

## 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>   | 医学微生物实验 Medical Microbiology Laboratory  |
| 2.  | <b>授课院系<br/>Originating Department</b>   | 医学院 School of Medicine   |
| 3.  | <b>课程编号<br/>Course Code</b>  | MED216   |
| 4.  | <b>课程学分 Credit Value</b>   | 1  |
| 5.  | <b>课程类别<br/>Course Type</b>  | 专业基础课/ Major Foundational Courses  |
| 6.  | <b>授课学期<br/>Semester</b>   | 春季/ Spring   |
| 7.  | <b>授课语言<br/>Teaching Language</b>  | 中英文 Chinese/English  |
| 8.  | <b>授课教师、所属学系、联系方式<br/>Instructor(s), Affiliation &amp; Contact</b><br>(For team teaching, please list all instructors) | 王博、医学院、wangb7@sustech.edu.cn<br>Wang Bo, School of Medicine, wangb7@sustech.edu.cn |
| 9.  | <b>实验员/助教、所属学系、联系方式<br/>Tutor/TA(s), Contact</b>   |  |
| 10. | <b>选课人数限额(可不填)<br/>Maximum Enrolment<br/>(Optional)</b>  |  |

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

### 教学大纲及教学日历 SYLLABUS

#### 15. 教学目标 Course Objectives

医学微生物学是一门实践和应用性很强的学科，而微生物学实验是微生物学课程中重要的教学环节。本课程以动手实验为主，讲授为辅，通过实验课教学巩固和补充课堂上讲授的理论知识，使学生掌握基本的实验操作技术和科学实验的概念，比如学习显微镜的使用，无菌操作技术和纯培养等。微生物实验课是非常有价值的课程，它会让学生近距离的学习和研究微生物。而且，给学生提供机会去学习特殊的实验技巧，鉴别微生物的物种。并且学生可以掌握对观察实验现象，统计实验数据和分析实验数据的能力。并将所学的微生物理论知识有机的结合起来，为微生物的实际应用打下坚实基础。

Microbiology is a highly practical and applied disciplines, and microbiology laboratory is an important teaching curriculum. This course gives students a chance to learn the special techniques and is supplemented with lectures. It will help students to understand and add some knowledge of the theory course. The goal is to teach students basic techniques and concepts: the use of the microscope and the aseptic and pure culture techniques. A microbiology laboratory is valuable because it actually gives students a chance to see and study microorganisms firsthand. In addition, it provides you with the opportunity to learn the special techniques used to study and identify these organisms. The ability to make observations, record data, and analyze results is useful throughout life. These exercises are also designed to help students understand basic biological concepts that are the foundation for applications in all life science fields.

#### 16. 预达学习成果 Learning Outcomes

该实验课让学生掌握微生物学中常用新的实验技能，受到观察某些微生物学现象的训练，同时培养学生从事科学研究工作的良好作风和工作习惯，逐步培养学生将学到的微生物规律和知识应用到各个领域。微生物实验课为学生打开了微生物的大门，希望学生能够掌握这门知识，并启发学生对这个领域的探索热情。

The course is chosen to give students an opportunity to learn new techniques and to expose them to a variety of experiences and observations. At the same time, it can train the students a good style and work habits in scientific research work. The principles and techniques demonstrated in microbiology laboratory can be applied to many fields. This course is an introduction to the microbial world, and we hope students will find it useful and interesting.

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. 微生物学实验简介及实验室安全教育（2学时）

Introduction to microbiology laboratory and lab safety education

微生物实验课程介绍，了解课程内容和考核方式。了解微生物实验室规章制度，掌握微生物实验操作安全及个人安全防护。熟悉课程常用仪器使用方法。

Introduce the microbiology laboratory course requirement. Read microbiology laboratory safety, master the safety of microbiological laboratory operation and personal safety protection. Be familiar with the use of instruments commonly used in the course.

2. 微生物学基本实验技术-1：显微镜（2学时）

Basic laboratory technology-1: Microscope

了解和掌握显微镜的使用方法，了解典型细菌的形态观察方法。

Learn the structure of microscope and how to use it correctly. Learn the shapes and arrangements of some common types of bacteria.

3. 微生物学基本实验技术-2：无菌技术和微生物培养（2学时）

Basic Laboratory technology-2: Aseptic technique & Cultivation of microorganisms

掌握无菌操作原则，了解培养基的选择与制备和保存。

Learn the aseptic operation. Explain the function of enriched, selective, highly selective, differential, and multitest media. Try to make common culture broth and plates.

4. 微生物鉴定的原理及方法-1：革兰氏染色（2学时）

Principle and methodology of microorganism characterization-1: Gram Stain

掌握涂片标本的制备及革兰氏染色的方法。

Learn the preparation of smear specimens and Gram Stain methods.

5. 微生物鉴定的原理及方法-2：微生物的代谢特征（4学时）

Principle and methodology of microorganism characterization-2: Metabolism-based identification

了解不同微生物代谢特性在微生物鉴定中的应用，开展 IMViC 实验及学生分组选题的开放性实验。

Learn the application of metabolic characteristics of different microorganisms in microbial identification, and carry out IMViC test and open experiments.

6. 微生物学基本实验技术-3：微生物计数（2学时）

Basic laboratory technology-3: Enumeration of microbes

掌握细菌生长曲线特征及相应影响因素。掌握常见的几种微生物计数的方法。

Learn the characteristics of the bacterial growth curve and corresponding influencing factors. Learn the diverse methods used to determine the number of cells in a bacterial culture.

7. 厌氧微生物的培养与发酵 (2 学时)

Anaerobic bacteria culture and Fermentation

了解厌氧微生物的生长特征, 观察厌氧微生物发酵情况和培养特殊性。

Understand the characteristics of anaerobic bacteria growth and observe the growth and fermentation of anaerobic bacteria.

8. 微生物的生长抑制 (6 学时)

Growth and inhibition of microorganisms

学习微生物生长抑制的方法, 了解物理、化学和抗生素杀菌法的测定。

Learn about the growth inhibition of microorganisms and understand how to determine the inhibition of physical-chemical factors and antibiotic sensitivity.

9. 内毒素的测量 (2 学时)

Determination of endotoxin

学习内毒素的测定原理, 掌握用 ELISA 方法测定内毒素的技术。

Learn about the mechanism of endotoxin and try to master the technique to perform ELISA to determine the endotoxin.

10. 流感病毒的鉴定 (2 学时)

Detection of influenza A by real-time PCR

学习掌握 qPCR 的原理和技术, 学会用 qPCR 方法测定流感病毒。

Learn the mechanism and technique of qPCR, master the technique of using qPCR to detect influenza A.

11. 病原微生物 (4 学时)

Pathogenic microbes: TB & virus virtual lab

掌握结核菌和病毒培养的要害。

Master the critical point of culturing TB and virus.

| Section | Topic  | Hours |
|---------|--|-------|
| 1       | 微生物学实验简介及实验室安全教育/ Introduction to microbiology laboratory and lab safety education   | 2     |
| 2       | 微生物学基本实验技术-1: 显微镜/ Basic laboratory technology-1: Microscope   | 2     |
| 3       | 微生物学基本实验技术-2: 无菌技术和微生物培养/ Basic laboratory technology-2: Aseptic technique & Cultivation of microorganisms                               | 2     |
| 4       | 微生物鉴定的原理及方法-1: 革兰氏染色/ Principle and methodology of microorganism characterization-1: Gram Stain  | 2     |
| 5       | 微生物鉴定的原理及方法-2: 微生物的代谢特征 (IMViC) / Principle and methodology of microorganism characterization-2: Metabolism-based identification (IMViC) | 2     |

|    |   |   |
|----|---|---|
| 6  | 微生物鉴定的原理及方法-2: 微生物的代谢特征 (开放性实验) / Principle and methodology of microorganism characterization-2: Metabolism-based identification (open experiments) | 2 |
| 7  | 微生物学基本实验技术-3: 微生物计数/ Basic laboratory technology-3: Enumeration of microbes   | 2 |
| 8  | 厌氧微生物的培养与发酵/ Anaerobic bacteria culture and Fermentation  | 2 |
| 9  | 微生物的生长抑制-1: 物理因素/ Growth and inhibition of microorganisms-1: Physical factors   | 2 |
| 10 | 微生物的生长抑制-2: 化学因素/ Growth and inhibition of microorganisms-2: Chemical factors   | 2 |
| 11 | 微生物的生长抑制-3: 药敏实验/ Growth and inhibition of microorganisms-3: Antibiotic sensitivity test  | 2 |
| 12 | 内毒素的测量/ Determination of endotoxin  | 2 |
| 13 | 流感病毒的鉴定/ Detection of influenza A by real-time PCR  | 2 |
| 14 | 病原微生物-1: 结合菌实验/ Pathogenic microbes-1: TB   | 2 |
| 15 | 病原微生物-2: 病毒实验/ Pathogenic microbes-2: Virus virtual lab   | 2 |
| 16 | 期末汇报/ Final presentation  | 2 |

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

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| 教材:<br>1. Microbiology: A Laboratory Manual, twelfth edition, By James Cappuccino, Chad Welsh, Pearson |
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课程评估 ASSESSMENT

| 19. 评估形式<br>Type of Assessment | 评估时间<br>Time | 占考试总成绩百分比<br>% of final score | 违纪处罚<br>Penalty | 备注<br>Notes |
|--------------------------------|--------------|-------------------------------|-----------------|-------------|
| 出勤 Attendance                  |              | 10                            |                 |             |
| 课堂表现<br>Class Performance      |              | 10                            |                 |             |
| 小测验<br>Quiz                    |              |                               |                 |             |
| 课程项目 Projects                  |              |                               |                 |             |
| 平时作业<br>Assignments            |              | 50                            |                 |             |

|   |  |    |  |  |
|---|--|----|--|--|
| 期中考试<br>Mid-Term Test   |  |    |  |  |
| 期末考试<br>Final Exam  |  |    |  |  |
| 期末报告<br>Final Presentation  |  | 30 |  |  |
| 其它（可根据需要<br>改写以上评估方<br>式）<br>Others (The<br>above may be<br>modified as<br>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

本课程已经医学院教学副主任张文勇教授审核通过。

