《岩心描述及相分析》教学大纲

一、基本信息

课程名称：岩心描述及相分析

英文课程名称：Core description and sedimentary facies analysis

课程代码：160101P016　　总学分：2

总学时：2周　　理论学时：1周

实验学时：1周　　上机学时：0

开课学院：石油学院　　适用专业：资源勘查工程

课程性质（必修/选修）：选修

先修课程：造岩矿物学、地层学与地史学、沉积岩石学、岩相古地理

二、课程简介

岩心描述及相分析是一次综合性的实践训练，使学生掌握岩心观察描述工作的基本技能，学会根据岩心资料判断沉积环境与沉积背景、识别典型岩心相标志、厘定沉积相、亚相与微相类型等的基本方法和编写岩心观察总结报告的初步能力，加深对已经学过的理论的理解，为今后的实际地质研究工作打下一定的基础。

本课程要求学生学习该课程后具备以下知识与能力：（1）掌握岩心的基本知识和岩心观察描述的基本方法；（2）具备运用所学知识，利用实际岩心资料、测井资料、地震资料进行沉积相类型确定的基本能力；（3）具有自主学习的能力。

三、教学目标

通过岩心观察与描述课程的实践过程，使同学们初步掌握岩心观察描述工作的基本技能，包括判断沉积环境与沉积背景、识别典型岩心相标志、厘定沉积相、亚相与微相类型等基本工作方法和编写岩心观察总结报告的初步能力。

四、教学内容与学习要求

以自由组合的形式分为若干个小组，每组6-7人，组长一名。教学内容包括理论教学、实际岩心观察及单井沉积相分析图的编制方法等。课程教学内容、要求及学时分配如下：

章节内容/教学单元		教学内容、重点、难点	学时	学习要求
第一篇 岩心基本知识及岩心观察描述方法讲解				
第一章 岩心的概念和观察描述的基	1.1 岩心的概念及钻井取心目的	了解岩心的概念及钻井取心目的	2	☑记忆 ☑理解
	1.2 岩心的基本知识	掌握岩心收获率、编号、长度记号、盒装岩心排列等基本知识		☑记忆

本知识				☑理解
	1.3 岩心观察描述的内容	掌握岩心观察描述的基本内容		☑记忆 ☑理解
第二章 准噶尔盆地地层概况及岩心情况介绍	2.1 准噶尔盆地基本概况及地层发育特征 课程思政：学习玛湖凹陷取心情况增强科技自信	了解准噶尔盆地不同地区地层发育情况及取心井主要取心层位	2	☑记忆 ☑理解
	2.2 不同层位勘探概况、环境分析及岩心特征	了解准噶尔盆地不同层位勘探概况、沉积环境及岩心特征		☑记忆 ☑理解
第三章 岩心观察描述方法	3.1 岩心描述的方法	掌握岩心描述记录方法、岩心描述的顺序及原则	2	☑理解 ☑应用
	3.2 不同岩性的岩心描述方法	掌握不同岩性的岩心描述方法		☑理解 ☑应用
	3.3 岩心相分析图制作	掌握岩心描述图件的基本要素及制作方法		☑应用 ☑综合分析
第二篇 岩心实物描述讲解和实践				
1、实际岩心观察描述示范讲解		利用实际岩心资料进行岩心观察、描述的示范	10	☑理解 ☑应用
2、岩心观察描述与分析		开展实际钻井岩心资料的观察、描述与记录；开展沉积相分析	16	☑应用 ☑综合分析
合计:			32	

五、教学方法

本课程以“夯实基础、强化实践、培养能力、注重创新”为教学理念，倡导知识传授与思维启发相结合、基础理论与实践操作相结合、综合培养学生的地质功底和实践能力。主要分为 4 种方式:

1、理论教学与岩心实物描述讲解(教师讲授、学生观测相结合)

2、岩心描述实践（学生独立实践）

3、小组讨论及汇报（学生独立实践）

4、单井岩心沉积相分析图与报告编写（之前理论讲授，学生独立完成）

六、考核内容及方式

是否排考	否
考核形式	大作业
成绩评定方式	百分制
过程成绩/%	20%
实验成绩/%	40%
结课考试成绩/%	40%

七、教材与参考书

（一）教材

自编讲义

（二）参考书目或文献

《砂岩油田岩心描述与用途》，许运新等，黑龙江科学技术出版社，2013，第二版。
《含煤岩系钻孔岩心描述》，国土资源部，中国标准出版社，2017。

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审核人：（开课系主任）陈刚强

制（修）订时间：2023 年 9 月

Core description and sedimentary facies analysis Syllabus

- **Basic Information**

  Course Title: Core description and sedimentary facies analysis

  Course Code: 160101P016

  Offering College: Petroleum college Total Credits:2

  Total Hours: 2 week Lecture Hours: 1 week

  Lab Hours:1 week Computer Lab Hours: 0

  Cours Type：Elective

  Corresponding Majors: Resource Exploration Engineering

  Prerequisite: Lithogenous Mineralogy, Stratigraphy and geohistory, Sedimentary petrology, Lithofacies palaeogeography

- **Course Introduction**

  Core description and sedimentary facies analysis is a comprehensive practical training, which enables students to master the basic skills of core observation and description, learn to judge sedimentary environment and sedimentary background based on core data, identify typical core facies markers, determine sedimentary facies, subfacies and microfacies types, and compile core observation summary report. The preliminary ability will deepen the understanding of the theory that has been learned, and lay a foundation for future practical geological research.

  Skills need to achieve. (1) To master the basic knowledge of core and the basic method of core observation and description; (2) To have the basic ability to determine sedimentary facies types by using the knowledge learned and using actual core data, logging data and seismic data; (3) Independent studying

- **Course Goal**

  Through the practice process of core observation and description course, students can grasp the basic skills of core observation and description, including the basic working methods of judging sedimentary environment and sedimentary background, identifying typical core facies markers, synthesizing core data, logging data, seismic data to determine sedimentary facies, subfacies and microfacies types. Preliminary ability to compile core observation summary report.

- **Table of Contents and Requirements**

In the form of a free combination of several groups, each group of 6-7 people, a team leader. The teaching contents include theoretical teaching, actual core observation and compilation method of single well sedimentary facies analysis map, etc. The contents, requirements and hours of the course are as follows.

Contents		Teaching content, key points, difficult points	Hours	Requirements
Part 1: Basic Core Knowledge and Core Observation Description Method				
Chapter 1 Core Concept and Drilling Coring Purpose	1.core concepts and drilling and coring purposes	Understand the concept of core and the purpose of drilling	2	☑Remember ☑Comprehension
	2. Core basics	Master the core recovery rate, number, length mark, core arrangement and other basic knowledge		☑Remember ☑Comprehension
	3.The content of the core observation description	Master the basic content of core observation description		☑Remember ☑Comprehension
Chapter 2 An introduction to Junggar basin strata and core conditions	1. General situation of Junggar Basin and characteristics of stratigraphic development Course Ideology and politics: Learning Mahu Depression core to enhance confidence in science and technology	To understand the formation development in different areas of Junggar basin and the main coring horizon of coring wells	2	☑Remember ☑Comprehension
	2.Exploration Survey, environmental analysis and core characteristics of different horizons	To understand the exploration situation, sedimentary environment and core characteristics of different layers in Junggar basin		☑Remember ☑Comprehension
Chapter 3 Method of Core Description	1. Core Description Recording Method	Master the recording method of core description, sequence and principle of core description	2	☑Comprehension ☑Application
	2. Core description method of different lithology	Master the core description method of different		☑Comprehension

		lithology		☑Application
	3. Drawing of core facies analysis map	Master the basic elements and making method of core description drawing		☑Application ☑Comprehensive analysis
Part 2: Interpretation and Practice of Core Physical Description				
1. Explanation and Practice of Basic Characteristics of Actual Core Data	Using actual core data, the basic characteristics of cores with different lithology and horizons are explained, and then the demonstration of core observation and description with standard well cores is carried out.	Demonstration of core observation and description using actual core data	10	☑Comprehension ☑Application
2. Description and analysis of core observation	Observation, description and recording of actual drilling core data; Sedimentary facies analysis using seismic and logging data	Observation, description and record of actual drilling core data and sedimentary facies analysis are carried out	16	☑Application ☑Comprehensive analysis
Total：			32	

- **Teaching Approach**

  This course takes the teaching idea of "consolidating foundation, strengthening practice, cultivating ability and emphasizing innovation", advocates the combination of knowledge imparting and thinking inspiration, basic theory and practical operation, and comprehensively cultivates students' geological foundation and practical ability. There are three main ways:

  1. Theory teaching and physical description of core (combining teacher's teaching with student's observation)

  2. Core Description Practice (Students Independent Practice)

  3.Group discussions and presentations (Student Independent Practice)

  4. Sedimentary facies analysis diagram and report compilation of single well cores (previous theoretical lectures, students completed independently)

- **Evaluation Method**

Whether to schedule the test	yes
Examination form	Project
Grade assessment method	Hundred-mark system
Process score /%	20%

Experiment score /%	40%
Final exam score /%	40%

- **Textbook and Reference**

Textbook：Handout by Instructor

Reference books：

《Description and application of core in sandstone oilfield》, Xu yunxin, Heilongjiang science and Technology Press, 2013, Second edition。

《Description of borehole core of coal-bearing rock series》, Ministry of Land and Resources of the People's Republic of China, China standard press, 2017

Organizer: (course leader) Zhang Yang

Auditor: (head of the department) Chen Gangqiang

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