

## 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.	<b>课程名称 Course Title</b>	引力和宇宙学 Gravitation and Cosmology
2.	<b>授课院系 Originating Department</b>	物理系 Department of Physics
3.	<b>课程编号 Course Code</b>	PHY338
4.	<b>课程学分 Credit Value</b>	3
5.	<b>课程类别 Course Type</b>	专业选修课 Major Elective Courses
6.	<b>授课学期 Semester</b>	春季 Spring
7.	<b>授课语言 Teaching Language</b>	中英双语 English & Chinese
8.	<b>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 &amp; Contact (For team teaching, please list all instructors)</b>	李淼 / Miao Li 教授 / Professor 物理系 / Department of Physics 第二科研楼 112 室 / Rm 112, Research Building II Email: <a href="mailto:3498044240@qq.com">3498044240@qq.com</a> ; <a href="mailto:lim7@sustech.edu.cn">lim7@sustech.edu.cn</a>
9.	<b>实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact</b>	待公布 To be announced
10.	<b>选课人数限额(可不填) Maximum Enrolment (Optional)</b>	

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
学时数 Credit Hours	48				48
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	分析力学 (PHY205-15), 电动力学 II (PHY208) Analytical Mechanics (PHY205-15), Electrodynamics II (PHY208)				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	引力理论、宇宙学、天体物理各专业课程 Courses of Gravitation Theory, Cosmology and Astrophysics				
14. 其它要求修读本课程的学系 Cross-listing Dept.					

### 教学大纲及教学日历 SYLLABUS

#### 15. 教学目标 Course Objectives

培养优秀的进行引力理论和实验研究的优秀本科生。  
培养优秀的进行天体物理理论和观测研究的优秀本科生。  
Cultivate outstanding undergraduates who conduct gravitational theory and experimental research.  
Cultivate outstanding undergraduates who are engaged in astrophysics theory and observational research.

#### 16. 预达学习成果 Learning Outcomes

熟练掌握广义相对论相关计算, 了解引力理论的最近发展, 掌握宇宙学的基础理论, 了解暴涨宇宙论的基础知识。  
Familiar with the calculations related to general relativity, understand the recent development of the theory of gravity, master the basic theories of cosmology, and understand the basic knowledge of inflationary cosmology.

#### 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.)

- 1) 作用量原理, 标架与微分几何, 3 学时
- 2) 星体的平衡和坍缩, 白矮星、中子星, 5 学时
- 3) 对称空间, 2 学时
- 4) 宇宙志, 6 学时
- 5) 宇宙学标准模型, 14 学时
- 6) 宇宙学其它模型, 3 学时
- 7) 暴涨宇宙论, 14 学时
- 8) 总结, 1 学时
- 1) Principle of action, frame and differential geometry, 3 credit hours
- 2) Balance and collapse of stars, white dwarfs, neutron stars, 5 credit hours
- 3) Symmetrical space, 2 credit hours
- 4) Cosmology, 6 credit hours
- 5) Standard Model of Cosmology, 14 credit hours
- 6) Other models of cosmology, 3 credit hours
- 7) Inflationary cosmology, 14 credit hours
- 8) Summary, 1 credit hours

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

教材:

引力和宇宙学: 广义相对论的原理和应用, S.温伯格 (Steven Weinberg) 著, 邹振隆, 张历宁 等译

Textbook:

Gravitation and Cosmology Principles and Applications of The General Theory of Relativity, Steven Weinberg, Zou Zhenlong, Zhang Lining, etc. Translated

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		10%		
课堂表现 Class Performance		10%		
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		20%		
期中考试 Mid-Term Test				
期末考试 Final Exam		60%		
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

