ECUT Master Program for IAEA
Master's Program in Geological Resources and Geological Engineering

(First-level Discipline Code: 0818)

1. Discipline Introduction

Geological Resources and Geological Engineering originated from the earliest establishment of Radiogenic Geology and Exploration program in ECUT, which is renowned as the *Cradle of Chinese Nuclear Geoscience Talent* and a *Valuable Asset to the World's Nuclear Industry.* Numerous professionals in uranium geological exploration graduated, making significant contributions to securing the supply of uranium resources in China and the successful development of *A-bomb, H-bomb and Nuclear-powered Submarine*.

The discipline enjoys a high-level discipline in the national and the provincial wide. Focused on uranium resource exploration and development, it has formed five research directions: Mineral Survey and Exploration, Geophysical Exploration, Geospatial Information Technology, Geological Engineering, and Tourist Geography and Planning Engineering, showcasing distinct characteristics in nuclear geoscience. It has the high-level labs such as: State Key Laboratory of Nuclear Resources and Environment, a national-level international scientific and technological cooperation demonstration base, the Defense Key Discipline Laboratory of Radiogenic Geology and Exploration Technology, Jiangxi Provincial Key Laboratory of Digital Land, International Atomic Energy Agency (IAEA) Uranium Geological Training Center, and the National Experimental Teaching Demonstration Center of Radiogenic Geology, among other research and teaching platforms.

The discipline primarily cultivates professionals with solid theoretical knowledge

in basic sciences and Earth sciences, understanding the forefront development. Graduates are capable of engaging in high-level scientific and engineering tasks related to exploration, assessment, development, utilization, planning, and management in relevant fields of the discipline.

2. Discipline Directions

The master's program in Geological Resources and Geological Engineering covers three secondary disciplines:

(1) Mineral Survey and Exploration: Focuses on the geological background, metallogenic conditions, geological characteristics of uranium and radioactive mineral deposits, mineralization mechanisms, exploration of spatial distribution patterns, evolutionary trends and the establishment of metallogenic models. Researches theoretical and methodological technologies for scientifically effective mineral prediction, exploration, and evaluation, aiming to establish efficient models for mineral exploration.

(2) Geophysical Exploration: Involves the following aspects: theoretical and methodological exploration of geophysics such as gravity, magnetic, electrical, seismic, and radioactive methods, studies comprehensive exploration technologies for concealed and deep-seated mineral resources, identification and extraction of indicators for weak mineralization information and complex multi-source information, incorporates modern sensing, computer and electronic technologies, and modern numerical analysis and signal processing into geological resource exploration and development, engineering, environmental survey, and monitoring domains.

(3) Geological Engineering: Primarily delves into geological engineering issues in hydrogeology and engineering geology fields, which includes hydrogeological and engineering geological conditions assessment for mining operations, R&D of key technologies for uranium mining and metallurgy, and selection and evaluation

of sites for high-level radioactive waste geological disposal facilities.

3. Educational Objectives

The discipline aims to cultivate graduates who meet the social demands, possessing comprehensive development in all-round way. The master students should be high-level innovative and equipped for independent scientific research, teaching, management, and R&D within the field of geological resources and geological engineering and its related disciplines.

4. Schooling Length and Credit Requirements

The schooling length for the academic master's program is 3 years, with a maximum study period not exceeding 5 years.

Graduate students must accumulate a minimum of 27 credits, among which the total credits shall not be less than 23 credits for coursework (including a minimum of 13 credits for degree courses and a minimum of 10 credits for non-degree courses within the discipline). Compulsory components must amount to at least 4 credits.

5. Training Methodology

The program combines coursework study, research training, and academic exchanges, implementing a mentor system. Supervisors are responsible for devising the graduate students training plan, mid-term assessments, guiding scientific research. They also have the responsibility to guide, demonstrate, and supervise the academic competence and ethical conduct of the graduate students.

Course Arrangements

Course Category		Course	Hour	Credit	Term			Remarks
					1	2	3	
Degree Courses	Public Foundation Courses	Basic Chinese Language	48	3	√			5 Credits
		Overview of Chinese Culture	32	2		√		
	Compulsory Courses	Research Methods in Geological Resources and Geological Engineering	32	2	√			4 courses, 8 credits
		Advanced Petrology	32	2	√			
		Advanced Structural Geology	32	2	√			
		Advanced Geochemistry	32	2	√			
Non-degree Courses	Compulsory Courses for Mineral Survey and Exploration	Exploration and Evaluation of Uranium	32	2		√		5 courses, 10 credits
		Uranium Geology	32	2		√		
		Quantitative Evaluation and Prediction of Geological Resources	32	2		√		

		Metallogenic tectonics	32	2		√		
		Technology and Application of Remote Sensing	32	2		√		
		Mineragraphy	32	2		√		
	Compulsory Courses for Geophysical Exploration	Geophysical Inversion	32	2	√			
		Mineral exploration geophysics	32	2		√		
		Environmental and engineering geophysics	32	2		√		
		Nuclear Geophysical Prospecting	32	2		√		
		Computational Geophysics	32	2	√			
	Compulsory Courses for Geological Engineering	Advanced Rock Mechanics	32	2		√		
		New Technology in Geological Engineering	32	2		√		
		Underground Engineering	32	2		√		
		Modern Hydrogeology	32	2		√		
		Applied Hydrogeochemistry	32	2		√		
Compulsory Component		Literature Review		1			√	4 credits

	Thesis Proposal		1			√	(Cannot apply for defense if any component is incomplete)
	Academic Activities		1			√	
	Teaching and Research Practice		1			√	

Total Required Credits for Graduation: 27

7. Compulsory Components

(1) Literature Review (1 credit)

Graduate students should extensively read articles in the corresponding semester. Literature reading is assessed and recorded by an expert group organized by a discipline before the commencement of dissertation.

(2) Academic Report (1 credit)

In order to broaden the academic horizon of graduate students, the school encourages graduate students to attend international conferences or national high-level academic conferences during their studies and to read their academic papers and exchange speeches at the conference.

(3) Proposal Report (1 credit)

The report of topic selection should be carried out and included in postgraduate course study. Under the guidance of the supervisors, students need to clarify the research field and the topic, then develop a

plan for their thesis.

(4) Teaching and research practice (1 credit)

Students are required to actively participate in various practical activities such as scientific research, engineering design, technological development, and teaching assistance under the guidance of the supervisor.

8.Basic Degree Requirements

The relevant requirements should be implemented in accordance with the *Regulations of East China University of Technology*.