

课程大纲 COURSE SYLLABUS

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| 1. | 课程代码/名称 Course Code/Title | OCE /地球板块构造学 Global Plate Tectonics |
| 2. | 课程性质 Compulsory/Elective | 专业选修课/Major Elective Course |
| 3. | 课程学分/学时 Course Credit/Hours | 3/48 |
| 4. | 授课语言 Teaching Language | 中 Chinese |
| 5. | 授课教师 Instructor(s) | 林间讲席教授 海洋科学与工程系 创园 9 栋 511 Chair Prof. Jian LIN, Department of Ocean Sciences and Engineering, Innovation Park 9-511 |
| 6. | 是否面向本科生开放 Open to undergraduates or not | 是 Yes |
| 7. | 先修要求 Pre-requisites | (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.) 本科生需要先选修《海洋科学导论》或《地球与空间科学导论》 |
| 8. | 教学目标 Course Objectives | <p>(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.)</p> <p>(1) 本科生: 通过本课程, (a) 使学生们了解全球板块构造学的最关键概念及其科学内涵; (b) 了解二十世纪地球科学的最伟大理论是如何产生的以及尚未解决的科学问题; (c) 激发学生们对地球科学的兴趣。</p> <p>(2) 研究生: 通过本课程, (a) 使学生们对全球板块构造学的基本概念及其科学内涵有较深刻的理解, 拓展视野, 了解地球科学的国际前沿; (b) 促进“海洋与大陆”地球科学、“固体地球科学与生命科学”的交叉。</p> <p>(1) Undergraduates: Through this course, students will (a) develop a basic understanding of the key concepts of the global plate tectonics; (b) gain insight into how “plate tectonics” – the greatest theory of Earth Sciences in the 20th century – was developed; and (c) develop interest in Earth sciences.</p> <p>(2) Graduate students: (a) Through this course, students will develop a deeper understanding of the key concepts in global plate tectonics, the current debates, and potential directions of cutting-edge research. (b) This course will promote the interaction and collaborative research between solid Earth and Life sciences.</p> |
| 9. | 教学方法 Teaching Methods | <p>(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.)</p> <p>(1) 教学方法 (研究生与本科生相同): (a) 授课; (b) 特邀报告; (c) 作业/报告/考试。</p> <p>(2) 研究生与本科生教学方法的区别在于: (a) 研究生与本科生将有不同的作业难度, 不同的课程报告要求, 不同的考试题目。 (b) 要求研究生对课程的内容有更深刻的认识, 表现在对作业/报告/考试有更高的要求。</p> |

(1) Teaching methods are the same between graduate and undergraduate students: (a) Lectures; (b) invited talks; (c) assignments, reports, and examinations.

(2) The difference of teaching method between graduate and undergraduate students: (a) Graduate and undergraduate students will have assignments of different levels of difficulty, reports of different requirements, and different examinations. (b) Graduate students are required to develop deeper level of understanding, as reflected in greater difficulty in homework assignments, reports, and examinations.

10. 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.)

教学内容对研究生与大学生相同。

Course contents are the same between graduate and undergraduate students.

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| Section 1 | 课程绪论 (2 学时): 地球板块构造学的发展史、研究现状及展望 Introduction of the course (2 hours): The history, current understanding, and research frontiers in Global Plate Tectonics |
| Section 2 | 板块运动学 (3 学时): 板块的定义、欧拉极、欧拉旋转以及概念的发现历史 Plate kinematics (3 hours): Definition of plate, Euler pole and rotation, and the discovery history of key concepts |
| Section 3 | 板块边界过程 (6 学时): 大洋中脊、转换断层、俯冲带过程以及当前前沿科学研究 Plate boundary processes (6 hours): Tectonic processes and cutting-edge research of mid-ocean ridges, transform faults, and subduction zones |
| Section 4 | 洋中脊概论与大洋板块 (3 学时) Introduction to mid-ocean ridges and oceanic plates (3 hours) |
| Section 5 | 海洋转换断层与研究进展 (3 学时) Oceanic transform faults and research (3 hours) |
| Section 6 | 俯冲带研究进展 (3 学时) Subduction zones and research (3 hours) |
| Section 7 | 地球与行星内部对流 (6 学时) Earth and planetary interior convection (3 hours) |
| Section 8 | 板块动力学: 最新发现与国际前沿 (3 学时) Plate dynamics: International research development (3 hours) |
| Section 9 | 未来多学科发展方向: 地球科学与生命科学交叉 (3 学时) Future cross-discipline research: The synergy of Earth and life sciences (3 hours) |
| Section 10 | G-plate 软件教学与研究进展: 模拟地球板块动力学 (6 学时) G-plate software for plate kinematic modeling (6 hours) |
| Section 11 | Earthbyte 软件系统教学与研究进展 (6 学时) Earthbyte software for plate dynamic modeling (6 hours) |
| Section 12 | 课程展示与讨论 (4 学时) In-class presentations and discussion (4 hours) |

11. 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.)

(1) 考核形式: 考勤+课堂表现+作业+期末考/报告。 Form of examination: Attendance + Performance + Homework assignments + Exams/Reports/Presentations.

(2) 分数构成: 十三级等级制, 如 A⁺, A, A⁻等。 Grading policy: Letter grading, A⁺, A, A⁻, etc.

(3) 研究生与本科生的考核区别: (a) 研究生与本科生将有两套不同的作业/报告要求/考试题目; (b) 对研究生的要求总体比对本科生高。

The difference between the course assessment of graduate and undergraduate students: (a) Graduate and undergraduate students will have two different sets of assignments/reports requirements/examinations; (b) The requirements for graduate students are in general higher than that for undergraduate students.

12. 教材及其它参考资料

Textbook and Supplementary Readings

Wiley-Blackwell 出版的 Global Tectonics (第三版), 作者为 Philip Kearey, Keith A. Klepeis 和 Frederick J. Vine. 【注】其中 Frederick J Vine 教授为海洋地磁条带的共同发现者。

Global Tectonics (Third Edition). Authors: Philip Kearey, Keith A. Klepeis and Frederick J. Vine. Publisher: Wiley-Blackwell. [Note] The co-author, Prof. Frederick J Vine is the original co-discoverer of the first magnetic stripes in the oceanic plates.