

## 课程大纲

### COURSE SYLLABUS

1.	<b>课程代码/名称</b> <b>Course Code/Title</b>	海底天然气水合物勘探与开采 Exploration and Production of Oceanic Gas Hydrates
2.	<b>课程性质</b> <b>Compulsory/Elective</b>	选修课 Elective
3.	<b>课程学分/学时</b> <b>Course Credit/Hours</b>	3 学分/48 学时 3 Course Credit/48 Hours
4.	<b>授课语言</b> <b>Teaching Language</b>	中 Chinese
5.	<b>授课教师</b> <b>Instructor(s)</b>	王誉泽 Yuze Wang
6.	<b>是否面向本科生开放</b> <b>Open to undergraduates or not</b>	是 Yes
7.	<b>先修要求</b> <b>Pre-requisites</b>	(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.) 无 (本科及研究生均无先修课要求) None (No pre-requisites for both undergraduates and master students)
8.	<b>教学目标</b> <b>Course Objectives</b>	(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.) 海底天然气水合物勘探与开采课程综合讲述国内外有关深海天然气水合物的调查和研究成果, 系统介绍天然气水合物的研究现状、基本性质、水合物气藏的形成和勘探技术、钻井与取样、力学特性、开采方法、灾害预测, 以及天然气水合物的开发前景。通过本课程的教学, 一方面, 旨在激发研究生对海底天然气水合物勘探与开采及相关领域的研究热情, 了解该领域前沿发展课题及挑战; 另一方面, 使本科生学习了解这门学科的基础理论知识, 了解和掌握其在海洋工程中的重要作用。 The submarine natural gas hydrate exploration and exploitation course comprehensively describes the investigation and research results of deep-sea gas hydrates at home and abroad. This course systematically introduces the research status of natural gas hydrates including the basic properties, the formation and exploration technology, drilling and sampling, mechanics characteristics, mining methods, disaster prediction, and development prospects of natural gas hydrates. The teaching of this course, on one hand, aims to stimulate graduate students' enthusiasm for research in the related fields; on the other hand, this course aims to understand the frontier development topics and challenges in this field, and enable undergraduates to learn and understand the basic theoretical knowledge of this subject, and master its important role in ocean engineering.
9.	<b>教学方法</b> <b>Teaching Methods</b>	(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.) 课堂讲授和考核相结合; 课程论文和课堂汇报难度针对本科生和研究生分别设计。 Combination of classroom teaching and assessment  The difficulty of course essay and presentation report are designed separately for undergraduates and graduate students.
10.	<b>教学内容</b> <b>Course Contents</b>	(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.)

<b>Section 1</b>	天然气水合物概述 Overview of Natural Gas Hydrate (2 hours)
<b>Section 2</b>	天然气水合物的概念及性质 Concept and properties of natural gas hydrate (4 hours)
<b>Section 3</b>	天然气水合物成藏机制 Gas hydrate accumulation mechanism (6 hours)
<b>Section 4</b>	天然气水合物的勘探技术 Exploration technology of natural gas hydrate (6 hours)
<b>Section 5</b>	天然气水合物开采理论 Theory of natural gas hydrate development (6 hours)
<b>Section 6</b>	天然气水合物力学特性 Mechanical properties of natural gas hydrate (6 hours)
<b>Section 7</b>	天然气水合物的开采方法 Mining method of natural gas hydrate (6 hours)
<b>Section 8</b>	天然气水合物开采诱发的海底地质灾害与地层环境变化 Submarine geological disasters and stratigraphic environment changes induced by natural gas hydrate mining (6 hours)
<b>Section 9</b>	天然气水合物研究进展 Research progress of natural gas hydrate (6 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.)

课堂出勤 (10%), 课后作业 (40%) 和期末考试 (50%)

Class attendance (10%), homework (40%) and final exam (50%)

课后作业和期末考试题的难度针对研究生和本科生分别设计, 对研究生的考核难度总体上高于对本本科生的考核难度。

The difficulty of homework and final exam questions are designed separately for graduate students and undergraduates. The difficulty of assessment for graduate students is generally higher than that for undergraduates.

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

教材

蒋宇静, 公彬, 王刚. 海天然气水合物开采概论[M]. 北京: 科学出版社, 2017.

其它参考资料

[1] 陈光进, 孙长宇, 马庆兰. 气体水合物科学与技术[M]. 北京: 化学工业出版社, 2008.

[2] 陈月明, 李淑霞, 郝永卯, 等. 天然气水合物开采理论与技术[M]. 青岛: 中国石油大学出版社, 2011.

[3] 李洋辉. 天然气水合物储层力学特性及本构模型研究[M]. 大连: 大连理工大学出版社, 2018.

[4] 刘昌龄, 孟庆国, 等. 天然气水合物实验测试技术[M]. 北京: 科学出版社, 2016.

[5] 肖钢, 白玉湖. 天然气水合物勘探开发关键技术研究[M]. 武汉: 武汉大学出版社, 2015.

[6] 肖钢, 白玉湖, 董锦. 天然气水合物综论[M]. 北京: 高等教育出版社, 2012.

[7] 于雯泉. 天然气水合物[M]. 北京: 中石化出版社有限公司, 2017.

Textbook:

Yujing Jiang, Bin Gong, Gang Wang. Introduction of methane hydrate production in deep sea,

Science Press,2017

Supplementary Readings:

- [1] Chen Guangjin, Sun Changyu, Ma Qinglan. Natural gas hydrate science and technology[M]. Beijing: Chemical Industry Press, 2008.
- [2] Chen Yueming, Li Shuxia, Hao Yongmao, etc. Theory and technology of natural gas hydrate exploitation[M]. Qingdao: China University of Petroleum Press, 2011.
- [3] Li Yanghui. Research on mechanical properties and constitutive model of natural gas hydrate reservoir[M]. Dalian: Dalian University of Technology Press, 2018.
- [4] Liu Changling, Meng Qingguo, et al. Natural gas hydrate test technology [M]. Beijing: Science Press, 2016.
- [5] Xiao Gang, Bai Yuhu. Research on key technologies of natural gas hydrate exploration and development[M]. Wuhan: Wuhan University Press, 2015.
- [6] Xiao Gang, Bai Yuhu, Dong Jin. Overview of natural gas hydrate [M]. Beijing: Higher Education Press, 2012.
- [7] Yu Wenquan. Natural gas hydrate [M]. Beijing: China Petrochemical Press, 2017.