

课程大纲 COURSE SYLLABUS

课程代码/名称 Course Code/Title	海洋地球物理前沿 Frontiers in Marine Geophysics
课程性质 Compulsory/Elective	研究生专业课 Compulsory for marine geophysical division
课程学分/学时 Course Credit/Hours	3/48
授课语言 Teaching Language	中英文 Chinese & English
授课教师 Instructor(s)	杨挺 Ting Yang
是否面向本科生开放 Open to undergraduates or not	否 Not
先修要求 Pre-requisites	海洋学导论或地球科学导论或地球物理学导论或高等物理学 Introduction to Oceanography / Introduction to Earth Science / Introduction to Geophysics / Advanced Physics

教学目标 Course Objectives

关注海洋地球物理学发展趋势和前沿研究内容，让学生在掌握海洋地球物理理论和方法（包括重力、电磁、地震、地热等）的基础上，了解与海洋地球科学相关的前沿科学问题，培养和巩固学生利用地球物理方法解决海洋和地球科学的科学问题能力和应用地球物理技术的能力。此外，让学生了解当前这一学科的国内外重大科学计划，培养学生进行海洋与地球科学的兴趣和热情。

This course focuses on the development trend and cutting-edge research of marine geophysics. Students can understand the frontier issues related to marine geosciences on the basis of mastering marine geophysical theories and methods, including gravity, electromagnetism, earthquake, geothermal, etc. This course will cultivate and consolidate students' ability to use geophysical methods to solve scientific problems in ocean and earth sciences. In addition, we will introduce the current major domestic and foreign scientific programs in the field of marine geophysics so that students' interest and enthusiasm in marine and earth sciences can be cultivated.

教学方法 Teaching Methods

在教授讲授海洋地球物理学基础之上；学生按研究方向对于海洋地球物理的前沿学术论文进行阅读、报告并讨论。

In addition to the traditional "teaching & listening" style, students will have opportunities to read the journal papers in the marine geophysics based on their research interests, and discuss them in class.

教学内容 Course Contents

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

Section 1	海洋定位和海底定位 Navigation & seafloor positioning
Section 2	海底定位前沿：文献阅读与讨论 Seafloor positioning: Journal papers & discussion
Section 3	主动源海洋地震学 Active-source marine seismology

Section 4	主动源海洋地震学前沿：文献阅读与讨论 Active-source marine seismology: Journal papers & discussion
Section 5	被动源海洋地震学 Passive-source marine seismology
Section 6	被动源海洋地震学前沿：文献阅读与讨论 Passive-source marine seismology: Journal papers & discussion
Section 7	海洋重力和电磁学 Marine gravity & electromagnetism
Section 8	海洋重力学学前沿：文献阅读与讨论 Marine gravity & electromagnetism: Journal papers & discussion
Section 9	海底构造单元：俯冲带 Submarine tectonic unit: subduction zones
Section 10	俯冲带前沿：：文献阅读与讨论 Subduction zones: Journal papers & discussion
Section 11	海底构造单元：洋中脊 Submarine tectonic unit: Mid-ocean ridges
Section 12	洋中脊前沿：：文献阅读与讨论 Mid-ocean ridges: Journal papers & discussion
Section 13	海底构造单元：大陆边缘 Submarine tectonic unit: Continental margins
Section 14	大陆边缘前沿：：文献阅读与讨论 Continental margins: Journal papers & discussion
Section 15	海底构造单元：海洋岩石圈演化 Submarine tectonic unit: Evolution of the oceanic lithosphere
Section 16	海洋岩石圈演化前沿：：文献阅读与讨论 Oceanic lithosphere: Journal papers & discussion
Section 17	其他：海山、热点、热液等 Other topics: seamounts, hotspots, hydrothermal etc.

课程考核

Course Assessment

(① 考核形式 Form of examination; ②. 分数构成 grading policy; ③ 如面向本科生开放, 请注明区分内容。
If the course is open to undergraduates, please indicate the difference.)
期末考试 (40%) + 科研实践小项目 (60%)
其中, 项目是学生根据自己研究兴趣和方向完成一个实际问题, 提交报告, 并展示自己的项目研究结果。
Grading: Final exam (40%) + small project (60%)
In small project, the students are supposed to submit a report and do a presentation on a specific scientific problem related to their interests.

教材及其它参考资料

Textbook and Supplementary Readings

<<Fundamentals of Geophysics (Second Edition) >> by William Lowrie, Cambridge University Press, 2007;
<<The ocean basins: Their structure & evolution (Second Edition) >> by John Wrigtht, David Rothery.
The open University, 2004.

<<The solid earth: An introduction to global geophysics (Second Edition) >> by C.M.R. Fowler, Cambridge University press, 2005.

最新有关海洋地球物理学的前沿论文，来自杂志 Nature, Science, Nature Geosciences, GRL, JGR, SRL, GJI, MGR. (the latest papers in the field of marine geophysics. Journals include Nature, Science, Nature Geosciences, GRL, JGR, SRL, GJI, MGR.)