

ECUT Master Program for IAEA

Master's Program in Chemistry

For Graduate Students

(First-level Discipline Code: 0703)

I. Discipline Introduction

Chemistry founded in 1959 and stands as one of the earliest disciplines in ECUT. Currently, it is recognized as a first-class discipline in Jiangxi Province, ranking within the top 1% globally according to ESI (Essential Science Indicators). Over more than 60 years of development, it has evolved into a comprehensive primary discipline with diverse academic categories and educational levels. Presently, it encompasses five secondary disciplines: Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, Physical Chemistry, and Polymer Chemistry and Physics. The discipline primarily relies on the Department of Applied Chemistry of the School of Chemical Biology and Materials Science, the Key Laboratory of Mass Spectrometry and Instrumentation in Jiangxi Province, and the Analysis and Testing Center to conduct teaching and research activities.

In recent years, the discipline has undertaken over 200 provincial and ministerial-level research projects, including the the Major Instrumentation Special Project of the Ministry of Science and Technology, preliminary research projects of the 973 Program, National Natural Science Foundation projects and etc. totaling nearly 100 million RMB in funding. It has been honored with four first prizes and five second or third prizes in Jiangxi Province for Natural Science.

Leveraging the platform advantages of the discipline and degree programs, the discipline has targeted significant scientific issues and development needs in emerging national strategic industries such as new materials and new energy. Distinctive research teams and high-level research platforms have been established

in areas like mass spectrometer development, metal-organic framework materials, adsorption functional materials for radioactive isotopes, green synthesis methods and techniques, and green energy chemistry. It possesses several research platforms including Jiangxi Province's first Innovation And Intelligence Introduction Base For Higher Education (the "111 Plan"), the International Joint Research Center for Mass Spectrometry Science and Instruments, Jiangxi Provincial Key Laboratories, and Jiangxi Provincial Basic Experimental Teaching Demonstration Centers.

2. Discipline Directions

The master's program in Chemistry covers five secondary disciplines: Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, Physical Chemistry, and Polymer Chemistry and Physics.

(1) Inorganic Chemistry: Focuses on research in coordination chemistry, supramolecular chemistry, and inorganic materials chemistry.

(2) Organic Chemistry: Engages in research in areas such as green organic synthesis chemistry, organometallic chemistry, bioorganic chemistry, green chemistry, physical organic chemistry, and applied organic chemistry.

(3) Analytical Chemistry: Primarily involves research in the analysis of rare and radioactive elements, environmental analytical chemistry, chemical information and metrology, biomass spectrometry analysis, organic mass spectrometry analysis, synthesis of new organic reagents, and electrochemical analysis.

(4) Physical Chemistry: Focuses on research in photoelectrochemistry, catalytic chemistry, and theoretical computational chemistry.

(5) Polymer Chemistry and Physics: Concentrates on research in novel polymer synthesis, functional polymers, multiphase polymers, and their structures and properties.

3. Educational Objectives

The discipline aims to cultivate individuals who meet the social demands, possessing comprehensive development in all-round way. The masters should be high-level innovative and equipped for independent scientific research, teaching, management, and R&D within the field of Chemistry 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.

6. Course Arrangement

Category		Course Title	Hour	Credit	Term			Remarks
					1	2	3	
Degree Courses	Public Basic Course	Basic Chinese language	48	3	√			5 credits
		Overview of Chinese Culture	32	2		√		
	Major Required Course	Advanced Inorganic Chemistry	32	2	√			4 courses 8 credits
		Advanced Organic Chemistry	32	2	√			
		Advanced Analytical Chemistry	32	2	√			
		Mass Spectrometry	32	2	√			
	Non-degree Courses	Major Elective Courses	Frontiers of Chemistry	32	2	√		
Modern Separation Technology			32	2		√		
Organic Structural Analysis			32	2		√		
Modern Synthetic Chemistry			32	2		√		
Characterization Technology of Material Structure			32	2		√		
Polymer Chemistry and Physics			32	2		√		

		Advanced Physical Chemistry	32	2		√	
		Green Energy Chemistry (Bilingual)	32	2		√	
Compulsory Components		Literature Review		1			√
		Thesis Proposal		1			√
		Academic Activity		1			
		Teaching and Scientific Research Practice		1			
							4 credits (Cannot apply for defense if any component is incomplete)

Total Required Credits for Graduation: 27

7. Compulsory Components

(1) Thesis Proposal

The thesis proposal comprises two parts: literature review and research plan. Before writing the thesis proposal, master's students should read at least 50 high-level papers. The literature review section summarizes and generalizes the previous work related to the research. The research plan section presents the significance of the topic, research content, expected goals, research methods, implementation plans, and schedule. This should be completed by the end of the fourth semester.

(2) Mid-term Assessment

During the mid-term assessment, graduate students should have completed course studies, the thesis proposal, and submitted materials to school. This should be completed by the end of the fourth semester.

(3) Academic Activities

Postgraduates should participate in more than 15 academic activities in the school, including participation in international, national, and provincial academic conferences or internal and external academic lectures at the university. Students must maintain a complete list academic reports after participating in academic seminars.

(4) Practical Components

During their studies, master's students must participate in teaching assistant activities, assisting in theoretical and practical courses in related majors as teaching assistants, under the guidance of the instructor. The workload for teaching assistant activities is 30 hours. After passing the assessment, credits are given.

8. Basic Degree Requirements

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