

## 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.	<b>课程名称 Course Title</b>	生物实验室安全与个人防护 <b>Biological Lab Safety and Personal Protection</b>
2.	<b>授课院系 Originating Department</b>	生物系 Department of Biology
3.	<b>课程编号 Course Code</b>	BIO112
4.	<b>课程学分 Credit Value</b>	1
5.	<b>课程类别 Course Type</b>	专业选修课 Major Elective Courses
6.	<b>授课学期 Semester</b>	春季 Spring / 秋季 Fall
7.	<b>授课语言 Teaching Language</b>	中英双语 English & Chinese
8.	<b>授课教师、所属学系、联系方式 Instructor(s), Affiliation &amp; Contact</b> (For team teaching, please list all instructors)	<p>余春红, 工程师, 生物系 第一教学楼 234 室 yuch@sustech.edu.cn 0755-88018745 Yu Chunhong, Engineer, Department of Biology Rm.234, No.1 Teaching building</p> <p>马小英 工程师 生物系 第一教学楼 234 室 <a href="mailto:maxy@sustech.edu.cn">maxy@sustech.edu.cn</a> MA Xiaoying, Teaching Engineer, Department of Biology Rm.234, No.1 Teaching building</p> <p>生悦, 工程师, 生物系, shengy@sustc.edu.cn Sheng Yue, Teaching Engineer, Department of Biology</p>
9.	<b>实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact</b>	待公布 To be announced

10. <b>Maximum Enrolment (Optional)</b>	选课人数限额(可不填)	无 None				
11. <b>Delivery Method</b>	授课方式	讲授 <b>Lectures</b>	习题/辅导/讨论 <b>Tutorials</b>	实验/实习 <b>Lab/Practical</b>	其它(请具体注明) <b>Other (Please specify)</b>	总学时 <b>Total</b>
	学时数 <b>Credit Hours</b>	16		16		32
12. <b>Pre-requisites or Other Academic Requirements</b>	先修课程、其它学习要求	无 None				
13. <b>Courses for which this course is a pre-requisite</b>	后续课程、其它学习规划	无 None				
14. <b>Cross-listing Dept.</b>	其它要求修读本课程的学系	无 None				

### 教学大纲及教学日历 SYLLABUS

#### 15. 教学目标 Course Objectives

实验室安全与个人防护内容包括实验室通识安全、生物安全、化学品安全、安全设施设备、实验室规范和个人防护、实验室废弃物处理和应急处理等，旨在帮助本科生科学理解实验室安全。

The course will introduce students to laboratory safety, including safety rules and policies, general safety, fire safety, safety equipment, chemical safety, biological safety, waste disposal, emergency planning and incident response, professional laboratory behaviour and personal protection. This course will improve undergraduate students' scientific understanding of laboratory safety.

#### 16. 预达学习成果 Learning Outcomes

本课程完成后，学生将能够：

- (1) 加深对实验室安全与个人防护的理解
- (2) 增强安全意识

With the completion of this course, the students will

- (1) gain deep understanding of laboratory safety and personal protection
- (2) have a strong safety awareness

#### 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.)**

#### 第一次课. 实验室通识安全 4h

学习实验室安全的重要性、政策和管理规定、常见隐患，消防安全、进入实验室基本行为规范和常规防护，常见消防安全防护用品的使用。

实验部分：

1. 实验室基本行为规范培训；
2. 常见消防安全防护用品的使用；
3. 消防演习。

#### No.1 Laboratory general safety 4h

This lecture will introduce students to the importance of laboratory safety, fire safety, general safety rules and policies, safe lab habits, personal protective equipments and et al. Students will learn how to use some personal protective equipments. Students will be asked to participate in fire drill/fire emergency evacuation drill.

Laboratory activities:

1. Personal hygiene and proper conduct/behavior in lab
2. How to use personal protective equipments
3. Fire drill

#### 第二次课 化学品安全 4h

学习化学品，特别是危险化学品的分类、标签和标识、储存、废弃物处理和防护；学校危险品管理制度等；实操处理酸碱类试剂、通风橱的使用。

实验部分：

1. 危险化学品的分类、储存、废弃物处理和防护；
2. 通风橱的使用；
3. 正确处理危险试剂如酸碱。

#### No.2 Chemical safety 4h

This lecture will focus on chemical hazard, classification and storage of chemicals, labels, chemical waste disposal, dangerous chemicals management in SUSTech, and et al. Students will learn how to use fume hood and avoid unnecessary exposure to chemicals while handling dangerous chemicals, e.g. strong acids and bases.

Laboratory activities:

1. Classification and storage of chemicals
2. Chemical waste disposal
3. Fume hood operation
4. Safe handling of chemicals (i.e., acids, bases)

#### 第三次课 生物安全 4h

了解生物危害，学习病原微生物分类、生物实验室安全等级分类、无菌技术、虚拟仿真练习 BSL-2 和 BSL-3 级实验室防护和操作规范等。

实验部分：

1. 无菌技术和生物安全柜的使用;
2. 虚拟 BSL-2 级实验室防护和操作规范;
3. 虚拟 BSL-3 级实验室防护和操作规范, 以及危险病毒样品意外泄露的处理模拟;
4. 虚拟 ABSL-3 级实验室漫游。

### No.3 Biological safety 4h

This lecture will introduce students to biological hazard, the classification of bacterial (viral) strains and specimens governed by the Catalogue of Pathogenic Microorganisms in China, Biosafety Levels, biological waste disposal, professional laboratory behavior and personal protection in BSL-2 and BSL-3 labs. Students will learn how to handle infectious substances in BSL-2, BSL-3 labs through virtual simulation experiment and aseptic technology.

Laboratory activities:

1. Aseptic technique and biological safety cabinet operation
2. Professional laboratory behavior and personal protection in BSL-2 & BSL-3 labs (virtual simulation experiments)
3. Visit ABSL-3 Laboratory (virtual simulation experiment)

### 第四次课 设施设备的使用 4h

了解设施设备的使用规范。学习常用安全相关设施设备（涉及高温、高压等）的操作，如常规酒精灯、电炉、烘箱、离心机、气体钢瓶、液氮、全自动高压灭菌锅的使用等。

实验部分：学习这些设施设备的操作使用。

### No. 4 Proper use of equipment 4h

This lecture will introduce students to general safety rule of equipment, especially heating machine and pressure equipment. Students will learn to properly use alcohol burner, electric stove, forced convection oven/drying oven, gas cylinders, liquid nitrogen, autoclaves and centrifuge.

Laboratory activities: how to operate these equipments.

### 第五次课 辐射安全 4h

了解辐射安全，侧重实验室常见的放射性同位素，学习放射性同位素的保存和处理等。

实验部分：虚拟仿真实验模拟同位素样品操作。

### No.5 Radiation safety 4h

This lecture will focus on radiation from radionuclides most commonly used in lab. The content includes storage and transportation of radioactive materials, disposal of radioactive waste materials, proper precautions while handling radioactive materials and accidental spills (including contamination of working areas and pipettes with radioactive materials).

Laboratory activities: how to handle radioactive materials (simulation experiments).

第六次课 实验室应急处理和急救 4h

学习常见实验室应急处理如气体中毒、触电、扎伤、烫伤、火灾等，以及急救知识。

实验部分：

1. 虚拟仿真+情景模拟实验室应急处理；
2. 邀请培训机构或医生过来做急救培训（如基础急救和心肺复苏等）。

No.6 Emergency and accidents 4h

Students will learn what to do with lab accidents or emergency, including exposures to hazardous chemicals (e.g. chemical spill, gas poisoning), contamination by pathogenic microorganisms, fire-related emergencies, scalding and burning, electric shock and et al. Students will participate in First Aid training.

Laboratory activities:

1. Laboratory emergencies (simulation experiments)
2. First Aid training

第七次课 参观安全体验馆 4h

No. 7 Visit Security Education Experience Platform in Shenzhen. 4h

第八次课 总结和考试 4h

No. 8 Review & Examination 4h

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

1. 实验室生物安全，余新炳，高等教育出版社
2. Laboratory Safety Manual, University of California, Davis.
3. Guidelines for safe laboratory practices, Yale University

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		10		
小测验 Quiz		20		
课程项目 Projects				
平时作业 Assignments				

期中考试 Mid-Term Test				
期末考试 Final Exam		70		
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.

