

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	海上实习 Marine Cruises				
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	OCE471				
4.	课程学分 Credit Value	2				
5.	课程类别 Course Type	专业选修课 Major Elective Courses				
6.	授课学期 Semester	夏季 Summer				
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)	刘志强 助理教授 海洋科学与工程系 创园 9 栋 609 0755-88018785 Dr. Zhiqiang Liu Department of Ocean Sciences and Engineering Chuangyuan-9-609 0755-88018785				
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	郭静 实验员 海洋科学与工程系 创园 9 栋 603 0755-88018796 Ms. Jing Guo Department of Ocean Sciences and Engineering Chuangyuan-9-603 0755-88018796				
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	20				
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			64		64

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	OCE201 海洋科学导论 Introduction to Oceanography
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	
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

海上实习是海洋科学教学中必不可少的环节，目的在于让学生亲身体验海上生活，学习并掌握基本的海上实验技能，提高学生理论联系实际的能力以及获取和分析资料的能力，为学生以后从事海上工作打下基础。同时激发学生认识海洋、探索海洋、研究海洋的兴趣，从而树立起献身海洋科学事业的积极学习态度。本次实习主要是学习和参观海洋调查仪器，出海学习海洋化学的水样采集及现场测定相关参数；进行物理海洋测流与温盐深等方面的数据现场测定，实践掌握海洋科考的基本技能，学习海洋化学与物理海洋的基本知识；出海进行海洋生物的采样，实践掌握海洋生物调查的基本技能，学习海洋生物学的基本知识；学会样品保存与数据分析等技能。同时，通过克服恶劣海况及海上生活的各种不便造成的困难，培养学生吃苦耐劳和团队合作的意识，锻炼学生发现问题解决问题的能力。

Marine Cruises is an indispensable part of marine science. To let our students experience life at sea, learn and master basic marine experimental skills, improve students' ability to connect with theory and ability, and analyse marine datas. At the same time, it stimulates students' interest in the ocean, thus establishing an active learning attitude dedicated to marine science. This internship is mainly to study marine survey instruments, sample collection and measure parameters on-site; conduct physical field measurement of physical ocean flow, temperature, salt and depth, and master the basic skills of marine scientific research. To learn the basic knowledge of marine chemistry, physical oceans, and marine organisms in the sea, to master the basic skills of marine surveys, sample preservation and data analysis. At the same time, by overcoming the difficulties caused by the inconvenience of the sea and the inconvenience of life at sea, we will cultivate students' awareness of hard work and teamwork, and train students to find problems and solve problems by themselves.

16. 预达学习成果 Learning Outcomes

要完成所有的课程任务，学生必须：

(1) 掌握海上实习相关规定及注意事项，确保上船实习期间的人身安全及仪器安全。

(2) 上船实习期间，克服船上环境及恶劣天气带来的各种困难，互帮互助，积极参与仪器实际操作，认真记录分组训练的实验数据，运用所学理论对数据进行分析整理。

学习要求：

1、最低学习要求：

了解海洋调查规范要求的一般规定，学习和掌握海洋化学、生物、地质、气象、水文等基础观测项目的基本原理、调查方法及仪器使用，学会实验数据的整理并运用相关理论知识进行分析处理，学会撰写海上实习报告。

2、进阶学习指导：

锻炼实际动手操作能力，掌握先进海洋调查仪器的工作原理和操作流程，掌握解决实际环境问题的能力。

(1) Master the relevant regulations and precautions to ensure personal safety and instrument safety during the marine cruise.

(2) Overcome various difficulties brought by the ship's environment and bad weather, help each other, actively participate in the actual operation of the instrument, carefully record the experimental data of the group training, and use the theory to analyze and sort out the data.

Learning requirements:

1. Minimum learning requirements:

Understand the general requirements of marine cruise, learn and master the basic principles, survey methods and instruments used in marine chemistry, biology, geology, meteorology, hydrology, etc. Learn the organization of experimental data and apply relevant theoretical knowledge for analysis. Learn to write a marine cruise report.

2. Advanced learning guide:

Exercise practical ability, master the working principle and operation process of advanced marine survey instruments, and master the ability to solve practical problems.

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.)

海上实习活动组织安排（11天，海上8天7晚）

D1: 上午八点，调查队员和首席科学家组再南方科技大学集合，进行实验室内甲板仪器、实验室仪器操作流程培训。下午，航次安排介绍、调查船生活介绍，天气情况、海况、波浪、台风等过程介绍、海上实习安全预培训。

D2: 上午八点，科学问题介绍，数值模式预报海况结果分析，数据分析方法介绍，调查船协同作业培训；下午，南方科技大学集合，集体前往调查船码头，例会总结，夜宿码头附近宾馆。

D3: 早上七点队员登船、进驻生活仓，全体队员参与仪器设备装船、固定、清单检查，下午介绍船上生活安排，值班分组安排。海上实习期间的注意事项、航线、测点安排，晚上调查船泊码头对开锚地，进行安全培训（需要录制视频）。晚八点结束，例会总结，九点队员休整，首席科学家通宵轮流值班。早7点和晚8点进行人员清点、情况汇报。

D4: 早上七点讲解海洋调查规范及方法，熟悉海洋野外调查仪器。下午实验室设备和甲板设备拆包、安装、固定、调试，全体队员和首席科学家进行甲板作业和实验室作业预演，理顺协同合作机制。全天进行人员安全、设备安全、数据安全检査，相机进行逃生、消防演习。晚六点装船结束，例会总结，队员休整，调查船启航赶往调查海域，首席科学家通宵轮流值班。早7点和晚8点进行人员清点、情况汇报。

D5: 早上七点开始按照排定时间表分组进行水深测量、海流观测、透明度、水色观测、海水温度观测，海面气象观测，实验室数据处理，理顺分组合作工作流程，进行断面观测，约进行一条断面，3-4个站位全参数调查，全天24小时工作，队员编组，分三班，每班分甲板作业组和实验室作业组，轮流值班，首席科学家全天轮流值班。每个站位结束后要进行数据汇交以及质量控制。早7点和晚8点进行人员清点、情况汇报。

D6: 全天，对前一天预处理的样品数据进行分析，数据记录，继续进行24小时分组连续大面调查，甲板培养实验数据持续收集。对照仪器数据和实验室数据进行溶氧、营养盐等相关参数测试；悬浮颗粒物采集与处理，海洋生物样品采集与处理。在已获得的物理海洋测流与温盐深等方面的数据现场基础上进行仪器校准、数据质量控制。甲板作业和实验室作业组协同处理海底沉积物样品，包括表层沉积物采样，箱式采泥器采样与处理。全天进行约一条断面，3-4个站位全参数调查，至晚八点作业结束，例会总结，队员全体休整，首席科学家通宵轮流值班，调查船赶往定点观测站位，下锚。每个站位结束后要进行数据汇交以及质量控制。早7点和晚8点进行人员清点、情况汇报。

D7-D8: 全天，连续站调查：连续站位采样，进行24-36小时昼夜不间断观测。甲板作业组每小时作业，实验室作业组每三小时采集样品，进行上述各物理、化学、生物、地质等海洋观测与现场测定分析，全天24小时工作，队员编组，分三班轮流值班，至D8下午4点作业结束，例会总结，队员全体休整，调查船起锚，向D5所在断面的重点站位航行，首席科学家全天轮流值班。早7点和晚8点进行人员清点、情况汇报。

D9: 早七点开始进行重点站位大面站再观测：在2个站位分别进行样品采集与分析，下午4点结束，例会总结，队员休整，首席科学家全天轮流值班，调查船返航，泊码头对开锚地。早7点和晚8点进行人员清点、情况汇报。

D10: 早七点开始甲板设备拆卸、清洗、打包，实验室样品预处理、分类、保存，实验室设备拆卸，清洗，维护。数据备份、分发、仪器清单检查，调查船靠码头，调查队员离船，集体返回南方科技大学。首席科学家负责仪器离船安排。早7点和离船时分别进行人员清点、情况汇报。

D11: 早 9 点南方科技大学实验室内, 与航次结合的数据处理方法详解, 调查数据初步解读, 调查报告撰写格式、内容等注意事项和科学问题针对性分析。

一周后学生递交实习报告。

Arrangement of Marine Cruises (11 days, 8 days and 7 nights at sea)

D1: At 8:00 am, the investigation team and the chief scientist team will gather at SUSTech for the training of deck instruments and instrument operation procedures. In the afternoon, the teacher will introduce the arrangement of the Marine Cruises, the weather, sea conditions, waves, typhoons and other processes, as well as the pre-training of maritime safety practice.

D2: At 8:00 a.m., the introduction of scientific problems, the analysis of the results of numerical model prediction of sea conditions, the introduction of data analysis methods, and the cooperative operation training of the marine cruises; In the afternoon, we will gather at SUSTech together to survey the ship dock, and live near the dock.

D3: At 7:00 a.m., we will board the ship and enter the living warehouse. We will take part in the loading, fixing and inventory inspection of instruments and equipment. Matters needing attention during the Marine Cruises at sea, arrangement of routes and observation points, investigation of the anchorage opposite to the berth at night, safety training (need to record video). At 8 p.m., the meeting concluded, the team rested at 9 p.m., and the chief scientist was on duty all night. Personnel counting and status report will be conducted at 7 am and 8 PM.

D4: At 7:00 a.m., the teacher will explain the specifications and methods of Marine Cruises. In the afternoon, the laboratory equipment and deck equipment were unpacked, installed, fixed and debugged. All the team members will be carried out the preview of deck operation and laboratory operation to rationalize the cooperative mechanism. Personnel safety, equipment safety, data safety inspection and camera escape will be carried out throughout the day. At 6:00 p.m., We will have a regular meeting summary and team rest. The survey ship will sail to survey the sea, the chief scientist are on duty overnight. Personnel counting and status report will be conducted at 7 am and 8 PM.

D5: At 7:00 a.m., in accordance with the scheduled timetable, the team will be classified in different group. The measurement of water depth, the current observations, transparency, sea water temperature observation, the surface meteorological observation and laboratory data processing will be carried out in group. For section observation, some, of a section of the three or four position parameter survey class 3, deck crew and laboratory operations per shift points, and turn on each other, At the end of each station, data interchange and quality control should be carried out. Personnel counting and status report will be conducted at 7 am and 8 PM.

D6: We will analyze the sample data, continue to carry out the continuous large-area investigation, and continuously collect the data of deck culture experiment. Relative parameters such as dissolved oxygen and nutrient salt were tested according to instrument data and laboratory data. Particulate matter collection and treatment, marine biological sample collection and treatment will be done. Instrument calibration and data quality control are carried out on the basis of the obtained field data of physical ocean current measurement and temperature and salt depth. The deck and laboratory teams work together to process sediment samples, including surface sediment sampling and box sampler sampling. About one section will be conducted all day, and 3-4 stations will be surveyed with full parameters. The operation will be finished at 8:00 PM. The regular meeting will be concluded. At the end of each station, data interchange and quality control should be carried out. Personnel counting and status report will be conducted at 7 am and 8 PM.

D7-D8: All two days, continuous station survey and continuous station sampling will be carried out. To collect samples, for the analysis of various physical, chemical, biological and geological ocean observation, deck crew assignments for per hour and laboratory operations for every three hours will be carried out at the whole a day. The work will be finished at 4 PM of D8. The survey ships will go to the D5 section where the key position of navigation. Personnel counting and status report will be conducted at 7 am and 8 PM.

D9: At 7:00 a.m., we will observe of the large area station of key stations again. Sample collection and analysis will be carried out at the two stations respectively. It will be finished at 4:00 PM. Regular meeting will be concluded. Chief scientist will take turn on duty all day. Survey ship will be returned. Personnel counting and status report will be

conducted at 7 am and 8 PM.

D10: At 7:00 a.m., the equipment shall be dismantled, cleaned and packed. Samples shall be pretreated, classified and stored. Data is backup and instrument list are inspection. Our team left the ship and returned to SUSTech. Personnel counting and situation report will be conducted at 7 am and departure time respectively.

D11: At 9:00 a.m., in the laboratory of SUSTech, data processing methods combined with the format of survey report are explained in detail.

One week later, students submit their internship reports.

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

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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				
期中考试 Mid-Term Test				
期末考试 Final Exam				
期末报告 Final Presentation		100		
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