

## 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>	海洋地震学观测基础 <b>Fundamental of Marine Seismology Observations</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>	OCE402				
4.	课程学分 <b>Credit Value</b>	3				
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>	秋季 Fall				
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)	郭震, 海洋科学与工程系, 13716877467 Zhen Guo, Department of Ocean Science and Engineering, 13716877467				
9.	实验员/助教、所属学系、联系方式 <b>Tutor/TA(s), Contact</b>	李世林, 海洋科学与工程系 Shilin Li, Department of Ocean Science and Engineering				
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>	48				48

<b>12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements</b>	OCE307 计算海洋学基础 Introduction to Computational Oceanography
<b>13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite</b>	
<b>14. 其它要求修读本课程的学系 Cross-listing Dept.</b>	

**教学大纲及教学日历 SYLLABUS**

**15. 教学目标 Course Objectives**

海洋地震学是一门以观测为基础的学科，本课程旨在以海洋地震学的基本理论为基础，讲授海洋地震学的观测、数据获取、处理等基本内容，使学生掌握海洋地震学相关计算方法和软件应用。

Fundamental of Marine Seismology Observations will introduce the concept of marine seismology, data acquisition and processing to image the structure of lithosphere beneath the oceans, and provide students with practical trainings on widely-used software in Marine seismology

**16. 预达学习成果 Learning Outcomes**

本课程将培养学生利用海洋地震学基本理论解决与海洋地震层析成像的相关科学问题的能力，激发学生对于海洋结构的兴趣与热情。

It is designed to cultivate students' ability and enthusiasm to solve problems in seismic tomography of oceanic structure using the basic concepts of marine seismology.

**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. 课程介绍（4学时）

Introduction to Marine Seismology (4 credit hours)

介绍海洋地震学的发展。

Introduce the history and involution of seismic observations in oceans.

2. 海洋地震学仪器（4学时）

Introduction to Instruments in Marine Seismology (4 credit hours)

海洋地震学仪器介绍，如海底地震仪，浮潜式地震仪。

Introduce instruments in marine seismology, such as OBS (Ocean Bottom Seismometer), and Mermaids.

3. 地球物理反演理论（8学时）

Geophysical Inversion Theory (8 credit hours)

介绍地球物理反演理论的基本原理。

Introduce the basic theory of geophysical inversion, such as linear inversion, Bayes' inversion.

4. 地震数字信号处理（4学时）

Digital Signal Processing in Seismology (4 credit hours)

介绍地震数字信号处理的基本原理。

Introduce the basic concepts of digital signal processing in seismic data processing.

5. 地震层析成像（8学时）

Basic Concepts of Seismic Tomography (8 credit hours)

介绍地震层析成像的原理。

Introduce the theory of seismic tomography in structural imaging.

6. 面波层析成像（4学时）

Surface Wave Tomography (4 credit hours)

介绍面波频散理论、面波层析成像理论方法。

Introduce the surface wave dispersion and theory of surface wave tomography.

7. 体波层析成像（4学时）

Body Wave Tomography (4 credit hours)

介绍体波走时理论，以及体波层析成像方法。

Introduce the ray theory in Cartesian coordinate system and spherical coordinate system, and body wave tomography.

8. 地震各向异性（4学时）

Seismic Anisotropy Tomography (4 credit hours)

介绍地震各向异性的成因、以及在地震学中的表达，以及各向异性成像方法。

Introduce the cause of seismic anisotropy, the seismic anisotropy in wave equation, and methods of anisotropy tomography.

9. 地震衰减（4学时）

Seismic Attenuation Tomography (4 credit hours)

介绍地震衰减的成因以及层析成像方法。

Introduce the cause of seismic attenuation, the seismic attenuation in wave equation, and methods of attenuation tomography.

10. 地震定位（4学时）

Earthquake Location (4 credit hours)

介绍地震震相拾取、地震定位方法。

Introduce the seismic wave picking and methods of earthquake location.

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

1. Lay T, Wallace T C. Modern Global Seismology [M]. Academic press, 1995.
2. Bormann P. New Manual of Seismological Observatory Practice (NMSOP). Annexes[M]. GeoForschungsZentrum, 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		5%		
课堂表现 Class Performance		5%		
小测验 Quiz		5%		
课程项目 Projects				
平时作业 Assignments		5%		
期中考试 Mid-Term Test		20%		
期末考试 Final Exam				
期末报告 Final Presentation		60%		
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