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	**微生物海洋学 Microbial Oceanography**
2.	授课院系 Originating Department	海洋科学与工程系 Department of Ocean Science and Engineering
3.	课程编号 Course Code	OCE308
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业核心课 Major Core Courses
6.	授课学期 Semester	春季 Spring
7.	授课语言 Teaching Language	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）	张传伦 海洋科学与工程系 创园 9 栋 603 0755-88018785 Prof. Chuanlun Zhang Department of Ocean Sciences and Engineering Chuang Yuan 9-603 0755-88018785
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	范陆 前沿与交叉技术科学研究院 创园 9 栋 605 Dr. Lu Fan Academy for Advanced Interdisciplinary Studies - Ocean-X Chuang Yuan 9-605
10.	选课人数限额(可不填) Maximum Enrolment（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	48	0	0	0	48

12.	先修课程、其它学习要求 **Pre-requisites or Other Academic Requirements**	OCE302 海洋生态系统导论 Introduction to Marine Ecosystem
13.	后续课程、其它学习规划 **Courses for which this course is a pre-requisite**	OCE316 海洋微生物学实验 Marine Microbiology Laboratory OCE471 海洋实习 Marine Cruises
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

OCE308 是针对本科生学习微生物海洋学的基础课程，学生将全面了解微生物与海洋生态系统中物理、化学和生物过程的复杂联系和相互作用关系，以及微生物在人类海洋生活生产中的作用。课程将同时介绍关于几个最著名的海洋生态系统的最新研究成果。

OCE308 is an introduction to microbial oceanography for undergraduate students. The Week will provide you with a comprehensive overview of how the microbiology being in complex correlation and interaction with physical, chemical and biological processes in marine ecosystems, and how microorganisms function in human activities in ocean especially the marine economy. Most recent progress in some most significant marine ecosystems will be introduced.

16. 预达学习成果 Learning Outcomes

能力方面：具有自主学习的能力和终身学习的意识；具有获取有关专业信息的能力，掌握中外文资料查询、文献检索及运用现代信息技术获取和表达信息的基本方法；具有不断学习和适应社会发展的能力。

知识方面：系统掌握微生物海洋学基本理论、基本知识和基本技能，了解海洋科学的知识体系和发展趋势；了解微生物海洋学的前沿发展现状和趋势。掌握一门外国语及基本的信息技术；具备一定的人文和社会科学知识。

The students will gain the ability of self-motivated study for their life-time; They are able to obtain the international scientific references, papers using modern information technology, and have the potential of continuous study and adaptation to the development of the society.

They master basic theories and skills of microbial oceanography, understand the knowledge, frontiers and development trends in microbial oceanography in different marine ecosystems. They master a foreign language, basic information and technology, and obtain certain background in humanities and social sciences.

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、微生物与海洋生态系统概述 General introduction of microorganisms and marine ecosystems. （3 学时）(3 hours)

• 微生物与海洋生态系统最显著的若干关系列举 Significant cases of close relationship between microorganisms and marine ecosystems

二、当代微生物学基本概念和研究技术方法介绍 Basic knowledge of modern microbiological science and technology. （6 学时）(6 hours)

• 微生物学简史、微生物细胞学、微生物遗传学、基因组学、微生物进化、微生物生态学 A brief history of microbiology, microbial cytology, microbial genetics, microbial genomics, microbial evolution, microbial ecology

• 微生物形态观察、微生物捕获和分离、微生物鉴定、微生物进化分析、微生物遗传序列分析、微生物多组学分析、微生物群落分析、海洋微生物分析方法列举 Microbial morphology, microbial cell capture/isolation, identification, phylogeny, genetic sequence analysis, omics, microbial community analysis, case study of analyzing marine microorganisms

三、海洋微生物类群 Taxonomic groups of marine microorganisms（6 学时）(6 hours)

• 分类系统介绍、水平基因转移与功能分类、海洋真核微生物、海洋病毒、病毒与细菌的协同进化 Taxonomic system, genetic element transfer & functional microbial groups, marine eukaryotes, marine viruses/phages, coevolution between bacteria and phages

• 与碳氮硫相关的微生物种群、其他特征性功能的海洋微生物种群 microbial groups corresponding to carbon/nitrogen/sulfur in the ocean, microbial groups corresponding to other specific functions

四、微生物与海洋物理过程 Microorganisms and marine physical processes（6 学时）(6 hours)

• 海洋物理因素对微生物分布的影响 Impact of marine physical factors on microbial distribution

• 微生物对海水温度和全球气候的影响、微生物在河口沉积中的作用、微生物在形成珊瑚礁中的作用 Impact of microorganisms on sea water temperature and global climate, on estuarine/coastline sedimentation, on coral reef formation

期中考试 Mid-term exam（2 学时）(2 hours)

五、微生物与海洋化学过程 Microorganisms and marine chemical processes（6 学时）(6 hours)

• 海洋化学因素对微生物分布的影响 Impact of marine chemical factors on microbial distribution

• 微生物对海洋元素和化合物分布的影响 Impact of microorganisms on element and compound distribution in the ocean

六、微生物在海洋生物群落中的作用 Microorganisms in marine biological communities（6 学时）(6 hours)

• 微生物驱动的海洋食物网 Marine food nets driven by microorganisms

• 微生物群落、微生物和其他大型海洋生物的共生系统 Microbial community, symbiosis between microorganisms and other marine macroorganisms

七、微生物与海洋生物地质化学演化 Microorganisms and marine biogeochemical evolution（6 学时）(6 hours)

• 当代不同地质条件下（包括极端条件下）微生物的分布 Current microbial distribution in different geological conditions including in extreme environment

• 不同地质时期微生物发挥的作用（生命的起源、海洋的氧化）Microbial roles in geological history of Earth (the origin of life, oxidation of the ocean)

八、海洋微生物与人类活动 Marine microorganisms and human activities（3 学时）(3 hours)

• 微生物在海洋经济生产中的作用（渔业、航运、油气开采）、人类活动对海洋微生物分布和进化的影响 Role of microorganisms in marine economy (fishery, shipping, oil and gas exploitation), impact of human activities on marine microbial distribution and evolution

期末展示 Final presentation（4 学时）(4 hours)

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

1. Biological Oceanography 2nd Edition, by Charles B. Miller and Patricia A. Wheeler. Publisher: Wiley-Blackwell; 2 edition (May 21, 2012). ISBN-10: 144433302X. ISBN-13: 978-1444333022

2. Biological Oceanography Research Trends, Editors: Léa P. Mertens. 2008. ISBN: 1-60021-935-7

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		0		
课堂表现 Class Performance		0		
小测验 Quiz		0		
课程项目 Projects		0		
平时作业 Assignments		30		
期中考试 Mid-Term Test		25		
期末考试 Final Exam		30		
期末报告 Final Presentation		15		
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

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