MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

MASTER'S PROGRAM

Level of education: **Master's**
Major: **Inorganic Chemistry**
English name: **Inorganic Chemistry**
Code: **8440113**
Type of education: **Full-time**

Binh Dinh, 2025

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QUY NHON UNIVERSITY

SOCIALIST REPUBLIC OF VIET NAM
Independence - Freedom - Happiness

MASTER'S PROGRAM

(Issued together with Decision No. 487/QĐ-ĐHQN dated February 14, 2025 of the Rector of Quy Nhon University)

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1. PROGRAM OBJECTIVES (POs)

1.1. General Objectives

The application-oriented Master's program in Inorganic Chemistry aims to cultivate graduate students with strong political integrity and professional ethics, a commitment to community service, advanced theoretical and experimental knowledge in Inorganic Chemistry, practical skills and the capacity to develop and apply fundamental research outcomes and source technologies into technological solutions, adaptability to the socio-economic environment, and the ability to effectively address scientific, technical, and technological problems in the fields of Theoretical Chemistry, Physical Chemistry, and related disciplines.

1.2. Specific Objectives (Program Outcomes – POs)

– In terms of knowledge:

PO1: To equip learners with advanced knowledge in Chemistry and related fields, as well as in-depth theoretical, practical, and applied knowledge in Inorganic Chemistry.

– In terms of skills:

PO2: To develop skills in problem identification, problem-solving, and collaboration in interdisciplinary and multidisciplinary environments; critical thinking, analysis, synthesis, and scientific evaluation of data and information in Chemistry in general and in the specialized field of Inorganic Chemistry in particular.

PO3: To develop skills in knowledge dissemination and communication; skills in utilizing, innovating, and developing appropriate methodologies and technologies in Chemistry, particularly within the specialized domain of Inorganic Chemistry.

– In terms of autonomy and responsibility:

PO4: To cultivate professional ethics and academic integrity; personal responsibility, responsibility to professional teams, and to society; the capacity for self-direction and adaptability to changing professional environments; the ability to guide others in fulfilling professional tasks; and the ability to manage, evaluate, and improve work methods to enhance professional effectiveness.

2. EMPLOYMENT OPPORTUNITIES AND FURTHER STUDY PROSPECTS

Graduates from the Inorganic Chemistry program are qualified to:

1. Teach at upper secondary, vocational, college, and university levels;
2. Work at production facilities and research centers;
3. Pursue doctoral studies.

3. PROGRAM LEARNING OUTCOMES (PLOs)

The program is designed to ensure that graduates achieve the following learning outcomes:

– In terms of knowledge:

PLO1: Ability to apply advanced principles and theories in Chemistry, as well as specialized and cutting-edge knowledge in Inorganic Chemistry, to solve chemical problems.

PLO2: Ability to evaluate results of fundamental research and apply these results to address practical issues related to chemical processes, and the structure and properties of matter and materials.

PLO3: Ability to apply interdisciplinary knowledge and scientific research methodologies to organize applied research and develop source technologies.

– In terms of skills:

PLO4: Ability to analyze, synthesize, and evaluate data and information in Chemistry in general and Inorganic Chemistry in particular, and to propose scientifically sound solutions for real-world problems.

PLO5: Ability to communicate scientific knowledge and exchange academic ideas and to discuss issues in Chemistry in general and Inorganic Chemistry in particular with both specialists and non-specialists.

PLO6: Skills in organizing and managing research activities related to methods and technologies involving chemical processes, and the structure and properties of matter and materials.

PLO7: Foreign language proficiency equivalent to Level 4/6 of the Vietnamese Language Competency Framework.

– In terms of autonomy and responsibility:

PLO8: Ability to conduct independent research and collaborative research; to propose recommendations of scientific value; to manage, evaluate, and improve activities in the field of Chemistry in general and Inorganic Chemistry in particular.

PLO9: Demonstration of professional ethics and academic integrity; demonstration of personal responsibility, responsibility to the team, and to the community.

4. ENTRY REQUIREMENTS

– Holding a bachelor's degree (or equivalent level or above) in a discipline compatible with Inorganic Chemistry, or having fulfilled the requirements for bachelor's degree conferral;

– Foreign language proficiency at Level 3 or above according to the Vietnamese 6-Level Language Competency Framework, or equivalent.

Applicants holding bachelor's degrees in compatible disciplines:

No.	Master's Program Applied For	Compatible Undergraduate Programs	Notes
1	Inorganic Chemistry	– Chemistry Education	

No.	Master's Program Applied For	Compatible Undergraduate Programs	Notes
		– Natural Science Education – Chemistry – Pharmaceutical Chemistry – Chemical Engineering – Chemical Engineering Technology – Environmental Engineering Technology – Food Technology	

– Applicants holding bachelor's degrees requiring supplementary coursework: List of programs requiring supplementary coursework and courses to be completed prior to admission to the Master's program in Inorganic Chemistry:

No.	Master's Program Applied For	Programs Requiring Supplementary Knowledge	Supplementary Courses	Notes
1	Inorganic Chemistry	– Materials Technology – Materials Science – Materials Engineering – Metallic Materials Engineering – Environmental Engineering – Food Engineering – Environmental Science – Biomedical Engineering *(Other disciplines will be considered on a case-by-case basis)*	– Inorganic Chemistry – Organic Chemistry – Theoretical and Physical Chemistry	*Depending on specific cases, the Faculty proposes the selection of the number of supplementary courses*

5. ADMISSION REQUIREMENTS

In accordance with the Regulations on Admission and Training at the Master's Level of Quy Nhon University, issued under Decision No. 2705/QD-DHQN dated 21 October 2021 and the Amendment and Supplementary Decision No. 926/QD-DHQN dated 25 April 2022.

6. DURATION AND TOTAL CREDIT LOAD

6.1. Training duration: 2 years

6.2. Total credit load for the entire program: **60 credits** (including **06 credits** for internships and **09 credits** for the Master's Project)

Program Structure	Credits
General Knowledge	**3**
Foundational and Specialized Knowledge	**48**
Compulsory courses	30
Elective courses	18
Master's Project	**9**
Total	**60**

7. TRAINING METHOD, GRADUATION REQUIREMENTS

7.1. Training Method

Training is conducted under a credit-based system in compliance with the current regulations of the Ministry of Education and Training and Quy Nhon University.

7.2. Graduation requirements

In accordance with the current regulations of the Ministry of Education and Training and Quy Nhon University:

a) Completion of all courses in the training program and successful defense of the Master's Project;

b) Foreign language proficiency meeting the program's learning outcome requirements at the time of graduation review, evidenced by a degree or certificate of foreign language proficiency equivalent to Level 4 of the Vietnamese 6-Level Language Competency Framework as specified in the Appendix of the Regulations on Admission and Training at Master's Level of Quy Nhon University, or other equivalent certificates announced by the Ministry of Education and Training, or a bachelor's degree or above in a foreign language program, or a bachelor's degree or above in another program conducted entirely in a foreign language;

c) Fulfillment of all obligations as required by Quy Nhon University; not subject to criminal prosecution and not under disciplinary action or suspension from studies.

8. LEARNING ASSESSMENT

8.1. Grading scale

A 10-point grading scale is used for all forms of assessment within courses.

8.2. Assessment formats and weightings

– *Lecture, practical, and internship courses:*

No.	Assessment Format	Weighting
1	**Progress Asessment**	40%
2	**Final Exam**	60%

– *Master's Project course:* Implemented in accordance with the Regulations on Admission and Training at Master's Level of Quy Nhon University. Specific criteria are detailed in the M4 document of the course.

8.3. Assessment methods

The assessment methods employed in the Master's program in Inorganic Chemistry are divided into two main categories: formative assessment and summative assessment.

9. PROGRAM CONTENT

No.	Course Code	Course Name	Semester	Number of credits				Prerequisite Code	Managing Faculty	Notes
				Total	Lecture	Tutorial	Lab/Field			
I. General Knowledge Component (Compulsory)				**3**						
1	TNTH 501	Philosophy	1	3	2	1			Faculty of Political Theory, Law and Public Administration	
II. Foundational and Specialized Knowledge				**54**						
II.1. Compulsory				36						
2	HHVC 037	Advanced Inorganic Chemistry	1	3	2	1			Faculty of Natural Sciences	
3	HHVC 002	Advanced Organic Chemistry	1	3	2	1			Faculty of Natural Sciences	
4	HHVC 003	Advanced Theoretical and Physical Chemistry	1	3	2		1		Faculty of Natural Sciences	
5	HHVC 036	Statistical Analysis of Chemical Experimental Data	1	2	1	0.3	0.7		Faculty of Natural Sciences	

No.	Course Code	Course Name	Semester	Number of credits				Prerequisite Code	Managing Faculty	Notes
				Total	Lecture	Tutorial	Lab/Field			
6	HHVC 005	Research Methodology in Specialized Chemistry	1	2	1.7	0.3			Faculty of Natural Sciences	
7	HHVC 038	Materials Characterization	2	3	2		1	HHVC001 HHVC002	Faculty of Natural Sciences	
8	HHVC 039	Coordination Chemistry and Applications	2	2	1.4	0.3	0.3	HHVC001 HHVC002	Faculty of Natural Sciences	
9	HHVC 031	Selected Topics in Inorganic Chemistry	2	3	2.4	0.4	0.2	HHVC001	Faculty of Natural Sciences	
10	HHVC 040	Advanced Inorganic Materials	3	3	2.7		0.3	HHVC001 HHVC002	Faculty of Natural Sciences	
11	HHVC 010	Professional Internship 1	3	3			3	HHVC001 HHVC002 HHVC003 HHVC005	Faculty of Natural Sciences	
12	HHVC 011	Professional Internship 2	3	3			3	HHVC001 HHVC002 HHVC003 HHVC005	Faculty of Natural Sciences	
II.2. Optional (Select 6 courses)				18						
13	HHVC 012	Medicinal Chemistry and Pharmacognosy	2	3	2.3	0.3	0.4	HHVC002	Faculty of Natural Sciences	
14	HHVC 041	Green Chemistry	2	3	2		1	HHVC001 HHVC002	Faculty of Natural Sciences	
15	HHVC 014	Materials for Energy and Environment Applications	2	3	2.7		0.3	HHVC001 HHVC002 HHVC003	Faculty of Natural Sciences	
16	HHVC 042	Chemical Applications in Environmental Treatment	2	3	2.7		0.3	HHVC001 HHVC003	Faculty of Natural Sciences	
17	HHVC 016	Solid Waste Recycling and Reuse Technology	2	3	2		1	HHVC001 HHVC002	Faculty of Natural Sciences	

No.	Course Code	Course Name	Semester	Number of credits				Prerequisite Code	Managing Faculty	Notes
				Total	Lecture	Tutorial	Lab/Field			
18	HHVC 043	Analytical Methods Applied in Inorganic Chemistry	2	3	2	0.7	0.3	HHVC001 HHVC003	Faculty of Natural Sciences	
19	HHVC 018	Applied Computational Chemistry	2	3	2		1	HHVC003	Faculty of Natural Sciences	
20	HHVC 032	Inorganic Substances Production Technology	2	3	2.7		0.3	HHVC001	Faculty of Natural Sciences	
21	HHVC 020	Applied Crystallography	2	3	2	1		HHVC001	Faculty of Natural Sciences	
22	HHVC 044	Bioinorganic Chemistry	3	3	2.1		0.9	HHVC007	Faculty of Natural Sciences	
23	HHVC 045	Food Biochemistry	3	3	2	1		HHVC001 HHVC002	Faculty of Natural Sciences	
24	HHVC 023	Material Modelling and Computation	3	3	2		1	HHVC001 HHVC003	Faculty of Natural Sciences	
25	HHVC 046	Spectroscopic Methods in Chemistry	3	3	2	0.6	0.4	HHVC001 HHVC002	Faculty of Natural Sciences	
26	HHVC 047	Inorganic Pigments	3	3	2		1	HHVC003 HHVC007	Faculty of Natural Sciences	
27	HHVC 026	Catalysis	3	3	2		1	HHVC001 HHVC002	Faculty of Natural Sciences	
28	HHVC 048	Applied Electrochemistry	3	3	2.5	0.3	0.2	HHVC003	Faculty of Natural Sciences	
29	HHVC 028	Surface Chemistry at The Nanoscale	3	3	2		1	HHVC001 HHVC002 HHVC003	Faculty of Natural Sciences	
30	HHVC 029	Silicate Chemistry	3	3	2	1		HHVC001	Faculty of Natural Sciences	
31	HHVC 033	Technology of Beverages	3	3	2	1		HHVC001 HHVC002	Faculty of Natural Sciences	

No.	Course Code	Course Name	Semester	Number of credits				Prerequisite Code	Managing Faculty	Notes
				Total	Lecture	Tutorial	Lab/Field			
32	HHVC 034	Applied Food Microbiology	3	3	2.3		0.7	HHVC001 HHVC002	Faculty of Natural Sciences	
33	HHVC 035	Food Fermentation Technology	3	3	2	1		HHVC001 HHVC002	Faculty of Natural Sciences	
II.3. Master's Project				**9**						
34	HHVC 049	Master's Project	4	9			9	HHVC004 HHVC005	Faculty of Natural Sciences	
Total				**60**						

10. TEACHING PLAN

No.	Course Code	Course Name	Credits	Sem. 1	Sem. 2	Sem. 3	Sem. 4	Assigned Instructors	Faculty
I. General Knowledge Component (Compulsory)									
1	TNTH501	Philosophy	3	3					
II. Foundational and Specialized Knowledge Component									
II.1. Compulsory									
2	HHVC037	Advanced Inorganic Chemistry	3	3				Dr. Truong Thi Cam Mai Dr. Pham Ngoc Thach	Faculty of Natural Sciences
3	HHVC002	Advanced Organic Chemistry	3	3				Assoc. Prof. Dr. Nguyen Thi Viet Nga Dr. Diep Thi Lan Phuong	Faculty of Natural Sciences
4	HHVC003	Advanced Theoretical and Physical Chemistry	3	3				Assoc. Prof. Dr. Nguyen Tien Trung Assoc. Prof. Dr. Nguyen Phi Hung	Faculty of Natural Sciences
5	HHVC036	Statistical Analysis of Chemical Experimental Data	2	2				Dr. Nguyen Le Tuan Assoc. Prof. Dr. Cao Van Hoang Dr. Dang Nguyen Thoai	Faculty of Natural Sciences
6	HHVC005	Research Methodology in Specialized Chemistry	2	2				Prof. Dr. Vo Vien Assoc. Prof. Dr. Nguyen Tien Trung	Faculty of Natural Sciences
7	HHVC038	Materials Characterization	3		3			Dr. Nguyen Van Thang Dr. Le Thi Thanh Lieu	Faculty of Natural Sciences

No.	Course Code	Course Name	Credits	Sem. 1	Sem. 2	Sem. 3	Sem. 4	Assigned Instructors	Faculty
8	HHVC039	Coordination Chemistry and Applications	2		2			Dr. Pham Ngoc Thach Dr. Le Canh Dinh Assoc. Prof. Dr. Huynh Thi Mien Trung	Faculty of Natural Sciences
9	HHVC031	Selected Topics in Inorganic Chemistry	3		3			Dr. Le Canh Dinh Dr. Pham Ngoc Thach Dr. Truong Thi Cam Mai	Faculty of Natural Sciences
10	HHVC040	Advanced Inorganic Materials	3			3		Dr. Tran Thi Thu Phuong Assoc. Prof. Dr. Nguyen Van Kim Assoc. Prof. Dr. Huynh Thi Minh Thanh	Faculty of Natural Sciences
11	HHVC010	Professional Internship 1	3			3		Faculty of Natural Sciences	Faculty of Natural Sciences
12	HHVC011	Professional Internship 2	3			3		Faculty of Natural Sciences	Faculty of Natural Sciences
II.2. Elective (Select 6 courses)									
13	HHVC012	Medicinal Chemistry and Pharmacognosy	3		3			Dr. Diep Thi Lan Phuong Assoc. Prof. Dr. Nguyen Thi Viet Nga	Faculty of Natural Sciences
14	HHVC041	Green Chemistry	3		3			Prof. Dr. Vo Vien Assoc. Prof. Dr. Nguyen Van Kim	Faculty of Natural Sciences
15	HHVC014	Materials for Energy and Environment Applications	3		3			Assoc. Prof. Dr. Nguyen Van Kim Assoc. Prof. Dr. Nguyen Thi Vuong Hoan	Faculty of Natural Sciences
16	HHVC042	Chemical Applications in Environmental Treatment	3		3			Assoc. Prof. Dr. Nguyen Thi Vuong Hoan Assoc. Prof. Dr. Nguyen Thi Dieu Cam Dr. Nguyen Tan Lam	Faculty of Natural Sciences
17	HHVC016	Solid Waste Recycling and Reuse Technology	3		3			Dr. Le Thi Thanh Lieu Dr. Truong Thanh Tam	Faculty of Natural Sciences

No.	Course Code	Course Name	Credits	Sem. 1	Sem. 2	Sem. 3	Sem. 4	Assigned Instructors	Faculty
18	HHVC043	Analytical Methods Applied in Inorganic Chemistry	3		3			Assoc. Prof. Dr. Cao Van Hoang Assoc. Prof. Dr. Huynh Thi Mien Trung	Faculty of Natural Sciences
19	HHVC018	Applied Computational Chemistry	3		3			Assoc. Prof. Dr. Nguyen Tien Trung Assoc. Prof. Dr. Vu Thi Ngan Dr. Nguyen Ngoc Tri	Faculty of Natural Sciences
20	HHVC032	Inorganic Substances Production Technology	3		3			Dr. Pham Ngoc Thach Dr. Huynh Thi Minh Thanh	Faculty of Natural Sciences
21	HHVC020	Applied Crystallography	3		3			Dr. Truong Thi Cam Mai Dr. Le Canh Dinh	Faculty of Natural Sciences
22	HHVC044	Bioinorganic Chemistry	3			3		Dr. Le Thi Thanh Lieu Dr. Hoang Duc An	Faculty of Natural Sciences
23	HHVC045	Food Biochemistry	3			3		Dr. Hoang Duc An Dr. Huynh Thi Minh Thanh Dr. Le Duy Thanh	Faculty of Natural Sciences
24	HHVC023	Material Modelling and Computation	3			3		Assoc. Prof. Dr. Nguyen Tien Trung Dr. Nguyen Ngoc Tri	Faculty of Natural Sciences
25	HHVC046	Spectroscopic Methods in Chemistry	3			3		Dr. Nguyen Le Tuan Dr. Le Canh Dinh	Faculty of Natural Sciences
26	HHVC047	Inorganic Pigments	3			3		Dr. Pham Ngoc Thach Assoc. Prof. Dr. Nguyen Van Kim	Faculty of Natural Sciences
27	HHVC026	Catalysis	3			3		Dr. Nguyen Van Thang Assoc. Prof. Dr. Nguyen Phi Hung Dr. Le Thi Thanh Lieu	Faculty of Natural Sciences
28	HHVC048	Applied Electrochemistry	3			3		Assoc. Prof. Dr. Huynh Thi Mien Trung Prof. Dr. Vo Vien Dr. Huynh Thi Lan Phuong	Faculty of Natural Sciences
29	HHVC028	Surface Chemistry at The Nanoscale	3			3		Assoc. Prof. Dr. Huynh Thi Mien Trung Prof. Dr. Vo Vien	Faculty of Natural Sciences

No.	Course Code	Course Name	Credits	Sem. 1	Sem. 2	Sem. 3	Sem. 4	Assigned Instructors	Faculty
30	HHVC029	Silicate Chemistry	3			3		Assoc. Prof. Dr. Nguyen Van Kim Dr. Pham Ngoc Thach	Faculty of Natural Sciences
31	HHVC033	Technology of Beverages	3			3		Dr. Hoang Duc An Dr. Le Duy Thanh	Faculty of Natural Sciences
32	HHVC034	Applied Food Microbiology	3			3		Dr. Hoang Duc An Dr. Le Duy Thanh	Faculty of Natural Sciences
33	HHVC035	Food Fermentation Technology	3			3		Dr. Hoang Duc An Dr. Le Duy Thanh	Faculty of Natural Sciences
III. Master's Project									
34	HHVC049	Master's Project	9				9	Faculty of Natural Sciences	Faculty of Natural Sciences
Total				**60**	**16**	**17**	**18**	**9**	

11. IMPLEMENTATION GUIDELINES FOR THE TRAINING PROGRAM

– This training program is applicable from the Cohort 26B admission cycle for students enrolled in the Inorganic Chemistry program.

– The training process is based on the designed curriculum, training objectives, target learners, human resource demands, and specific training requirements. For elective courses, depending on actual development trends and social needs, the academic management faculty will advise students in selecting appropriate courses.

– The Head of the academic management faculty is responsible for organizing and guiding the principles for developing detailed syllabi to ensure that objectives, content, and requirements are met, while also satisfying the needs of learners and society.

– The training program is reviewed and updated at least once every two years to keep pace with developments in the field of Inorganic Chemistry and to meet the needs of socio-economic development.

Binh Dinh, February 14, 2025

RECTOR

Assoc. Prof. Dr. Doan Duc Tung