFUG1501 (L01) - General Physics I

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Full Title: General Physics I **Course Number:** UFUG1501 **Course Credits**: 3

Grading Type: Letter Grades **Medium of Instruction/Materials:** English

Prerequisites: Gaokao Physics or Gaokao Lizong (Integrated Science) OR Level 3 or above in HKDSE 1/2x OR HKDSE 1x Physics **Other Enrollment Restrictions:** No

Exclusions: UFUG1503 Honors General Physics I **Allow course repetition for credit:** No

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Venue: Rm 101, E4

Time: Wednesday, 09:00AM - 11:50AM (No lecture in the examination week)

Office Hours: Every Wednesday 7:30pm-9:30pm, W3-607 (Instructor's office)

Course Description

General Physics I is designed for students who are interested in science and technology. The course is mostly delivered based on an algebra-based approach, and it incorporates conceptual understandings and mathematical problem-solving skills. Key topics covered by General Physics I are divided into three modules. The first module covers the fundamentals of mechanics, including motion in one and two dimensions, Newton's Laws, and rotational kinematics and dynamics, etc. The second module covers energy and oscillations, including work, energy conservation, momentum conservation, oscillations, fluids, and waves, etc. The third module covers thermodynamics, including the laws of thermodynamics and ideal gases, etc.

Intended Learning Outcomes (ILOs)

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

1. Apply Newton's laws of motion to predict and describe the simple dynamics motions.
2. Use the principles of energy and linear momentum conservation to solve problems, involving kinetic and potential energy as well as collisions between objects.
3. Analyze the rotational motion in terms of angular displacements, velocity and acceleration.
4. Explain oscillatory motion and the phenomena related to waves, including superposition, interference, diffraction, Doppler effect.

5. Use gas laws and kinetic theory of gases to explain the physical phenomena of gases.
6. Apply the first and second laws of thermodynamics to solve the real-life problems.
7. Use the physical concepts and theories to explain the phenomena in mechanics and thermodynamics.
8. Use physics knowledge in quantitative problem solving, with an algebra-based approach.

Weekly schedule & Weekly ILOs

Week	Topics	Weekly ILOs
1	Measurement, Motion Along a Straight Line (1D Motion), Vector, 2D and 3D Motion	CILO-7, CILO-8
2	Force and Motion	CILO-1, CILO-2, CILO-7, CILO-8
3	Kinetic Energy and Work, Center of Mass and Linear Momentum	CILO-1, CILO-2, CILO-7, CILO-8
4	Rotation, Rolling, Torque, and Angular Momentum	CILO-1, CILO-2, CILO-3, CILO-7, CILO-8
5	Module-based exam, Lab #1	CILO-1, CILO-2, CILO-3, CILO-7, CILO-8
6	Potential Energy and Conservation of Energy, Equilibrium and Elasticity	CILO-2, CILO-7, CILO-8
7	Gravitation, Fluids	CILO-2, CILO-7, CILO-8
8	Oscillations, Waves I	CILO-4, CILO-7, CILO-8
9	Waves II	CILO-4, CILO-7, CILO-8
10	Module-based exam, Lab #2	CILO-2, CILO-4, CILO-7, CILO-8

11	Temperature, Heat, The first law of thermodynamics	CILO-6, CILO-7, CILO-8
12	The Kinetic Theory of Gases	CILO-5, CILO-7, CILO-8
13	Entropy, The Second Law of Thermodynamics	CILO-6, CILO-7, CILO-8
14	Module-based exam, Lab #3	CILO-5, CILO-6, CILO-7, CILO-8

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:

Assessment Task	Contribution to Overall Course grade (%)	Due date
In-class test	10%	Every lecture week
Written assignment	20%	Every lecture week
Module-based exam	50%	Week 5 and 10 and final exam week
Lab	20%	TBD

* 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

In-class test	CILO-1, CILO-2, CILO-3, CILO-4, CILO-5, CILO-6, CILO-7, CILO-8	This task will involve weekly quizzes conducted during class and after class. These quizzes are designed to assess students' understanding of the core concepts covered in the lecture and evaluate their progress toward achieving all ILOs.
Written assignment	CILO-1, CILO-2, CILO-3, CILO-4, CILO-5, CILO-6, CILO-7, CILO-8	This task will take place after lectures, where students will engage with quantitative problem-solving questions for approximately 2 hours each week. These assignments are designed to assess students' ability to apply theoretical concepts to practical problems, thus evaluating their understanding and achievement of all ILOs.
Module-based exam	CILO-1, CILO-2, CILO-3, CILO-4, CILO-5, CILO-6, CILO-7, CILO-8	This task will take place at the end of each module, lasting 2-3 hours. The exam will assess students' overall understanding and application of the concepts covered in the lecture, evaluating their mastery of all ILOs. It will include problem-solving tasks designed to test both conceptual knowledge and analytical skills.
Lab	CILO-1, CILO-2, CILO-3, CILO-4, CILO-5, CILO-6, CILO-7, CILO-8	This task assesses students' ability to apply the theoretical knowledge gained from lectures to practical experiments (CILO-1 to CILO-6). It also evaluates students' skills in quantitatively analyzing experimental data, emphasizing an understanding of

		the physical principles involved (CILO-7 and CILO-8).

Grading Rubrics

The course utilizes an absolute grading system as follows.

A+: [100,96]; A: (96,92]; A-: (92:88];

B+: (88,84]; B: (84,80]; B-: (80:76];

C+: (76,72]; C: (72,68]; C-: (68:64];

D: (64:60];

F: (60,0].

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

Students are permitted to use generative artificial intelligence tools to assist with in-class tests and written assignments. However, the use of such tools is **strictly prohibited** for module-based exams.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks after the submission deadline. Feedback on assignments will include the grades of the assessment. 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

Resubmission is not allowed.

Required Texts and Materials

No

Academic Integrity

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

Additional Resources

Fundamentals of Physics by Jearl Walker (later than 10th Edition)

物理学原理（翻译版，原书第10版） 潘笃武，马世红译，机械工业出版社

The Feynman Lectures on Physics (Volume I) by Richard Feynamn, Robert Leighton and Matthew Sands

University Physics with Modern Physics by Hugh Young and Freedman

College Physics by Raymond Serway and Chris Vuille

University Physics with Modern Physics by Wolfgang Bauer and Gary Westfall

新概念物理教程(力学、热学) by 北京大学赵凯华等

Exam schedules and notes (tentative)

First module-based exam

- **Time: 9:00 – 11:00 am, March 14 (Saturday)**
- **Venue: E1-101**

Second module-based exam

- **Time: 14:00 – 16:00 pm, April 18 (Saturday)**
- **Venue: E1-101**

Third module-based exam

- final exam, the time and venue will be arranged by ARS.

Bring a scientific calculator!

Other Information

All materials are available on Canvas.

Course slide available one week ahead of the lecture at “Files”

Homework available one weak ahead of the lecture at “Assignments”

Homework has to be submitted on the day of lecture time of the next week (**Wednesday, in Lecture**), the corresponding Answer will be released on the same day later at “Files”.

Homework and in-class test are centrally graded for the two parallel sessions of UFUG 1501. If any issues/concerns regarding the graded homework and in-class test are raised, please refer to the following information to identify the appropriate TA to contact.

Assignment Week	**TA name**	**Email of TA**

Week 1	Yu Cao	ycao878@connect.hkust-gz.edu.cn
Week 2	Yu Cao	ycao878@connect.hkust-gz.edu.cn
Week 3	Jiahu Tang	jtang163@connect.hkust-gz.edu.cn

Course Summary:

Date	Details	Due
Wed Feb 4, 2026	Assignment 1 (https://hkust-gz.instructure.com/courses/2879/assignments/20794)	due by 12pm
Wed Feb 25, 2026	Assignment 2 (https://hkust-gz.instructure.com/courses/2879/assignments/20996)	due by 12pm
Wed Mar 4, 2026	Assignment 3 (https://hkust-gz.instructure.com/courses/2879/assignments/21264)	due by 12pm
	Quiz 1 (https://hkust-gz.instructure.com/courses/2879/assignments/21040)	
	Quiz 2 (https://hkust-gz.instructure.com/courses/2879/assignments/21270)	