

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	生命科学概论 (INTRODUCTION TO LIFE SCIENCE)
2.	授课院系 Originating Department	生命科学学院 School of Life Sciences
3.	课程编号 Course Code	BIO102B
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	通识必修课程 General Education Required (GER)
6.	授课学期 Semester	春季 Spring / 秋季 Fall
7.	授课语言 Teaching Language	英文 English / 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)	生命科学学院 School of Life Sciences 余聪 YU Cong 副教授 Associate Professor yuc@sustech.edu.cn 赵燕 ZHAO Yan 副教授 Associate Professor zhaoyan@sustech.edu.cn 刘东 LIU Dong 副教授 Associate Professor liud@sustech.edu.cn 董涛 DONG Tao 教授 Professor dongt@sustech.edu.cn 温子龙 WENZilong 讲席教授 Chair Professor zilong@ust.hk 侯圣陶 HOU Shengtao 教授 Professor houst@sustech.edu.cn 吴柘 WU Zhe 副教授 Associate Professor wuz@sustech.edu.cn 戴紫薇 DAI Ziwei 助理教授 Assistant Professor daizw@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
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	无 N/A

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	48				48
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无 N/A				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	无 N/A				
14. 其它要求修读本课程的学系 Cross-listing Dept.	本课程为通识理工基础课, 适合非生物专业学生, 特别是高中阶段无生物学基础的学生。 This is a General Education Required (GER) course for any non-biology majors, and for those who did not take any biology class in high school.				

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

《生命科学概论》是一门入门和/或发现课程, 面向大学一年级学生(但不局限于低年级), 从生物学的角度阐述当今地球生物包括人所面临的一些重大生命问题。在过去的半个世纪里, 生物和生物医学研究是一个发展很快的领域, 在一定程度上迅速扩增、甚至颠覆传统和当代生命科学知识。因此, 本课程旨在解释该领域在智力上的挑战性, 得益于跨学科(包括但不限于化学、物理、数学、医学、计算机科学、健康科学和材料科学)合作的巨大成功, 及各发达国家对生物技术和生物医学研究的巨大投入。《生命科学概论》将摆脱人们对生物学教学的刻板印象, 引导学生体验一个全新的生命科学学习旅程, 并更加尊重、珍惜和欣赏生命。

BIO102B is an introductory/discovery course for freshmen (but not limited to) to understand biology through laying out some major modern-day issues that we and other species of the planet have been facing. In the past half century, the biological and biomedical research represents an actively evolved rapidly progressed scientific field to expand and somehow to quick subvert traditional and contemporary knowledge of life. The course is thus intended to explain why the field is challenging and requires an enormous effort of inter-disciplines (including but not restricted to the chemistry, physics, mathematics, medicine, computer science, health science and material science) and why biotech and biomedical research has been heavily invested in developed countries around the world. Unlike the stereotype of biology course, i.e., applying a few theorems or rules and memorizing lots of names, terms and facts, BIO102B would guide the students to experience a new learning journey of life science, and to cherish, revere and appreciate life more.

16. 预期学习成果 Learning Outcomes

学习本课程后, 学生应能充分了解:

1. 生命科学是什么、如何影响人类和地球
2. 生命科学研究是数学、计算机科学, 物理学、化学, 工程学交叉领域
3. 研究生命科学的目的(伦理道德)
4. 为何要珍惜、感恩生命

Students would acknowledge:

1. The true meaning of life science and its impact on us and our globe
2. Life science research is a cross-discipline field of mathematics, physics, chemistry, computer science, engineering, and so on
3. The purpose of life science research and the essential morals it must bear
4. Life is precious and should be gently treated

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. 生命的化学：一场“从无到有”的革命（6学时）——余聪

1.1: 从”无机“到”有机“（2学时）

1.2: 从“无理“到”有理“（2学时）

1.3: 从“无序“到”有序“（2学时）

1. The biochemistry of the life 6h -YU Cong

1.1: The important function of biomolecules 2h

1.2: The tight regulation of biomolecules 2h

1.3: The interesting “folding” of biomolecules 2h

2. 细胞生物学（6学时）——赵燕

2.1: 生命的最小单元——细胞生物学的发展史（2学时）

2.2: 冠状病毒的细胞内一日游——细胞内的运输系统（2学时）

2.3: 卧底还是叛变？——肿瘤产生的过程（2学时）

2. Cell Biology 6h—ZHAO Yan

2.1: The smallest unit of life—The history of cell biology 2h

2.2: The tour of coronaviruses in host cells—The intracellular trafficking systems 2h

2.3: Undercover or betrayer? — The process of tumorigenesis 2h

3. 发育与再生生物学（6学时）——刘东

3.1: 从细胞到你——多细胞动物的形态发生及生命延续的规律；（2学时）

3.2: 再造一个你——人类克隆动物的梦想；（2学时）

3.3: 一个新的你——人类对组织器官再生的向往（2学时）

3. Developmental and Regenerative Biology 6 h - LIU Dong

3.1: From a cell to you—The rule of morphogenesis and reproduction 2h

3.2: Re-creating you—A dream to clone animals 2h

3.3: Renewing you—Organ/tissue regeneration 2h

4. 微生物学：病毒、细菌与人类疾病（6学时）——董涛

4.1: 被遗忘的器官-微生物与健康；（2学时）

4.2: 敌人的敌人-抗生素与超级耐药细菌；（2学时）

4.3: 精细的细菌分子武器；（2学时）

4. Microbiology: Microbes and human diseases (6 h)- DONG Tao

- 4.1 A forgotten organ-Microbes and Health 2h
- 4.2 Antibiotics and Superbugs 2h
- 4.3 Molecular Weapons of Microbes 2h
- 5. 免疫学（6学时）——温子龙**
- 5.1: 人体防御系统 - 免疫细胞、器官；（2学时）
- 5.2: 免疫多样性和免疫耐受性；（2学时）
- 5.3: 免疫反应和免疫疗法；（2学时）
- 5. Immunology 6h——WEN Zilong**
- 5.1: Cells and organs of immune system 2h
- 5.2: Immune diversity and tolerance 2h
- 5.3: Immunity and immunotherapy 2h
- 6. 脑与心智 - 科学的最后疆界（6学时）——侯圣陶**
- 6.1: 天才大脑的独特之处；（2学时）
- 6.2: 大脑如何感受世界？（2学时）
- 6.3: 大脑与压力.（2学时）
- 6. Brain and Mind - the last frontier of science 6h - HOU Shengtao**
- 6.1: The uniqueness of the genius brain 2h
- 6.2: How does the brain sense the world? 2h
- 6.3: Brain and stress. 2h
- 7. 植物的魅力（6学时）——吴柘**
- 7.1: 植物的私生活-植物长生不老之谜（2学时）
- 7.2: 植物是第一生产力-光合作用如何改变世界（2学时）
- 7.3: 大自然的馈赠-青蒿素与植物天然产物宝库（2学时）
- 7. The Beauty of Plants 6h - WU Zhe**
- 7.1: The private life of plants - Why plants can be immortal? 2h
- 7.2: Photosynthesis - How photosynthesis has changed the world? 2h
- 7.3: A Gift from Nature - Artemisinin and plant natural products. 2h
- 8、生命科学的“大数据时代”（6学时）——戴紫薇**
- 8.1: 生命科学的大数据时代（2学时）

8.2: 从理解生命到设计生命 (2 学时)

8.3: 生命科学对其他学科的启示 (2 学时)

8. Life sciences meet big data 6h ——DAI Ziwei

8.1: Life sciences meet big data; 2h

8.2: From understanding life to redesigning life; 2h

8.3: What life sciences have taught non-biologists; 2h

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

指定教材: 《Campbell Essential Biology with Physiology》, 第五版

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		30		
课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		20		
期中考试 Mid-Term Test		25		
期末考试 Final Exam		25		
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

本课程经生命科学学院本科教学指导委员会审议通过。

This Course has been approved by Undergraduate Teaching Steering Committee of School of Life Sciences