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**	傅里叶分析 Fourier Analysis
2.	**授课院系** **Originating Department**	数学系 Mathematics
3.	**课程编号** **Course Code**	MA229
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 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）**	SALOMAO Pedro psalomao@sustech.edu.cn
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）**	20

		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
11.	授课方式 Delivery Method					
	学时数 Credit Hours	48				48

12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	数学分析 IIMA102a 或 数学分析 II(H)MA122 或 高等数学（下）MA127
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	无 NA
14.	其它要求修读本课程的学系 Cross-listing Dept.	无 NA

教学大纲及教学日历 SYLLABUS

15. **教学目标 Course Objectives**

本课程将系统地介绍傅里叶级数和傅里叶积分。它们在偏微分方程、物理、计算数学、数论、概率与统计、信号处理等领域均有广泛应用。

This course will provide a systematic treatment of Fourier series and Fourier integrals that have many scientific applications in fields such as partial differential equations, physics, numerical analysis, number theory, probability and statistics, signal process, etc.

The course aims to nurture the student's balanced view on “pure mathematics” and applications.

16. **预达学习成果 Learning Outcomes**

本课程意在培养学生对“纯数学”与应用的平衡观念，故而学生不但要学理论，也要学习应用；学生也要学会用软件来达到对理论的直观理解。

The students will learn basic theory, as well as applications of Fourier series and Fourier integrals; they will also develop basic skills to use softwares to achieve graphical understanding of the theory.

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. The genesis of Fourier series
   - 1.1 Heat equations
   - 1.2 Wave equations
2. Basic properties of Fourier series
   - 2.1 Definitions and examples
   - 2.2 Uniqueness
   - 2.3 Convolutions
   - 2.4 Good kernels
   - 2.5 Cesaro and Abel summability
3. Convergence of Fourier series
   - 3.1 Convergence in L^2
   - 3.2 Pointwise convergence
   - 3.3 Gibbs' phenomenon
4. Applications of Fourier series: isoperimetric inequality, Weyl's equidistribution theorem, heat equation on the circle, etc.
5. Fourier transforms
   - 5.1 Fourier series leads to Fourier transform
   - 5.2 Definitions and basic properties
   - 5.3 Inverse Fourier transform and Plancherel formula

Applications: fundamental solution of heat equation, Poisson summation formula, central limit theorem, Heisenberg uncertainty principle, band- and time-limited functions, etc.

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

Textbook: Fourier Analysis, by E. Stein and R. Shakarchi 世界图书出版公司北京公司; 第 1 版 (2013 年 1 月 1 日)

Reference book: Fourier series and integrals, by H. Dym and H. P. Mckean

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**

南方科技大学
SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

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**		30		
期末考试 **Final Exam**		30		
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
