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**	**普通生物学实验 General Biology Laboratory**
2.	**授课院系 Originating Department**	生物系 Department of Biology
3.	**课程编号 Course Code**	BIO104
4.	**课程学分 Credit Value**	2
5.	**课程类别 Course Type**	专业基础课 Major Foundational 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）**	生悦，生物系，shengy@sustc.edu.cn Sheng Yue, Department of Biology, Email: shengy@sustc.edu.cn 马小英，生物系，maxy@sustc.edu.cn Ma Xiaoying, Department of Biology, Email: maxy@sustc.edu.cn 余春红，生物系，yuch@sustc.edu.cn Yu Chunhong, Department of Biology, Email: yuch@sustc.edu.cn 吕沫，生物系，lvm3@sustc.edu.cn Lv Mo, Department of Biology, Email: lvm3@sustc.edu.cn
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	林飚，生物系，linb3@sustc.edu.cn Lin Biao, Department of Biology, Email: linb3@sustc.edu.cn 张敏，生物系，zhangm6@sustc.edu.cn Zhang Min, Department of Biology, Email: zhangm6@sustc.edu.cn 贾方兴，生物系，Jiafx@sustc.edu.cn Jia Fangxing, Department of Biology, Email: Jiafx@sustc.edu.cn
10.	**选课人数限额(可不填) Maximum Enrolment**	24/班，24 per class

（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			课堂实验 56 学时 class experiment 56 h	课后实验观察 8 学时 Observation after class 8 h	64
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	学习本实验课的同时学习《生物学原理》或《生命科学概论》或《生物医学导论》理论课课程。 Study the theory courses Principles of Biology or Introduction to Life Science or Introduction to Biomedical Sciences with the experiments course at the same time.				
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.					

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

普通生物学实验课是生物学实验的基础课程，内容涉及细胞生物学、遗传学、微生物学、植物学及动物学等多个学科。本课程内容丰富有趣，如：面包及酸奶的制作、涡虫的再生、南方科技大学校园植物多样性的观察等，激发学生对生命科学的兴趣。本课程使学生掌握生物学的基本技术、实验方法及常规实验仪器的使用，加深学生对生物学理论的理解。同时，培养学生的观察能力、动手能力、良好的科研思维与实验习惯，为后续的专业课学习和科研实践奠定基础。

General biology experiment is the basic course of biology. It covers courses of cell biology, genetics, microbiology, zoology, and botany. Experiments are designed interesting, such as making of bread and yogurt, regeneration of planarian and observation of the plants in SUSTech campus, which are aimed to stimulate students' interest in biology learning. The goal is to teach students basic biological techniques, methods and use of laboratory equipment. It will help students to have a better understanding of the theory course. At the same time, it can train the students' observation ability, practical ability, critical thinking and good habits in scientific work. Furthermore, It provides the basis for the further professional course and scientific research.

16. 预达学习成果 Learning Outcomes

1.学生将掌握生物学常规实验仪器的使用，如：光学显微镜、体视显微镜、移液器、离心机等。

2.学生将掌握动植物解剖的规范操作，细胞和组织水平动植物结构的观察。

3.学生将掌握生物学常用的实验技术，如：显微镜临时装片的制备、DNA 的提取、染色技术（细胞骨架、有丝分裂、生物大分子染色等）。

4.通过对本课程的学习，使学生初步形成对生命科学领域的整体认识，培养学生的创新意识和实践能力，启发学生的学习兴趣。

1.Students will master the use of basic experimental equipments: light microscope, stereoscope, pipette and centrifuge.

2.Students will master the standard operation of animal and plant anatomy, observation of their structure at cell and tissue levels.

3.Students will master the commonly used techniques: preparation slides for microscopic observation, isolation of DNA, staining methods of cytoskeleton, mitosis and biological macromolecules in cells.

4.The course can help students develop an overall understanding of life science, train their innovative consciousness and practical ability, and stimulate their interest in biology learning.

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.)

一、普通生物学实验简介 学时：4 学时

Lab 1 Introduction to general biology laboratory Hours: 4 h

介绍生物实验室安全管理制度，了解课程要求、课程评估方式、课程内容及时间安排等。

Introduce biology laboratory safety, course requirement, course evaluation, course content and schedule.

二、细胞大小的测量 学时：4 学时

Lab 2 Measurement of Cell Size Using Microscope Hours: 4 h

本实验学生将学习如何正确的使用光学显微镜及介绍使用显微镜注意事项。学习如何应用显微镜测量细胞大小、观察胞质环流现象。

Study how to use a microscope properly and introduce some attentions. Students will also measure cell sizes and observe the phenomenon of cyclosis using a microscope.

三、原核细胞和真核细胞的观察 学时：4 学时

Lab 3 Observation of Prokaryotic and Eukaryotic Cells Hours: 4 h

本实验学生将应用光学显微镜观察原核细胞（细菌和古细菌）及真核细胞（原生生物、真菌、植物和动物细胞）。比较原核细胞和真核细胞的区别，理解细胞结构基础决定其生理功能。

Observe prokaryotic cells (bacteria and cyanobacteria) and eukaryotic cells (protista, fungi, plantae and anamalia) using the microscope. Learn the differences between them and collect evidence that cellular structure reflects function.

四、细胞内生物大分子的观察 学时：4 学时

Lab 4 Observation of Biological Macromolecules in Cells (Starch, Lipid Droplet, Cytoskeleton) Hours: 4 h

本实验学生将观察细胞内的生物大分子：碳水化合物、脂质和蛋白质。学习生物基本染色技术：应用碘-碘化钾对淀粉颗粒进行染色，应用苏丹三对脂滴进行染色，应用考马斯亮蓝 R250 对细胞骨架蛋白进行染色。

Observe the biological macromolecules in cells including carbohydrates, lipids and proteins. Study the basic stain methods for starch grain stained with IKI solution, lipid droplet stained with Sudan III and cytoskeleton stained with Coomassie brilliant blue R-250.

五、微生物发酵 学时：6 学时

Lab 5 Microbial Fermentation Hours: 6 h

本实验学生将学习如何制作面包及酸奶。在制作的过程中观察发酵的现象及产物，更好的理解细胞呼吸活动。包括课堂上课 4 学时和第二天观察结果 2 学时。

Learn how to make bread and yogurt. Observe the fermentative action of microorganisms in the production of bread and yogurt. Gain a better understanding of cellular respiration. 4 class hours for the classroom teaching and 2 class hour for the results observed in the next day.

六、植物细胞有丝分裂的观察　　学时：4 学时

Lab 6 Observation of Plant Mitosis　　Hours: 4h

本实验学生将应用孚尔根法对大蒜根尖进行染色，制作临时装片并在显微镜下观察植物细胞有丝分裂的不同时期。

Feulgen stain will be used for staining garlic root tips. Students will prepare slides for microscopic observation using Feulgen staining techniques which stain only DNA in chromosomes. Then observe different stages of mitosis in plant cells.

七、小鼠肝脏 DNA 的提取　　学时：4 学时

Lab 7 Genomic DNA Extraction from Mouse Liver　　Hours: 4h

本实验学生将学习 DNA 提取的原理，学习如何从小鼠肝脏提取 DNA 及 DNA 浓度及纯度的检测方法。

Students will understand the principle of DNA extraction, learn how to isolate DNA from mouse liver and test the concentration and purity of DNA.

八、南方科技大学校园植物多样性　　学时：4 学时

Lab 8 Plant Diversity in SUSTech　　Hours: 4h

本实验学生将学习深圳常见景观植物。通过认识南方科技大学校园植物，更好的理解植物多样性的概念。

Introduce several common garden plants in Shenzhen city. Get to know most of plants in SUSTech campus and have a good understanding of plant biodiversity.

九、涡虫的再生　　学时：10 学时

Lab 9 Regeneration of Planarian　　Hours: 10h

本实验学生将认识和了解涡虫的形态特征及生活习性。对损伤涡虫进行研究假设，饲养涡虫并观察其再生现象。理解涡虫再生的机制及其在干细胞研究中的应用前景。包括课堂上课 4 学时和第二、三、五、七天观察结 6 学时。

Recognize some of the basic features and habits of Planarian. Use scientific approach to hypothesize how Planarian respond to fragmentation. Explain how Planarian have the capacity to regenerate and why it is a useful model for stem cell research. 4 class hours for the classroom teaching and 6 class hours for the results observed in the following 7 days.

十、小鼠解剖　　学时：4 学时

Lab 10 Mouse Dissection　　Hours: 4h

本实验学生将学习如何辨别雌鼠及雄鼠。学习动物解剖的规范操作，辨认小鼠的主要器官。

Identify and compare the female and male mice. Learn the standard operation of animal anatomy. Recognize the anatomical structure of mice.

十一、动物组织观察　　学时：4 学时

Lab 11 Observation of Animal Tissues　　Hours: 4h

本实验学生将学习并观察四种动物组织，包括上皮组织、结缔组织、肌肉组织及神经组织，了解及辨认各种组织结构。

Observe the four basic animal tissues and to identify and compare the common mammalian subtypes of each tissue,

including epithelial tissues, connective tissues, muscle tissues and nervous tissue.

十二、花结构的观察　　学时：4 学时

Lab 12 Observation of Plant Flower Structure　　Hours: 4h

本实验学生将学习花的基本结构。通过对百合和月季的解剖，更好的认识花的结构。比较花的大体结构及显微结构，了解花的无性繁殖及有性繁殖特征。

Study the flower basic structure and dissect the flowers (lily and rose) to understand more about the flower structure. Compare the anatomical and microscopic structure of flower. Understand the characteristics of asexual reproduction and sexual reproduction of flowers.

十三、叶的结构观察及导管的分离　　学时：4 学时

Lab 13 Leaf Structure and Separation of the Vessel Elements　　Hours: 4h

本实验学生将学习单子叶植物及双子叶植物的叶结构特征。学习如何进行导管分离及叶脉书签制作。

Study the structure of monocot and dicot leave. Learn how to separate the vessel elements and make the bookmark of the leaf vein.

十四、实验回顾与总结　　学时：4 学时

Lab 14 Course review　　Hours: 4h

总结本课程的所有实验内容, 收集课程意见及建议。

Review all the experiments and to collect the suggestions and comments about our laboratories.

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

教材由课程的负责老师、工程师共同编写。

Manual is written by teachers and engineers in charge of the course.

参考资料：

General Biology Laboratory Manual. Barbara Johnson

Miller & Levine Biology: Laboratory Manual.Inc. Pearson Education

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		10		
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		30		notebook

期中考试 **Mid-Term Test**				
期末考试 **Final Exam**				
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)**		50		Lab safety exam 10 Report 30 Practical exam 10

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.