

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	几何与拓扑讨论班 Seminar in Geometry and Topology
2.	授课院系 Originating Department	理学院数学系 Department of Mathematics, School of Sciences
3.	课程编号 Course Code	MA423
4.	课程学分 Credit Value	1
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)	朱一飞, 数学系, zhuyf@sustech.edu.cn Ingrid Irmer, 数学系, ingridmary@sustech.edu.cn Stavros Garoufalidis, 数学系, stavros@sustech.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	待公布 To be announced (请保留相应选项 Please only keep the relevant information)
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	

11. 授课方式 Delivery Method	讲授	习题/辅导/讨论	实验/实习	其它(请具体注明)	总学时
	Lectures	Tutorials	Lab/Practical	Other (Please specify)	Total
学时数 Credit Hours	32	0	0	0	32
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	MA323 拓扑学 Topology, MA327 微分几何 Differential Geometry				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite					
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

几何与拓扑和代数、分析一道是基础数学的三大领域，强调几何直观，包括微分几何（几何分析）、代数几何、代数拓扑、几何拓扑（低维拓扑）等活跃的研究方向。本讨论班旨在发挥数学系几何与拓扑方向的师资优势，由相关教员组织感兴趣的同学围绕前沿、交叉专题滚动开设。形式为学生分工轮流主讲，负责教师指导并与该方向其他教师及外校专家参与选讲。近期可能讨论的专题包括应用与计算拓扑、流形与模形式、四维流形的拓扑与几何、纽结论与代数数论等。

Geometry and topology, algebra, and analysis are the three major fields of pure mathematics. It emphasizes geometric intuition and visualization, and includes active research areas such as differential geometry (geometric analysis), algebraic geometry, algebraic topology, and geometric topology (low-dimensional topology). The seminar grows out of a strong representation of the field by faculty in the Department. Relevant faculty members will take turns over semesters to organize interested students for directed reading on hot topics. Registered students will present assigned topics under supervision of the instructor, with supplementary lectures by the instructor, other relevant faculty members, as well as experts in the field from other universities. Recent proposed topics include applied and computational topology, manifolds and modular forms, the topology and geometry of four-manifolds, knot theory and algebraic number theory.

16. 预达学习成果 Learning Outcomes

- 掌握几何与拓扑专题的基本理论和实例。
- 初步具备研究的意识和能力。
- Learn the basic theory and examples of topics in geometry and topology.
- Acquire a scientific mentality and basic abilities for research.

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.)

- Introduction and organization (1 lecture)
- Student presentations (3 lectures)
- Supplementary examples and applications (1 lecture)
- Student presentations (3 lectures)
- Supplementary examples and applications (1 lecture)
- Student presentations (3 lectures)
- Supplementary examples and applications (1 lecture)
- Additional topics and applications, further readings (2 lectures)

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

教材 Textbook

- Herbert Edelsbrunner and John L. Harer, Computational Topology: An Introduction, American Mathematical Society
- Friedrich Hirzebruch, Thomas Berger, and Rainer Jung, Manifolds and Modular Forms, Viewweg
- Alexandru Scorpan, The Wild World of 4-Manifolds, American Mathematical Society
- Masanori Morishita, Knots and Primes: An Introduction to Arithmetic Topology, Springer

参考书 References

- Raúl Rabadán and Andrew J. Blumberg, Topological Data Analysis for Genomics and Evolution: Topology in Biology, Cambridge University Press

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		60		参与, 包括讨论班做报告 Participation, including presentations
期中考试 Mid-Term Test				
期末考试 Final Exam		40		读书报告 reading report
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

