

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1. 课程名称 Course Title	大学物理（上） College Physics I
2. 授课院系 Originating Department	物理系 Department of Physics
3. 课程编号 Course Code	PHY105
4. 课程学分 Credit Value	4
5. 课程类别 Course Type	通识必修课程 General Education (GE) Required Courses
6. 授课学期 Semester	春季 Spring / 秋季 Fall
7. 授课语言 Teaching Language	英文 English / 中英双语 English & Chinese / 中文 Chinese
8. 授课教师、所属学系、联系方式 (如属团队授课, 请列明其他授课教师) Instructor(s), Affiliation & Contact (For team teaching, please list all instructors)	<p>1. 陈远珍, 物理系 理学院 P3109 室 Chen Yuanzhen, Department of Physics Rm. P3109, College of Science chenyz@sustech.edu.cn 0755-88018226</p> <p>2. 何佳清, 物理系 理学院 P4101 室 He Jiaqing, Department of Physics Rm. P4101, College of Science hejq@sustech.edu.cn 0755-88018266</p> <p>3. 王峻岭, 物理系 理学院 P4110 室 Wang Junling, Department of Physics Rm. P4110, College of Science jwang@sustech.edu.cn 0755-88015982</p>

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9. 实验员/助教、所属学系、联系方式
Tutor/TA(s), Contact

待公布 To be announced

10. 选课人数限额(可不填)
Maximum Enrolment (Optional)

11. 授课方式
Delivery Method

讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other (Please specify)	总学时 Total
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学时数
Credit Hours

64	0	0	0	64
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12. 先修课程、其它学习要求
Pre-requisites or Other Academic Requirements

高中物理，代数，三角学。课上将利用到微积分
 High school physics, algebra, trigonometry. Calculus will be adopted in class

13. 后续课程、其它学习规划
Courses for which this course is a pre-requisite

PHY106 大学物理（下） College Physics II

14. 其它要求修读本课程的学系
Cross-listing Dept.

物理学专业及其它理工科专业，或对物理有要求的非理工科专业
 Physics and other science and engineering majors, or non-engineering majors that require physics knowledge

教学大纲及教学日历 SYLLABUS

15. 教学目标 **Course Objectives**

本课程主要面向非物理专业的理工科本科生，侧重于介绍基本物理概念和规律及其实际应用。课程讲授以下内容：运动学、牛顿力学、弹性力学、流体力学*、振动和波、热学。

This course provides a basic training in physics for undergraduate students majoring in science and engineering other than physics. It teaches basic concepts and principles of physics, as well as their applications. The course covers the following topics: kinematics, Newtonian mechanics, elasticity, fluid dynamics*, oscillation and wave, and thermal physics.

* 按进度增减 *optional

16. 预达学习成果 **Learning Outcomes**

掌握并运用课程中的物理专业术语和定义。

能使用简单的微积分和矢量代数来推导并应用课程中的物理定律。

能在实际情况中应用牛顿力学、弹性力学、流体力学*、振动、波和热学中的物理定律。

Recognize and use appropriately physics terms and definitions relevant to the major topics in the course.

Use simple calculus and vector notation to formulate the physics laws covered in the course.

Apply the physics laws of Newtonian mechanics, elasticity, fluid dynamics*, oscillations, waves and thermal physics in practical situations.

* 按进度增减 *optional

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

The main contents are chapters 1-20 from textbook (Principles of Physics, David Halliday, et al.).

Week 1-2: Kinematics (chapter 1-4) (运动学)

Unit and dimension of quantities, vector algebra, calculus introduction, motion-related quantities, 1D and 2D motion, equation of motion, relative motion.

Week 2-3: Force and motion (chapter 5-6) (力与运动)

Newton's laws and their application, gravity, normal force, friction, drag force, spring force, centripetal force.

Week 4: Energy (chapter 7-8) (能量)

Kinetic energy, work, work-kinetic energy theorem, power, potential energy, mechanical energy, conservation of energy

Week 5: Linear momentum (chapter 9) (线动量)

Center of mass, linear momentum, impulse, impulse-linear momentum theorem, conservation of linear momentum, collision

Week 6-8: Rotation (chapter 10-11) (转动)

Angular quantities in rotation, angular kinematics, rotational kinetic energy, rotational inertia, torque and rotational dynamics, rolling, angular momentum, conservation of angular momentum, gyroscope

Week 9: Equilibrium, Elasticity, Fluids* (chapter 12, 14*) (平衡、弹性、流体*)

Equilibrium conditions, center of gravity, Elastic modulus, fluids at rest: hydrostatic pressure*, Pascal's principle*, Archimedes' principle*; fluids in motion: equation of continuity*, Bernoulli's equation*

Week 10: Gravitation (chapter 13) (引力)

Newton's law of gravitation, gravitational potential energy, two-body system in elliptical orbit, Kepler's laws, Newton's derivation for Kepler's law.

Week 11: Oscillation (chapter 15) (振动)

Simple harmonic oscillation, linear oscillator, angular oscillators, torsion pendulum and physical pendulum, damped oscillation, forced oscillation and resonance.

Week 12-13: Waves (chapter 16-17) (波)

Sinusoidal wave, wave along string and sound wave: wave speed, wave equation and wave energy, Interference of waves, standing wave and resonant modes, sounds of music, beat, Doppler effect of wave and shock wave

Week 14-16: Thermal physics (chapter 18-20) (热物理)

Temperature, zeroth law of thermodynamics, and thermal expansion, heat and heat transfer, Thermodynamic process, work, 1st law of thermodynamics, kinetic theory of ideal gas, entropy and 2nd law of thermodynamics.

Lectures will include 10-16 hours small class lectures. (讲授过程将包括 10-16 小时小班讲授)

* 按进度增减 *optional

18. 教材及其它参考资料 Textbook and Supplementary Readings

David Halliday, Robert Resnick, Jearl Walker, Principles of Physics Extended International Student Version (10th edition), Wiley 2014.

课程评估 ASSESSMENT

19. 评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance				
小测验 Quiz		10%		每学期平均 8~10 次课堂测试。 An average of 8 to 10 in-class test per semester.
课程项目 Projects				
平时作业 Assignments		10%		平均每章有 5 到 8 道作业题。 On average, there are 5 to 8 homework questions per chapter.
期中考试 Mid-Term Test		40%		
期末考试 Final Exam		40%		
期末报告 Final Presentation				

其它（可根据需要
改写以上评估方
式）
**Others (The
above may be
modified as
necessary)**

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20. 记分方式 **GRADING SYSTEM**

- A. 十三级等级制 **Letter Grading**
 B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 **REVIEW AND APPROVAL**

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority

物理系教学指导委员会 Education Instruction Committee of Physics department

