

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 B(下) General Physics B (II)
2. 授课院系 Originating Department	物理系 Department of Physics
3. 课程编号 Course Code	PHY105B
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
8. Instructor(s), Affiliation & Contact (For team teaching, please list all instructors)	<p>1. 陈朗, 教授, 物理系 第二科研楼 202 室 CHEN Lang, Professor, Department of Physics Rm.202, No.2 Research Bldg. chenlang@sustech.edu.cn 0755-88018228</p> <p>2. 吴文政, 副教授, 物理系 第二科研楼 122 室 Ng Man Ching Alan, Associate Professor, Department of Physics Rm.122, No.2 Research Bldg. ngamc@sustech.edu.cn 0755-88018211</p> <p>3. 张立源, 副教授, 物理系 第二科研楼 131 室 ZHANG Liyuan, Associate Professor, Department of Physics Rm.131, No.2 Research Bldg. zhangly@sustech.edu.cn 0755-88018201</p> <p>4. 刘畅, 副教授, 物理系 第二科研楼 129 室 LIU Chang, Associate Professor, Department of Physics Rm.129, No.2 Research Bldg. liuc@sustech.edu.cn</p>

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

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

150 人/教室

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	PHY103B General Physics B (I) 大学物理 B (上) 或 PHY103A General Physics A (I) 大学物理 A (上)
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	Physics, applied physics and other science and engineering related courses 物理学、应用物理学专业其他理工科系相关课程
14. 其它要求修读本课程的学系 Cross-listing Dept.	所有系

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

本课程教学目标是讲授以下的物理内容：电学、磁学、波动光学以及相对论和量子力学简介。课程主要面向科学研究者和工程师，侧重于介绍基本物理规律在实际生活和工程的应用。

The main objective of this course is to introduce basic physics concepts including electricity, magnetism, wave nature of light, and the introduction to relativity and quantum mechanics. The course aims to provide trainings for scientists and engineers to apply the above physics concepts.

16. 预达学习成果 Learning Outcomes

1. 掌握并运用课程中的物理专业术语和定义。
 2. 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。
 3. 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。
1. Recognize and use appropriately physics terms and definitions relevant to the major topics in the course.
 2. Use simple calculus and vector notation to formulate the physics laws covered in the course.
 3. 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.).

1. 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

2. Electric current and circuits (电流与电路)

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

3. 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
4. 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
5. 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. (讲授过程将包括 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	每次 3-4 分钟	0-5%		以随机的课堂小测验方式作为间接考勤的一种方式。
课堂表现 Class Performance	同上			
小测验 Quiz	2-3 次, 按需求制定	55-60%		
课程项目 Projects	无			
平时作业 Assignments		10%		平均每章有 5 到 8 道作业题。
期中考试 Mid-Term Test	包含在 quiz 当中			
期末考试 Final Exam	2 小时	30%		

期末报告 Final Presentation	无			
其它（可根据需要 改写以上评估方 式） Others (The above may be modified as necessary)	无			

20. 记分方式 **GRADING SYSTEM**

<input checked="" type="checkbox"/> A. 十三级等级制 Letter Grading <input type="checkbox"/> 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

