南方科技大学 SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

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**	**生物学原理 Principles of Biology**
2.	**授课院系 Originating Department**	生物系 Department of Biology
3.	**课程编号 Course Code**	BIO103
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	通识必修课程 General Education (GE)Required Courses
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）**	陈炜（生物系，讲席教授，chenw@sustech.edu.cn） 郭红卫(生物系，讲席教授，guohw@sustech.edu.cn) 肖波(生物系，教授，xiaob@sustech.edu.cn) CHEN Wei (Department of Biology, Chair Professor,chenw@sustech.edu.cn) GUO Hongwei(Department of Biology, Chair Professor,guohw@sustech.edu.cn) XIAO Bo(Department of Biology, Professor,xiaob@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）**	

11.		**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**
	授课方式 Delivery Method					
	学时数 Credit Hours	40			8(学生口头报告） (student presentation)	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**	本课程为通修通识必修课，是适合生物和生物相关专业的课程。 This is a compulsory course for general study, and therefore is suitable for biology majors and bio-relate majors.
14.	**其它要求修读本课程的学系 Cross-listing Dept.**	生物医学工程系、医学院 Biomedical Engineering Department, Medical School

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

生物学原理课程通过广泛的、最多元化的入门级生命科学介绍，让学生接触到可以作为终身学习基础的生命科学知识（包括生命最基本的分子、细胞器、细胞、基因、遗传、植物等相关领域），同时，生物学原理所介绍的内容还为更广泛的生命科学高级课程（包括生物化学，细胞生物学，分子生物学，生理学等）的学习提供极好的准备。建议对生命科学有特别兴趣的学生选修。

Principles of Biology allows the most diversified exposure to biology at the introductory level. It is designed to provide a knowledge base in life sciences that students can use as a foundation for life-long learning in the sciences. In addition, it is also designed to provide an excellent preparation for a wide range of advanced courses including biochemistry, cell biology, molecular biology, physiology, etc. As such, it is recommended for those students who have a particularly strong interest in studying biology-related majors.

16. 预达学习成果 Learning Outcomes

Students will be able to understand: 重点掌握的方面

- evolution and diversity of living organism 演化原理与物种多样性
- heredity and its molecular basis 遗传及其分子基础
- the correlation of biological structure, function and processes at all levels of biological organizations 在不同层面上理解结构-功能及生物学过程间的关系
- how energy, nutrients, metabolites and information are acquired and organized, and how they flow through biological systems 理解能量，营养，代谢及信息的获得和组织，理解它们怎样贯穿在生物系统中。
- biotic interactions and the relationship of organisms to the physical environment 生物体与其它生物体及物理环境间的相互关系
- how mathematics, physics and chemistry are integrated into the study of biology 初步了解数学，物理和化学知识与生物学的整合
- Students will have skills to: 学生将掌握的技能
- construct reasonable hypotheses to explain biological phenomena and design 对生物学现象的解释，学会构建与之对应的合理的假说。
- clearly and accurately communicate biological concepts effectively in oral and written forms 能够清晰和准确的表述（口述及书面）生物学概念。

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.)

Informational Content 内容简介

Introduction: Biology Today (2 hrs) 今日之生物学 (Instructor: XIAO Bo 授课人：肖波)

- Importance of Biology and Ethical Considerations 生物学的重要性和伦理考量
- Biology/Life at Different Levels 不同层级的生物/生命
- Basic Principles and Intellectual Unification of Biology 基本原则和生物学知识系统

Part I: Chemistry of Life (12 hrs) 生命中的化学 (Instructor: XIAO Bo 授课人：肖波)

- The Birth of Biochemistry: Cell-Free Fermentation Carried Out by Eduard Buchner's "Yeast Juice" 生物化学的诞生:由爱德华·毕希纳的"酵母果汁"所提出的无机发酵学说
- Essential Chemistry for biology 生物学之化学基础

a)Fractionating Life 生命的不同层级

b)Chemical Bonds and Forces 分子中的化学键和力

c)Understanding Properties of Molecules 理解分子性质

- The Molecules of Life 生物分子

a)Molecules (ATP/Carbohydrates, Fatty Acids/Lipids, Proteins, Nuclei Acids) 分子(ATP/碳水化合物、脂肪酸/脂质、蛋白质、核酸)

b)Protein Structure, PDB and JMol App 蛋白质结构,PDB 和 JMol 的应用

c)Understanding Protein Machines: Hemoglobin, Enzymes 理解蛋白质机器:血红蛋白,酶

d)Enzymes: How do enzymes work? 酶如何工作?

- Biochemical Pathways—Breaking down Sugars (Glycolysis and Cellular Respiration) 生化途径-消化糖(糖酵解和细胞呼吸)
- Cell Structure and Function 细胞之结构&功能

a)Cell Theory 细胞学说

b)Making Cell membrane 细胞膜的形成

c)Organelles and Functions 细胞器和功能

d)Chromosomes in Cell Division (Mitosis and Meiosis) 细胞分裂中的染色体行为(有丝分裂和减数分裂

e)Cellular Metabolism and Homeostasis 细胞代谢和稳态

Students Presentation, 2 hrs (instructor: XIAO Bo) 学生口头报告 （授课人：肖波）

Part II: Genetics (16 hrs) 遗传学（Instructor: Chen Wei 授课人：陈炜)

- Classical Genetics: From Aristotle to Gregor Mendel 经典遗传学：从亚里士多德到孟德尔
- Cellular Genetics: Thomas Morgan 细胞遗传学：摩尔根学说
- Molecular Genetics 分子遗传学

a) It is DNA! DNA—遗传物质

b) DNA replication DNA 复制

c) Transcription 转录

d)Translation 翻译

e)Gene regulation 基因调控

- Population Genetics and Evolution 群体遗传学和进化

Students Presentation: 2 hrs (Instructor: XIAO Bo) 学生口头报告 （授课人：肖波）

Part III: Plant Biology (8hrs)植物生物学 (Instructor: Guo Hongwei 授课人：郭红卫)

- plant structure and anatomy 植物形态和结构
- life cycle of plants 植物生活史
- water and nutrient uptake and transport 水分和养分吸收及运输
- photosynthesis 光合作用
- plant growth regulation 植物生长调节
- plants and environment 植物和环境

Students Presentation: 4hrs (Instructor: GUO Hongwei) 学生口头报告 （授课人：郭红卫）

Review and Q&A (2hrs) 复习与答疑(Instructor: XIAO Bo 授课人：肖波)

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

Molecular Biology of the Cell, 6th Ed;

Introduction to Genetic Analysis, 8th ed.

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				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		40		
期中考试 Mid-Term Test				
期末考试 Final Exam		40		
期末报告 Final Presentation		10		
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

本课程经生物系本科教学指导委员会审议通过。
This Course has been approved by Undergraduate Teaching Steering Committee of Department of Biology.