

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	偏微分方程 (上) Partial Differential Equations I
2.	授课院系 Originating Department	数学系 Department of Mathematics
3.	课程编号 Course Code	MAT7023
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业选修课 Major Elective Courses
6.	授课学期 Semester	春季 Spring
7.	授课语言 Teaching Language	英文 English
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)	王学锋, 教授, 数学系 慧园 3 栋 530 室 wangxf@sustc.edu.cn 0755-88018754 Wang Xuefeng, Professor, Department of Mathematics Rm.530, Building 3, Huiyuan wangxf@sustc.edu.cn 0755-88018754
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
学时数 Credit Hours	48				48
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	MA301 实变函数, MA202 复变函数, MA302 泛函分析 MA 301 Theory of Functions of a Real Variable, MA202 Complex Analysis, MA302 Functional Analysis				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	MAT7024 偏微分方程 (下) Partial Differential Equations II				
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

学生通过本课程的学习将掌握现代椭圆与抛物偏微分方程理论中的基本概念、基本理论以及基本方法。此课将为学生们以后阅读参考文献和开展相关的科研工作打好基础。

The students will learn fundamental concepts, theories, and methods, especially modern ones, in elliptic and parabolic partial differential equations, and will be able to apply them to solve problems. Students will be well prepared to read more advanced literature and carry out related research in the future.

16. 预达学习成果 Learning Outcomes

掌握现代椭圆与抛物偏微分方程理论中的基本概念、基本理论以及基本方法,为继续学习《偏微分方程(下)》做好准备。

The students will grasp fundamental concepts, theories, and methods, especially modern ones, in elliptic and parabolic partial differential equations, preparing them to take the subsequent course "PDE II".

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.)

Section 1 Classical weak and strong maximum principles for 2nd order elliptic and parabolic equations, Hopf boundary point lemma, and their applications. (16h)

Section 2 Sobolev spaces, weak derivatives, approximation, density theorem, Sobolev inequalities, Kondrachov compact imbedding. (16h)

Section 3 L^2 theory for second order elliptic equations, existence via Lax-Milgram Theorem, Fredholm alternative, L^2 estimates, Harnack inequality, eigenvalue problem for symmetric and non-symmetric, second order elliptic operators. (16h)

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

Text: Partial Differential Equations, by Lawrence C. Evans, 2017

References:

1. Elliptic and Parabolic Equations, by Wu Zhuoqun, Yin Jinxue and Wang Chunpeng, World Scientific Publishing Co.

2. Elliptic Partial Differential Equations of second Order, by David Gilbarg and Neil S.Trudinger, Springer.
3. Partial Differential Equations, 2nd edition, by R. McOwen, Prentice-Hall

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				
课程项目 Projects				
平时作业 Assignments		40%		
期中考试 Mid-Term Test	2 hours	20%		
期末考试 Final Exam	3 hours	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