

PHY 1001 General Physics I

Course Description

This introductory course discusses the basic principles of mechanics and atomic physics. It is suitable for Secondary 6 entrants in science and engineering. Topics include: particle kinematics, force and motion, work, kinetic energy and potential energy, systems of particles, moment of inertia and rotational motions, Newton's laws of gravitation, fluid statics and dynamics, oscillations, waves, photons, electrons and atoms.

Course Content

	Topics	Highlights of Fundamental Concepts
1.	Particle kinematics and dynamics	Vectors; motion in one, two and three dimensions; Newton's laws, force and motion; circular motion; work, kinetic energy, potential energy, conservation of energy.
2.	Systems of particles	Centre of mass, linear momentum and Newton's second law for a system of particles, collisions.
3.	Rotation	Rotational kinematics, rotational inertia, torque, Newton's second law for rotation, work and rotational kinetic energy, rolling, angular momentum, conservation of angular momentum.
4.	Gravitation	Newton's law of gravitation, gravitational potential energy.
5.	Fluids	Pressure, Pascal's principle, Archimedes' principle, fluid flow and equation of continuity, Bernoulli's equation.
6.	Oscillations	Simple harmonic motion, energy in a simple harmonic motion, damped oscillation, forced oscillations and resonance.
7.	Waves	Transverse and longitudinal waves, wavelength and frequency, energy of a travelling string wave, the principle of superposition, interference of waves, standing waves, sound waves and the speed of sound.
8.	Photons, electrons and atoms	Light quanta, photoelectric effect, the Bohr model, X-ray production.

Learning Outcomes

1.	Able to use the concepts of force, momentum, and energy to describe and analyze the states and motions of simple mechanical systems.
2.	Able to use vectors and calculus in solving mechanical problems.
3.	Appreciate the simplicity, elegance and deductive power of Newtonian formulism in describing and understanding mechanical systems.

Learning Activities

Lecture	Tutorial		Exercise Class and Assignment		Laboratory		Project / Report		Presentation		Case study		Web teaching		Other 1 (specify)		Other 2 (specify)	
	(hr / week) in class	(hr / week) out class	(hr / week) in class	(hr / week) out class	(hr / week) in class	(hr / week) out class	(hr in total) in class	(hr in total) out class	(hr in total) in class	(hr in total) out class	(hr in total) in class	(hr in total) out class	(hr / week) in class	(hr / week) out class	(hr in total) in class	(hr in total) out class	(hr in total) in class	(hr in total) out class
2.25	2			0.75	3													
M	M	NA	NA	M	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

M: Mandatory activity in the course O: Optional activity NA: Not applicable

Assessment Scheme

	Component	Description	Weight
1.	Homework	The homework will be graded by the TAs and the graded homework will be returned to you. If you have enquiries concerning the grading, please feel free to contact me or the TAs.	20%
2.	Mid-term Test	The schedule and venue of the mid-term exam will be announced later.	30%
3.	Final Exam	The final exam will be centrally arranged by the university.	50%

Learning Resources

	Resource	Web link or ref no. in library
1.	Halliday, Resnick, Walker: <i>Fundamentals of Physics, 7th Edition</i>	http://bcs.wiley.com/he-bcs/Books?action=index&itemId=0471216437&itemTypeId=BKS&bcsId=1924

Feedback for Evaluation

1.	send email to the teacher, give him a call, or come to his office; especially for issues that require immediate action;
2.	express your views in the mid-term and term-end course evaluation;
3.	express your views (or ask a student representative to help you convey the messages) in the staff-student consultation meeting held every year;
4.	post a message on the forum of the course website.

Course Schedule

	Topics	Week No.	Activities / Readings / References
1.	Particle kinematics and dynamics	1-3	Chapters 2-7 of textbook and corresponding lecture notes
2.	Systems of particles	4-5	Chapter 9 of textbook and corresponding lecture notes
3.	Rotation	5-7	Chapters 10-11 of textbook and corresponding lecture notes
4.	Gravitation	8	Chapters 8 and 13 of textbook and corresponding lecture notes
5.	Fluids	9-10	Chapter 14 of textbook and corresponding lecture notes
6.	Oscillations	10-11	Chapter 15 of textbook and corresponding lecture notes
7.	Waves	11-12	Chapters 16-179 of textbook and corresponding lecture notes
8.	Photons, electrons and atoms	12-13	Chapters 38-40 of textbook and corresponding lecture notes

Teachers' or TAs' Contact Details

Teacher's Name	Contact	Additional Information
GU Shijian Teacher	Office : SC 217 Tel. no. : 2609 6301 Email : sjgu@phy.cuhk.edu.hk Office hr : Tue. 2:00pm-4:00 pm	
TA's Name	Contact	Additional Information
To be arranged		

Academic Honesty and Plagiarism

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details can be found at <http://www.cuhk.edu.hk/policy/academichonesty/>.

1.	After the course registration, you are required to submit "Declaration of Honesty in Academic Work" declaring that you are aware of these policies, regulations and procedures. The form can be found at http://www.phy.cuhk.edu.hk/
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Facilities for Posting Announcements and Materials

1.	The course website (http://www.phy.cuhk.edu.hk/course/2009-2010/1/phy1001) contains the following useful information and resources: (a) All course materials, including lecture notes, homework and solutions in pdf format. The password for download will be given to you in the first lecture. (b) A notice board for announcements of assignments, latest download, and important events (e.g. exam. and presentation schedule). (c) A web forum for you to ask questions, discuss problems with teachers and classmates. You are also welcome to express your comments on the course in the forum.
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