

《海洋地质动力学》课程教学大纲（2022 版）

课程基本信息 (Course Information)					
课程代码 (Course Code)	MS3701	*学时 (Credit Hours)	48	*学分 (Credits)	3
*课程名称 (Course Name)	海洋地质动力学 Marine Geological Dynamics				
课程类型 (Course Type)	专业选修课 Major Elective				
授课对象 (Target Audience)	本科生 Undergraduate student				
授课语言 (Language of Instruction)	英文 English				
*开课院系 (School)	海洋学院 School of Oceanography				
先修课程 (Prerequisite)		后续课程 (Post)			
*课程负责人 (Instructor)	Bradley A. Weymer Xingqian Cui (Alternate)	课程网址 (Course Webpage)	https://canvas.sjtu.edu.cn/courses/41102		
课程简介 (中文) (Description)	<p>本门课程面向海洋地质方向本科生，简介大陆边缘地质，以及大洋钻探和海洋地球物理方法在研究海底浅层和深层结构中的应用。大陆边缘是世界上最为令人惊叹的地貌单元，并具有重大基础性地质意义。大陆边缘与人类活动之间相互作用，相互影响。同时，它还蕴藏了大量的烃类、矿物和地下水等宝贵资源。借助不同阶段的国际大洋发现计划（IODP）所完成的大洋钻探，我们对于复杂并且持续演化的大陆边缘有了更深入的了解和认识。因此本门课程的一个主要关注点是大洋钻探计划在大陆边缘研究中的扮演的角色。我们首先回顾国际大洋发现计划（IODP）的历史，之后讲述最常使用的海洋地物方法，这将有助于我们理解边缘动力学研究，为后续深入学习海洋地质学作铺垫。每一章节都包括了理论、仪器使用、数据获取与分析、模型和解释等，同时安排了说明性案例研究、课堂练习和实验室练习。本课程计划组织一次野外实习，前往临港参观中国大洋发现计划（IODP-China）岩芯库和观测与大陆边缘演变相关的现代海岸过程。在最后，本课程会讨论大陆边缘的经济资源，并列举若干值得关注的未来研究方向。</p>				

<p>课程简介 (英文) (Description)</p>	<p>The purpose of this class is to introduce marine geology undergraduate students to the geology of continental margins and the application of ocean drilling and marine geophysical methods for studying shallow and deep structures beneath the seafloor. The continental margins of the world make up the most impressive and largest physiographic feature of the earth's surface, and one of fundamentally great geological significance. This portion of Earth both affects and is impacted by various human activities. Many of the planet's hydrocarbon, mineral, and groundwater resources are located along continental margins. Our understanding of this complex and continually changing part of Earth's surface has been largely investigated and understood through advances in scientific ocean drilling through the various phases of the International Ocean Discovery Program (IODP). These topics will be the focus of this course. The lecture series is organized firstly by an overview on IODP scientific ocean drilling, followed by discussions on the most commonly used marine geophysical techniques that provide a complementary role for enhancing our understanding of margin dynamics. These topics will provide the necessary background for exploring margin geology in greater depth throughout the remainder of the course. Within each section, there will be discussions on theory, instrumentation, data acquisition and processing, modeling and interpretation. Each section will include a selection of illustrative case studies, student in class exercises, and laboratory exercises. A field trip to the Lingang coast is planned to visit the IODP-China core repository and explore modern coastal processes as they are related to margin evolution. The course culminates with discussions on economic resources along continental margins and highlights some key future research directions.</p>							
<p>课程目标与内容 (Course objectives and contents)</p>								
<p>*课程目标 (Course Objectives)</p>	<p>After successful completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Explain the impact of scientific ocean drilling on our understanding of the ocean and earth system with particular emphasis on continental margins 2. Describe the basic concepts and applications of marine geophysics for investigating both shallow and deep geologic structures beneath the seafloor 3. Explain the key concepts on the nature and dynamics of continental margins; how they are formed, how they evolve, and how they may change in the future 4. Identify important economic resources and future research directions along modern continental margins around the world 							
<p>*教学内容进度安排及对应课程目标 (Class Schedule & Requirements &</p>	<p>章节</p>	<p>教学内容 (要点) Contents</p>	<p>教学目标 Content - objective s</p>	<p>学时 In class hours</p>	<p>教学形式 Teaching format</p>	<p>作业及考核要求 Homework and test requirements</p>	<p>课程思政融入点</p>	<p>对应课程目标 Relation with course objective</p>

Course Objectives)	Course introduction and overview of scientific ocean drilling		8	Lectures and in class exercises	2 homework's and 1 in class assignment		Objective 1
	Introduction to marine geophysics – seismic and electromagnetic methods		8	Lectures and in class exercises	1 homework and 1 in class assignment		Objective 2
	Geological significance of continental margins – classification and margin types		6	Lectures and in class exercises	1 homework and 1 in class assignment		Objective 3
	Midterm		2	In class examination	Midterm		Objectives 1-3
	Sea-level history and stratigraphy		6	Lectures and in class exercises	1 homework and 1 in class assignment		Objective 3
	Nearshore geological processes and the coastal transition zone		4	Lectures and in class exercises	1 homework		Objective 3
	Field trip: Lingang lab and IODP-China core repository, tidal flats		4	Fieldwork	1 report		Objective 3
	Sediment core description and grain-size analysis		4	Laboratory exercises	1 in class assignment		Objective 3

		Resources at continental margins, future research directions, and course conclusion		4	Lectures and in class exercises	1 homework		Objective 4
		Final		2	In class group presentations and term paper	Final		Objectives 1-4
<p>注 1: 建议按照教学周周学时编排, 以便自动生成教学日历。</p> <p>注 2: 相应章节的课程思政融入点根据实际情况填写。</p>								
*考核方式 (Grading)	<p>Attendance (10%; assessed in terms of being on time to/from class)</p> <p>Homework, in class exercises and discussions (25%; assessed in terms of both active in class participation and completed assignments/reports)</p> <p>Midterm exam (25%; based on objectives 1-3, closed book)</p> <p>Fieldtrip report (10%; 2-page report on key concepts learned)</p> <p>Final: (total = 30%; group term paper on a topic chosen at the beginning of the course (20%), group presentation summarizing the key findings in the term paper (10%).</p>							
*教材或参考资料 (Textbooks & Other Materials)	<p>1) Hsü, K. 1992. <i>Challenger at sea: A ship that revolutionized earth science</i>. Princeton University Press. Selected Chapters.</p> <p>2) Kennett, J.P., 1982. <i>Marine Geology</i>. Pearson. Selected Chapters.</p> <p>3) Burk, C.A. and Drake, C.L. eds., 2013. <i>The geology of continental margins</i>. Springer. Selected Chapters.</p> <p>4) Li, M.Z., Sherwood, C.R. and Hill, P.R. eds., 2012. <i>Sediments, Morphology and Sedimentary Processes on Continental Shelves: Advances in technologies, research and applications</i> (Vol. 109). John Wiley & Sons.</p> <p>5) Other journal articles and reading materials as assigned during the course.</p>							
其它 (More)								
备注 (Notes)								