

## 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 <b>Course Title</b>	海洋微生物学实验 <b>Marine Microbiology Laboratory</b>				
2.	授课院系 <b>Originating Department</b>	海洋科学与工程系 Department of Ocean Science and Engineering				
3.	课程编号 <b>Course Code</b>	OCE316				
4.	课程学分 <b>Credit Value</b>	2				
5.	课程类别 <b>Course Type</b>	专业选修课 Major Elective Courses				
6.	授课学期 <b>Semester</b>	春季 Spring				
7.	授课语言 <b>Teaching Language</b>	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) <b>Instructor(s), Affiliation &amp; Contact</b> (For team teaching, please list all instructors)	张传伦, 海洋科学与工程系, 创园9栋602, zhangcl@sustech.edu.cn Zhang Chuanlun, Department of Ocean Science and Engineering, Chuangyuan 9-602 Tel. 18817202206				
9.	实验员/助教、所属学系、联系方式 <b>Tutor/TA(s), Contact</b>	郭静, 海洋科学与工程系, 创园9栋602, guoj@mail.sustech.edu.cn Guo Jing, Department of Ocean Science and Engineering, Chuangyuan 9-602 Tel. 18126401114				
10.	选课人数限额(可不填) <b>Maximum Enrolment (Optional)</b>					
11.	授课方式 <b>Delivery Method</b>	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>	0		64		64

12. 先修课程、其它学习要求 <b>Pre-requisites or Other Academic Requirements</b>	OCE308 微生物海洋学 Microbial Oceanography
13. 后续课程、其它学习规划 <b>Courses for which this course is a pre-requisite</b>	
14. 其它要求修读本课程的学系 <b>Cross-listing Dept.</b>	

教学大纲及教学日历 SYLLABUS

15. 教学目标 **Course Objectives**

本课程教学目标：掌握海洋微生物常见种类及分离、培养、保藏的方法，生长曲线的测定；掌握微生物计数统计方法；掌握海洋微生物染色技术和应用方法，海洋微生物 DNA 提取、PCR 扩增和电泳分析，以及海水和沉积物样品采集。

Course objectives: To command the common types of marine microorganisms, the methods for isolation, culture and preservation, determination of growth curves of marine microorganisms; to understand the counting methods of marine microbial cells., staining techniques of marine microbial, DNA extraction, PCR and agarose gel electrophoresis of marine microbial cells, the collection method of seawater and sediment.

16. 预达学习成果 **Learning Outcomes**

1 掌握海洋微生物的分类特征，能正确地描述其形态学特征和结构特征。

Classification characteristics of marine microorganisms, and correct descriptions of their morphological and structural characteristics.

2 掌握显微镜操作方法和技术，包括镜检、描述和生物绘图等技术。

Techniques of microscopy, including microscopy, descriptions and biological mapping of marine microorganisms.

3 掌握微生物计数统计方法。

The counting methods of marine microbial cells.

4.掌握微生物染色技术与应用方法。

Staining techniques of marine microbial cells.

5.掌握微生物培养基配制方法、培养方法以及生长曲线测定方法。

Medium preparation method, culture method and growth curve determination method of microbial cells.

6.掌握微生物 DNA 提取、PCR 扩增和电泳分析。

Method of DNA extraction, PCR and agarose gel electrophoresis from microbial cells.

7.掌握海水和沉积物样品的采集与分析。

Method of seawater and sediment collection, and how to analyse these samples.

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. 海洋细菌染色和形态观察 Staining and Micrographs of marine bacteria (4 学时) (4 hours)

通过革兰氏染色方法在显微镜下认识观察深圳海域常见海洋细菌，熟悉掌握细胞染色原理和微生物形态学特征。Under the microscope, Gram staining method is used to observe the marine bacteria in Shenzhen Bay, grasping the principle of cell staining and be familiar with the morphological characteristics.

2. 青霉菌标本片的制备与观察 Preparation and observation of Penicillium sp. specimen (4 学时) (4 hours)

学习青霉菌染色标本制作法及观察霉菌的形态。Method of making Penicillium sp. staining specimens and observe the morphology of Penicillium sp.

3. 微生物细胞大小测定 Determination of microbial cell size (4 学时) (4 hours)

了解目镜测微尺和镜台测微尺的构造及使用原理，掌握测定微生物细胞大小的方法。Under the microscope, Stage Graticules and Eyepiece micrometer were used to measure the microbial cell size.

4. 培养基的制备及灭菌 Preparation and sterilization of culture medium (4 学时) (4 hours)

介绍培养基的基本组分，掌握培养基配置的方法步骤，并进行灭菌处理。Introducing the basic components of the culture medium, preparing and sterilizing the culture medium for cultivating marine bacteria.

5. 海洋微生物的分离与培养 Isolation and enrichment of marine bacteria (4 学时) (4 hours)

介绍微生物分离技术，并对海洋样品中的微生物进行分离与培养。The method of bacterial isolation is introduced, isolation and enrichment of marine bacteria.

6. 稀释平板计数法 Dilution plate counting method (4 学时) (4 hours)

准备平板培养基，学习并掌握稀释平板计数的基本原理和方法。Preparation plate medium and counting the number of bacteria cells through dilution plate counting method

7. 微生物细胞的显微镜直接计数法，即血球计数法 Hemocytometer Counting (4 学时) (4 hours)

了解血球计数板的构造、计数原理和计数方法，用显微镜直接测定微生物总细胞数。The structure and method for the hemocytometer counting chamber. Place the chamber on the microscope stage to count the cells number directly.

8. 光电比浊计数法 Photoelectric Turbidity Counting method (4 学时) (4 hours)

了解光电比浊计数法的原理，学习和掌握分光光度计的操作方法。The principle of photoelectric turbidity counting method, the operation method of Spectrophotometer.

9. 大肠杆菌生长曲线测定 The growth curve of E.coli (4 学时) (4 hours)

通过对大肠杆菌的液体培养，观察并测定大肠杆菌的生长特性，记录大肠杆菌的生长情况，绘制生长曲线。Through the liquid culture of E.coli, observing and measuring the growth characteristics of E.coli., recording the growth of E.coli, and drawing a growth curve.

10. 菌种保藏 Preservation of bacterial cells (4 学时) (4 hours)

学习和掌握菌种保藏的基本原理，比较几种不同的保藏方法。Basic principles of strain preservation and comparison of several different preservation methods.

11. 淀粉水解实验 Starch Hydrolysis Experiment (4 学时) (4 hours)

检测细菌能否产生淀粉酶和利用淀粉的能力，熟练微生物接种。To detect whether bacteria can produce amylase and the ability to use starch, the skills of microbial inoculation.

12.细菌总 DNA 提取 DNA extraction from marine bacteria (4 学时) (4 hours)

了解 DNA 的提取原理，掌握如何提取微生物 DNA 和保存 DNA 样品。Introduction of the method of DNA extraction, and be familiar with how to extract DNA and preserve DNA sample.

13.PCR 扩增 Polymerase chain reaction (4 学时) (4 hours)

PCR 的定义、原理和应用 Definition of PCR, the basic principle of PCR and application of PCR.

14.琼脂糖凝胶电泳分析技术 Agarose gel electrophoresis (4 学时) (4 hours)

掌握琼脂糖凝胶电泳的基本原理和操作技术。To master the basic principle and operating methods of agarose gel electrophoresis.

15.海水样品采集及海水细菌总数的测定 Collection of seawater sample and determination of the total number bacteria from seawater (4 学时) (4 hours)

学习水样的采集方法和水样细菌总数的测定方法。The method to collect seawater samples and how to measure the total number of bacteria in water samples.

16.沉积物样品采集及沉积物细菌总数的测定 Collection of sediment sample and determination of the total number bacteria from sediment (4 学时) (4 hours)

学习沉积物的采集方法和沉积物细菌总数的测定方法。The method to collect sediment samples and how to measure the total number of bacteria in sediment samples.

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

王祥红，微生物与海洋微生物实验，中国海洋大学出版社，2011

高冬梅，洪波，环境微生物实验，中国海洋大学出版社，2014

Michael T. Madigan, John M. Martinko, Jack Parker, Brock's Biology of Microorganism 14TH, 2014

Colin B. Munn, Marine Microbiology: Ecology & Applications (2nd. ed) ,2011

Lansing M. Prescott , Donald Klein, John Harley, Microbiology (6th. ed) ,2002

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		20		
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		30		

期中考试 <b>Mid-Term Test</b>	20		
期末考试 <b>Final Exam</b>	20		
期末报告 <b>Final Presentation</b>			
其它（可根据需要 改写以上评估方 式） <b>Others (The above may be modified as necessary)</b>			

20. 记分方式 **GRADING SYSTEM**

<input checked="" type="checkbox"/> A. 十三级等级制 <b>Letter Grading</b> <input type="checkbox"/> B. 二级记分制（通过/不通过） <b>Pass/Fail Grading</b>
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**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**

海洋科学与工程系本科教学委员会 Department of Ocean Science and Engineering Undergraduate Committee
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