

## 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 <b>Course Title</b>	大学物理（下） College Physics II
2. 授课院系 <b>Originating Department</b>	物理系 Department of Physics
3. 课程编号 <b>Course Code</b>	PHY106
4. 课程学分 <b>Credit Value</b>	4
5. 课程类别 <b>Course Type</b>	通识必修课程 General Education (GE) Required Courses
6. 授课学期 <b>Semester</b>	春季 Spring / 秋季 Fall
7. 授课语言 <b>Teaching Language</b>	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) <b>Instructor(s), Affiliation &amp; Contact</b> (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 <a href="mailto:chenyz@sustech.edu.cn">chenyz@sustech.edu.cn</a> 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 <a href="mailto:hejq@sustech.edu.cn">hejq@sustech.edu.cn</a> 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 <a href="mailto:jwang@sustech.edu.cn">jwang@sustech.edu.cn</a> 0755-88015982</p>

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9. 实验员/助教、所属学系、联系方式

待公布 To be announced

Tutor/TA(s), Contact

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
64	0	0	0	64

学时数

Credit Hours

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

PHY105 大学物理(上) College Physics I  
or  
PHY101 普通物理学(上) General Physics I

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

物理学、应用物理学专业及其它理工科专业相关课程  
Courses related to Physics, Applied Physics and other science and engineering majors

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: 电学、磁学、电路基础、麦克斯韦方程、电磁波、波动光学、狭义相对论和量子力学简介。

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: electricity, magnetism, circuits, Maxwell's equations, electromagnetic waves, wave nature of light, and an introduction to the special theory of relativity and quantum mechanics.

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电学、磁学、波动光学和现代物理中的物理定律。

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 electricity, magnetism, light as waves, and modern physics in practical situations.

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 21-39 from textbook (Principles of Physics, David Halliday, et al.).

Electrostatics : Coulomb's law, electric field and potential, Gauss'law, capacitance (静电学:库仑定律、电场与电势、高斯定律、电容)

Week 1: Electric charge, Coulomb's law, electric field, electric dipole

Week 2: Electric flux, Gauss' law

Week 3: Electric potential, capacitance

Electric current and circuits (电流与电路)

Week 4-5: Current, Ohm's law, Kirchhoff's rules, circuits, RC circuits

Magnetic field, Ampere's law, Lenz's law, Faraday's law, inductance, electromagnetic oscillations, RLC circuits, AC, Maxwell's equations (磁场、安培定律、楞次定律、法拉第定律、电感、电磁振荡、RLC 电路、交变电流、麦克斯韦方程组)

Week 6-7: Magnetic force, Magnetic field, Biot-Savart Law, Ampere's Law

Week 8: Lenz's law, Faraday's law, inductance, RL circuits

Week 9: EM oscillations, RLC circuits, AC, Maxwell's equations

Wave nature of light, interference and diffraction (光的波动特性、干涉、衍射)

Week 10: EM Waves, Poynting vector, radiation pressure, polarization, reflection & refraction

Week 11: Interference: Young's interference experiment, intensity in double-slit interference, interference from thin films

Week 12: Diffraction: single-slit diffraction, intensity in single-slit diffraction, diffraction by a double-slit, diffraction gratings

Introduction to quantum mechanics (量子力学简介)

Week 13: Special relativity: relativity of simultaneity, time and length, Lorentz transformation, Doppler effect for light, momentum and energy

Week 14-16: Quantum mechanics: Photoelectric effect, Schrodinger's equation, potential well, Bohr model of the

hydrogen atom

Lectures will include 10-16 hours small class lecture. (讲授过程將包括 10-16 小时小班讲授)

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)				

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