

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	古地磁学与环境磁学 Paleomagnetism and Environmental Magnetism				
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	OCE309				
4.	课程学分 Credit Value	3				
5.	课程类别 Course Type	专业选修课 Major Elective Courses				
6.	授课学期 Semester	秋季 Fall				
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)	刘青松 Qingsong Liu 海洋科学与工程系 Department of Ocean Science and Engineering E-mial: liuqs@sustech.edu.cn, Tel: 0755-88018789				
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	杨德庭 Deting Yang 海洋科学与工程系 Department of Ocean Science and Engineering E-mial: yangdt@mail.sustech.edu.cn				
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	32	8	8		48

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	OCE303 普通地质学 Physical Geology
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

本课程为地球物理学和海洋地质学专业本科生的核心课程及部分地质学、第四纪地质学本科生的选修课程。地磁学近年来蓬勃发展，在地质构造演化、地球内部动力学过程、古气候与环境重建、生物演化、环境污染检测等多方面发挥着越来越重要的作用。目前，传统的古地磁学已经扩展到岩石磁学、环境磁学、生物地磁学、比较行星学等多个领域，研究的介质包括各种沉积物、岩石与矿物。本课程将集中讲授岩石磁学、环境磁学、与古地磁学的基本理论与应用，并涉及地磁学的基本原理与综合年代学。

This course is a core course for undergraduates majoring in Geophysics and Marine Geology, and an optional course for some undergraduates majoring in Geology and Quaternary Geology. Geomagnetism has developed vigorously in recent years, playing an increasingly important role in geological tectonic evolution, geodynamic processes within the Earth, paleoclimate and environmental reconstruction, biological evolution, environmental pollution detection and so on. At present, the traditional paleomagnetism has been extended to many fields, such as Rock Magnetism, Environmental Magnetism, Bio-geomagnetism, Comparative Planetology and so on. The objectives studied include various sediments, rocks and minerals. This course will concentrate on the basic theories and applications of rock magnetism, environmental magnetism, and paleomagnetism, as well as the basic principles and comprehensive chronology of geomagnetism.

16. 预达学习成果 Learning Outcomes

通过本课程学习，使学生了解丰富的研究实例，让学生能够解释较为复杂的各类磁学参数变化规律，能够了解古地磁基本原理与应用，为将来开展相关研究打下基础。

Through the study of this course, students will be able to understand abundant research examples, to explain the more complex rules of changes in various magnetic parameters, to understand the basic principles and applications of paleomagnetism, and to lay a foundation for future research.

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. 岩石磁学基础 1（磁性基础与磁畴理论）（3学时，3 credit hours）

Foundation of Rock Magnetism 1 (Foundation of Magnetism and Domain Theory)

2. 岩石磁学基础 2（磁晶各向异性与尼尔理论）（3学时，3 credit hours）

Foundation of Rock Magnetism 2 (Magnetocrystalline Anisotropy and Neel Theory)

3. 岩石磁学基础 3（磁化率 1）（3学时，3 credit hours）

Foundation of Rock Magnetism 3 (Magnetic Susceptibility 1)

4. 岩石磁学基础 4（磁化率 2）（3学时，3 credit hours）

Foundation of Rock Magnetism 4 (Magnetic Susceptibility 2)

5. 岩石磁学基础 5 (热剩磁与沉积剩磁) (3 学时, 3 credit hours)

Foundation of Rock Magnetism 5 (TRM and DRM)

6. 岩石磁学基础 6 (交变退磁和非粘滞剩磁) (3 学时, 3 credit hours)

Foundation of Rock Magnetism 6 (Alternating Demagnetization and ARM)

7. 岩石磁学基础 7 (磁晶相互作用) (3 学时, 3 credit hours)

Foundation of Rock Magnetism 7 (Magnetic Interaction)

8. 岩石磁学基础 8 (磁性矿物概论 1) (3 学时, 3 credit hours)

Foundation of Rock Magnetism 8 (Magnetic Minerals 1)

9. 岩石磁学基础 9 (磁性矿物概论 2) (3 学时, 3 credit hours)

Foundation of Rock Magnetism 9 (Magnetic Minerals 2)

10. 环境磁学及其应用 (环境磁学参数) (3 学时, 3 credit hours)

Environmental Magnetism and its applications (Parameters)

11. 环境磁学及其应用 (环境磁学应用实例) (3 学时, 3 credit hours)

Environmental Magnetism and its applications (Application Cases)

12. 构造磁学 (磁性物理学基础与现代地球磁场) (3 学时, 3 credit hours)

Tectonomagnetism (Foundation of Magnetic Physics and Modern Earth's Magnetic Field)

13. 构造磁学 (古地磁场、岩石磁组构、磁性地层学) (3 学时, 3 credit hours)

Tectonomagnetism (Palaeomagnetic Field, Rock Magnetic Fabric and Magnetostratigraphy)

14. 生物磁学 (生物磁学理论与应用) (3 学时, 3 credit hours)

Biomagnetism (Theory and Applications)

15. 讨论课 (实例讨论: 重磁化、磁学在黄土中应用) (3 学时, 3 credit hours)

Seminar (Case: Remagnetization and Application in the Loess Study)

16. 读书汇报 (3 学时, 3 credit hours)

Reading Report

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

1. 朱岗崑 (2005). 古地磁学: 基础, 原理, 方法, 成果与应用. 北京: 科学出版社.
2. Butler, R. F. (1992). Paleomagnetism: magnetic domains to geologic terranes, Blackwell Scientific Publications.

3. Dunlop, D. J., and Ö. Özdemir (2001). Rock magnetism: fundamentals and frontiers, Cambridge University Press.

4. Evans, M. E., and F. Heller (2003). Environmental magnetism: principles and applications of enviromagnetics, Academic Press.

5. Tauxe, L. (2010). Essentials of paleomagnetism, Univ. of California Press.

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		10		
课程项目 Projects		10		
平时作业 Assignments		10		
期中考试 Mid-Term Test		10		
期末考试 Final Exam		40		
期末报告 Final Presentation		10		
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