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	生物数学　　Mathematical Biology
2.	授课院系 **Originating Department**	数学系　　Department of Mathematics
3.	课程编号 **Course Code**	MA310
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**	中英双语 English & Chinese
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**）	数学系 苏琳琳 助理教授 sull@sustc.edu.cn 88018679 慧园 3 栋 403 Department of Mathematics, Linlin Su, Assistant Professor; Room 403, Block 3, Wisdom Valley
9.	实验员/助教、所属学系、联系方式 **Tutor/TA(s), Contact**	无 NA
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				

12.	先修课程、其它学习要求 **Pre-requisites or Other Academic Requirements**	数学分析 III 或者 数学分析精讲 Mathematical Analysis III or Real Analysis
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.**	

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教学大纲及教学日历 SYLLABUS

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15. **教学目标 Course Objectives**

生物数学是生物学与数学之间的边缘学科。它以数学方法研究和解决生物学问题，并对与生物学相关的数学方法进行理论研究。本课程将向学生介绍生物数学中的几类经典模型，学生通过课程学习将深刻理解这些模型所涉及的生物问题的基本原理，了解基于这些原理的建模方法和思路，并掌握分析这些模型所用的数学方法。

Mathematical Biology is a frontier subject between biology and mathematics. It studies and solves biological problems with mathematical methods, and conducts the theoretical study on the mathematical methods related to biology. This course will introduce students some of the classic models of biology. The students will understand the basic principles of biology involved in these models, and how to model biological problems based on these principles. They will also master a wide range of mathematical techniques used in analysing these models.

16. **预达学习成果 Learning Outcomes**

学生们通过学习本门课程可以了解一些建立生物数学模型的基本思想和方法，并掌握一些常用的分析这些模型的数学方法，特别是利用常微分方程和偏微分方程理论来分析这些模型。

Through this course, students can learn some basic ideas and principles for deriving bio-mathematical models, and master some common mathematical methods for analyzing these models, especially using ordinary differential equations and partial differential equation theory to analyze these models.

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.　　　Population growth models　（人口增长模型）(10 credit hours)
2.　　　Competition of two species　（两种物种的竞争）（8 credit hours）
3.　　Predator-Prey Models　（捕食者 - 猎物模型）(9 credit hours)
4.　　　Spatially distributed Populations　（空间分布的种群）(12 credit hours)
5.　　Age-structured populations　（有年龄结构的种群）(3 credit hours)

Selective topics （选讲内容）: (6 credit hours)
6.　　Population Genetics　（群体遗传学）
7.　　Infectious Disease Modelling　（传染病模型）
8.　　Biochemical Reactions　（生物化学反应模型）

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

No required textbook

Main References:

1. Josef Hofbauer (U. of Vienna), Course Notes on Mathematics in Population Biology.
2. Jeffrey R. Chasnov (HKUST), Course Notes on Mathematical Biology.

Further References:

3. Reinhard Bürger, The Mathematical Theory of Selection, Recombination, and Mutation, John Wiley & Sons, 2000.
4. Josef Hofbauer and Karl Sigmund, Evolutionary Games and Population Dynamics , Cambridge University Press , 1998.
5. Thomas Nagylaki, Introduction to Theoretical Population Genetics, Biomathematics 21, Springer-Verlag, Berlin, 1992.
6. Robert Stephen Cantrell and Chris Cosner, Spatial ecology via reaction-diffusion equations, Wiley Series in Mathematical and Computational Biology, John Wiley & Sons, Ltd., Chichester, 2003.

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**	20%		
期末考试 **Final Exam**	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