中国石油大学(北京)

Oil and Gas Artificial Intelligence（Master Program）

Training plan

I. Program Introduction and Training Objectives

The Master's Program in Oil and Gas Artificial Intelligence aims to train international students. The program is based on the first-class disciplines of Geological Resources and Geological Engineering, as well as Petroleum and Natural Gas Engineering, with an interdisciplinary focus on Oil and Gas Artificial Intelligence. Through coursework, comprehensive practical projects, or thesis research, the program aims to cultivate students who possess scientific research, technological development, engineering design and construction, and engineering planning and management capabilities in fields such as petroleum and natural gas exploration and development, geothermal and other emerging energy extraction, in-situ conversion and utilization of underground energy and minerals, carbon dioxide capture and utilization, and underground energy storage.

Graduates of this program should have a solid understanding of the basic theories, advanced technical methods, and modern technological means in the field of engineering. They should possess the ability to engage in engineering design and operation, analysis and integration, research and development, management and decision-making in a specific field within this domain. They should also have a strong grasp of the current technological status and development trends in this field, as well as possess practical engineering skills and a certain level of innovation ability.

II.Training Directions：

（1）Intelligent Petroleum Engineering

（2）Intelligent Exploration Engineering

III. Training Mode and Duration:

The training mode and duration of this program are divided into two types:

（1）Course-based：The course-based master's program has a duration of 12 months, with a maximum study period of 15 months. In the first autumn and spring semesters after enrollment, students will participate in unified course learning. During the summer short semester, under the guidance of a supervisor, students will undertake comprehensive project practice. After the completion of the practice, they will submit a practice report and participate in the defense organized by the university. Within the prescribed study period, students who fulfill the

requirements of the training plan, achieve satisfactory results in coursework, and complete the comprehensive project practice will be awarded a graduation certificate.

（2）Thesis-based：The thesis-based master's program has a duration of 24 months, with a maximum study period of 36 months. In the first year, students will participate in unified course learning in the autumn and spring semesters. At the end of the first year, students who meet the requirements of the training plan can apply to switch to the thesis-based program. Before the end of the first year's spring semester, students will select a supervisor, determine the topic for their thesis, and enter the research stage. The thesis research, from proposal defense to final defense, should not be less than 6 months. Within the prescribed study period, students who pass the thesis evaluation and defense can apply for a master's degree. Upon approval by the faculty committee and the university degree committee, they will be awarded a master's degree certificate and a graduation certificate.

IV. Graduation Requirements：

（1）Course-based: Obtain 30 credits, including 25 credits from coursework and 5 credits from comprehensive project practice.

（2）Thesis-based: Obtain 25 credits from coursework, complete the thesis, and pass the evaluation and defense.

V. Curriculum and examination requirements:

The curriculum emphasizes both theoretical teaching and practical training, with a focus on the application of intelligent methods in relevant fields. Assessment is conducted through course assignments, which aim to evaluate students' abilities to solve practical problems using the knowledge and intelligent methods learned in the courses.

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Course category		Course number	Course title	Credit	Class hour	Semester	Professors	Notes
Basic Compulsory Courses			Numerical Analysis	3	64	Spring	Tao Xu	
			Machine Learning	3	48	Spring	Dandan Zhu	
Chinese Culture Compulsory Course			Chinese	3	48	Autumn	Guiju Hao	Those who meet the corresponding conditions can apply for exemption
			Chinese Culture	2	32	Spring	Yang Zhou	
Core courses	Intelligence Oil and Gas Engineering		Advanced Petrophysics	2	32	Autumn	Haiyang Yu	
			Petroleum Related Rock Mechanics	2	32	Autumn	Shiyuan Li	
			Advanced Well Drilling Engineering	2	32	Spring	Dong Chen/ Bing Hou	
			Intelligent Well Completion Engineering	2	32	Spring	Qinzhuo Liao/ Mao Sheng	
			Advanced Reservoir Engineering	3	48	Spring	Xiuyu Wang	
			Intelligent Production Engineering	3	48	Spring	Cong Xiao/ Jianye Mou	
	Intelligence Exploration Engineering		Advanced Petroleum Geology	3	48	Autumn	Ruiqian Chen Pingping Li	
			Sedimentary Processes and Sedimentary Basins	2	32	Spring	Zhiyaun Ge	

			Structural Geology and Plate Tectonics	2	32	Autumn	Zhina Liu	
			Quantitative Seismic Interpretation and Prediction	2	32	Autumn	Zonghu Liao	
			Numerical Modeling on Geothermal Reservoir Engineering	2	32	Spring	Yonghui Huang	
			Reservoir Characterization	3	48	Spring	Yuanzhe Ma Qing Li	

VI.Organization and Requirements for Comprehensive Project Practice：

The overall process of comprehensive project practice includes "topic formulation - topic selection - research - defense."

Teachers related to each training direction initially propose topics for comprehensive project practice, and the head of the college will review the topics and work content. Students and teachers are involved in a mutual selection process, where the teacher proposing the topic needs to clarify the main content and requirements of the project practice. The proposing teacher should also explain the necessary conditions and preparations required to complete the project. Students autonomously choose topics, and after the supervisor's approval, it is considered a successful topic selection. Ideally, each student should have one topic. For tasks requiring collaboration among multiple students, all students choosing the topic should participate in the overall project design. Clear tasks for each student should be defined to ensure comprehensive practical training for everyone.

Upon the supervisor's review and approval for the practical report, it needs to be submitted to two teachers for evaluation and grading. The presentation and defense of the comprehensive project practice are organized and chaired by the defense committee of the student's college, composed of the project supervisors.

The evaluation of comprehensive project practice consists of 10% for the process, 40% for the review of the practical report, and 50% for the defense.

VII.Mid-Term Assessment:

The mid-term assessment is conducted in accordance with the relevant regulations of the university.

VIII.Thesis:

The thesis follows the relevant regulations for master's degree theses at the university.