

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	海洋科学概论 Principles of 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	OCE100
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业基础课 Major Foundational Courses
6.	授课学期 Semester	春秋季 Spring & Fall
7.	授课语言 Teaching Language	中文与英文 Chinese & English
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)	林间 海洋科学与工程系，创园 9 栋 511 徐景平 海洋科学与工程系，创园 9 栋 503 张传伦 海洋科学与工程系，创园 9 栋 603 Prof. Jian LIN, Department of Ocean Sciences and Engineering, Innovation Park, 9-511 Prof. Jingping XU, Department of Ocean Sciences and Engineering, Innovation Park, 9-503 Prof. Chuanlun ZHANG, Department of Ocean Sciences and Engineering, Innovation Park, 9-603
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	TA1 罗怡鸣（海洋地球物理与构造学助教）海洋科学与工程系 创园 9 栋 511 TA2 齐富康（地质海洋学与物理海洋学助教）海洋科学与工程系 创园 9 栋 503 TA3 郭静（海洋生物与微生物海洋学助教）海洋科学与工程系 创园 9 栋 603 TA1 Yiming LUO (Teaching Assistant for marine geology and geophysics), Department of Ocean Sciences and Engineering, Innovation Park 9-511 TA2 Fukang QI (Teaching Assistant for geological and physical oceanography), Department of Ocean Sciences and Engineering, Innovation Park, 9-503 TA3 Jing GUO (Teaching Assistant for marine organisms and microbial oceanography), Department of Ocean Sciences and Engineering, Innovation Park, 9-603

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		48
12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements					
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	OCE305 物理海洋学 Physical Oceanography; OCE317 海洋环流数值模拟 Numerical Simulation of Ocean Circulation OCE401 海洋地球物理学 Marine Geophysics; OCE470 地质实习 Geology Field Trip OCE471 海上实习 Marine Cruises				
Ma	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

本课程由国际知名的海洋科学家讲授，采用先进的启发型教学方法，系统概述全球海洋中最重要的过程，包括物理、化学、地质/地球物理、生物/微生物过程等；揭示海洋在地球系统演化中的重要作用，地球与海洋灾害（包括地震海啸、风暴潮、海岸带侵蚀与海洋污染等），海洋与大气圈-岩石圈-生物圈相互作用等。本课程将面向全校具有不同专业背景的学生，强调海洋学的基本概念、重大思想的发现过程，并结合授课教授丰富的国际前沿研究实例，旨在让学生认识海洋、了解海洋对人类生活与地球系统的重要性、激发学生对海洋科学的兴趣。

Taught by internationally renowned marine scientists, this course employs the advanced inquiry-based teaching approach. The course will focus on the fundamental physical, chemical, geological/geophysical, and biological/microbiological ocean processes; elucidate the important roles of the ocean in Earth system evolution, and explore the ocean hazard including earthquake, tsunami, storm surge, coastal erosion, and marine pollution; interactions between the ocean and atmosphere-lithosphere-biosphere. This course is designed for students from a broad discipline background. The primary emphasis of this course is on the basic concepts in oceanography, history of discovery of key concepts, and examples of cutting-edge research conducted by the professors and their research teams. This course aims to help students to develop a deep understanding of the important roles of oceans in humanity and Earth system, and inspire student's interest in ocean sciences.

16. 预达学习成果 Learning Outcomes

- (1) 学生将认识海洋科学的最基本概念、重大思想的发现过程以及全球海洋中最重要的物理、化学、地质/地球物理、生物/微生物过程等；
- (2) 学生将认知海洋对生命起源、地球系统演化与人类生活的重要性，包括海洋与大气圈-岩石圈-生物圈相互作用、地球与海洋灾害等；
- (3) 激发学生对海洋科学的兴趣。

(1) Students will acquire the basic concepts in oceanography, history of discovery of key concepts, and the fundamental physical, chemical, geological/geophysical, and biological/microbiological ocean processes;

(2) Students will develop a deep understanding of the important roles of the ocean in origin of life, Earth system evolution, and humanity, including interactions between the ocean and atmosphere-lithosphere-biosphere, and Earth and ocean hazards;

(3) This course will inspire students' interest in ocean 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、海洋与地球（授课老师：林间），16 学时

1. 海洋之初：太阳系、地球与海洋的形成（2 学时）

The oceans: Formation of the solar system, Earth, and oceans (2 units)

2. 地球系统：大气圈、水圈、岩石圈和生物圈（2 学时）

Earth system: Atmosphere, hydrosphere, lithosphere, and biosphere (2 units)

3. 洋陆演化：板块合久必分，分久必合（2 学时）

Oceans and continents: Divergence and convergence of plates (2 units)

4. 大洋与海：广阔的洋、长不大的海（2 学时）

Oceans and seas: Open oceans, marginal seas (2 units)

5. 海洋板块：从洋中脊到俯冲带的地球物质与水循环（4 学时）

Oceanic plate recycling: From ocean ridges to subduction zones (4 units)

6. 海底世界：透视海水下的地球（2 学时）

Exploring the ocean floor: The world under oceans (2 units)

7. 未来海洋：大海洋时代（2 学时）

Future oceans: A new era of ocean science and transformative ocean technology (2 units)

二、海洋与气候（授课老师：徐景平），16 学时

1. 物质循环与沉积物源-汇过程：万物都有始终吗？（2 学时）

Earth material cycle-sediment source to sink: The end of beginning (2 units)

2. 海浪：无风也起浪（2 学时）

Waves: No winds, no problems (2 units)

3. 潮汐：星球的旋律（2 学时）

Tides: The melody of planets (2 units)

4. 大洋环流：维持地球宜居气候的动脉（2学时）

Ocean circulation: The artery that makes Earth habitable (2 units)

5. 海-气相互作用：台风与台湾（2学时）

Air-sea interaction: Why do many typhoons land on Taiwan (2 units)

6. 海平面与全球变化：格陵兰的冰与深圳湾的海景房（2学时）

Sea level and global change: Greenland ice and Shenzhen's ocean resorts (2 units)

7. 海洋近岸作用：台风前后的大梅沙（2学时）

Coastal beaches and shoreline processes: Shenzhen beaches after typhoons (2 units)

8. 中国海岸线：绿水青山与蓝色港湾（2学时）

The coastline of China: Green hills, clean waters, and blue harbors (2 units)

三、海洋生命（授课老师：张传伦），16 学时

1. 海洋生物：海洋，生命的摇篮（2学时）

Marine biology: Ocean as the cradle of life (2 units)

2. 海水成分：海水是咸的-见证地球的沧海桑田（2学时）

Sea water composition: Salty sea water as the witness of the Earth evolution (2 units)

3. 海洋化学：碳是海水的硬核（2学时）

Marine chemistry: Carbon, the hard core of sea water (2 units)

4. 海洋生命光合作用：万物生长靠太阳，说对了一半（2学时）

Photosynthesis of marine life: Everything grows under the Sun - but only half right (2 units)

5. 海洋生命化能合成：洋中脊黑暗食物链，水与火的恋爱（2学时）

Chemosynthesis of marine life: Dark food chain at deep-ocean hydrothermal vents (2 units)

6. 甲烷：假如海洋打个饱嗝（2学时）

Methane: If the ocean lets out a hiccup (2 units)

7. 古菌：生命的祖先？（2学时）

Archaea: Ancestor of life? (2 units)

8. 深部生物圈：海洋地下沉睡的巨人（2学时）

Deep biosphere: The sleeping giant beneath the seafloor (2 units)

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

1. Essentials of Oceanography (Pearson; 11th edition) by Trujillo and Thurman, 2013.
2. An Introduction to the World's Oceans (McGraw-Hill Education; 10th edition) by Sverdrup and Armbrust, 2008.

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				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		30		
期中考试 Mid-Term Test		20		
期末考试 Final Exam		50		
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

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