

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.

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| 1. | 课程名称 Course Title | 科学思维 Scientific thinking |
| 2. | 授课院系 Originating Department | 医学院 School of Medicine |
| 3. | 课程编号 Course Code | MED341 |
| 4. | 课程学分 Credit Value | 2 |
| 5. | 课程类别 Course Type | 专业选修课/Major Elective Courses |
| 6. | 授课学期 Semester | 秋季 /Fall |
| 7. | 授课语言 Teaching Language | 英语 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) | 饶海教授，南方科技大学医学院，raoh@sustech.edu.cn Hai Rao, School of Medicine, raoh@sustech.edu.cn |
| 9. | 实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact | 无/none |
| 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 | 32 | | | | 32 |
| 12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements | BIO202 生物化学 II (新陈代谢) 或 MED203 医学生物化学 BIO202 Biochemistry II (Metabolism) or MED203 Medical Biochemistry | | | | |
| 13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite | 无/none | | | | |
| 14. 其它要求修读本课程的学系 Cross-listing Dept. | 无/none | | | | |

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

本课程主要面向生物医学的高年级本科生（三年级，四年级）教授培养科学想法，分析思维和交流全方位的能力。我们将以理论结合具体的科研事例（比如中药研究中屠呦呦的青蒿素工作、张亭栋的三氧化二砷研究；成功的如 Fields, Chalfie, 失败的如韩春雨, Watanabe 等等）讲述科研逻辑思维，注意的陷阱。学生有多个机会通过写作和演讲将学到的知识在课堂上应用，老师和同学将一起讲评及讨论。

This course aims to teach junior and/or senior undergraduate students how to think scientifically, analyze critically and communicate effectively. Combining both theory/model with actual successful or failed cases, we will demonstrate the value of scientific thinking and various traps/caveats. Students will have multiple opportunities, both individually and in groups, to present their own thinking and ideas in writing and orally to the class for critique.

16. 预达学习成果 Learning Outcomes

本课程结束后，学生将能够有对科研多方面的清醒认识，有逻辑性的科学思维，有效的交流思路和方法；培养和提升学生观察、分析、综合和独立解决问题的科研能力，了解科研课题的计划及发展，开发。会批评性的阅读科学论文，因此这个新颖的课程于生物医学科学专业人才具有十分重要的意义，会引导他们成为独立的科学家。

At the end of this course, students will realize the key issues involved in life sciences, analyze scientific problems critically and logically, communicate their ideas and thinking in an effective manner. They will be able to read and review scientific literature, learn how to identify important scientific problems and come up ways to tackle them. This unique course will set students on their way to become independent scientists.

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.)

| | | |
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| Lecture 1 | 2 hr | 科学其实很有趣（课程介绍） Science is interesting |
| Lecture 2 | 2 hr | 科学道德及准则：春雨的尴尬 Ethics and regulation in science |
| Lecture 3 | 2 hr | 科学的烦恼：转基因的上下五千年 Scientific dilemma |
| Lecture 4 | 2 hr | 科学其实爱挑刺：批评性的阅读科学论文 Critical reading of scientific papers |
| Lecture 5 | 2 hr | 科学其实蛮残酷：荧光蛋白的暗淡 Light of fluorescent proteins |
| Lecture 6 | 2 hr | 科学其实很简单：选题及探索 How to design and explore in science |
| Lecture 7 | 2 hr | 论文阅读讲评（section 4 作业）及应用的挑战 Reading assignment review |
| Lecture 8 | 2 hr | 中药研究的丰碑 Major achievements in traditional Chinese medicine |
| Lecture 9 | 2 hr | 泛素的诺贝尔奖该给谁？（I） Scientific evaluation on ubiquitin I |
| Lecture 10 | 2 hr | 泛素的诺贝尔奖该给谁？（II） --- 讨论 Scientific evaluation on ubiquitin II |
| Lecture 11 | 2 hr | 细胞自噬 autophagy 的诺贝尔奖该给谁？Scientific evaluation on autophagy |
| Lecture 12 | 2 hr | 科学的争议及底线：基因编辑 Controversies in Science – gene editing |
| Lecture 13 | 2 hr | 疾病（癌症）的诊断及治疗 Diagnosis and treatment of cancers |
| Lecture 14 | 2 hr | 如何做组会（lab meeting）及学术报告 How to give scientific presentation? |
| Lecture 15 | 2 hr | 学生课题（模拟）演讲 I. Year-end student project I |
| Lecture 16 | 2 hr | 学生课题（模拟）演讲 II. Year-end student project I |

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

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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 | | 20 | | |
| 小测验 Quiz | | | | |

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| 课程项目 Projects | | | | |
| 平时作业 Assignments | | 40 | | |
| 期中考试 Mid-Term Test | | | | |
| 期末考试 Final Exam | | | | |
| 期末报告 Final Presentation | | 30 | | |
| 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

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Technology