

MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

MASTER PROGRAM

Level: **Master**

Major: **Inorganic Chemistry**

Code: **8440113**

Mode of study: **Full-time**

Binh Dinh, 2025

MASTER PROGRAM

*(Issued together with Decision No. 487/QĐ-DHQN 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 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)

– 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.

– 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.

– 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. JOB OPPORTUNITIES AND PROFESSIONAL DEVELOPMENT

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:

– 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.

– 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.

– 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 Program Applied For	Compatible Undergraduate Programs	Notes
1	Inorganic Chemistry	– Chemistry Education	

No.	Master 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 program in Inorganic Chemistry:

No.	Master 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 <i>(Other disciplines will be considered on a case-by-case basis)</i>	– Inorganic Chemistry – Organic Chemistry – Theoretical and Physical Chemistry	<i>Depending on specific cases, the Faculty proposes the selection of the number of supplementary courses</i>

5. ELIGIBLE APPLICANTS

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. PROGRAM DURATION AND TOTAL ACADEMIC WORKLOAD

6.1. Program duration: 2 years

6.2. Total academic workload: 60 credits (including **06 credits** for internship and **09 credits** for the research project)

Program Structure	Number of Credits
General Knowledge	3
Fundamental and Specialized Knowledge	48
Compulsory courses	30
Elective courses	18
Research 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 assessment components of the course.

8.2. Assessment methods and weighting

– *Lecture, practical, and internship courses:*

No.	Assessment Methods	Weighting
1	Formative Assessment	40%
2	Summative Exam	60%

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

8.3. Assessment methods

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

9. PROGRAM CONTENT

No.	Course Code	Course	Semester	Number of credits				Prerequisite Code	Department in charge	Notes
				Total	Lecture	Tutorial	Lab/Field			
I. General Knowledge (Compulsory)				3						
1	TNTH 501	Philosophy	1	3	2	1			DPSLM	
II. Fundamental and Specialized Knowledge				54						
II.1. Compulsory courses				36						
2	HHVC 037	Advanced Inorganic Chemistry	1	3	2	1			DNS	
3	HHVC 002	Advanced Organic Chemistry	1	3	2	1			DNS	
4	HHVC 003	Advanced Theoretical and Physical Chemistry	1	3	2		1		DNS	
5	HHVC 036	Statistical Analysis of Chemical Experimental Data	1	2	1	0.3	0.7		DNS	
6	HHVC 005	Research Methodology in Specialized Chemistry	1	2	1.7	0.3			DNS	
7	HHVC 038	Materials Characterization	2	3	2		1	HHVC001 HHVC002	DNS	

No.	Course Code	Course	Semester	Number of credits				Prerequisite Code	Department in charge	Notes
				Total	Lecture	Tutorial	Lab/Field			
8	HHVC 039	Coordination Chemistry and Applications	2	2	1.4	0.3	0.3	HHVC001 HHVC002	DNS	
9	HHVC 031	Selected Topics in Inorganic Chemistry	2	3	2.4	0.4	0.2	HHVC001	DNS	
10	HHVC 040	Advanced Inorganic Materials	3	3	2.7		0.3	HHVC001 HHVC002	DNS	
11	HHVC 010	Professional Internship 1	3	3			3	HHVC001 HHVC002 HHVC003 HHVC005	DNS	
12	HHVC 011	Professional Internship 2	3	3			3	HHVC001 HHVC002 HHVC003 HHVC005	DNS	
<i>II.2. Elective courses (Select 6 courses)</i>				18						
13	HHVC 012	Medicinal Chemistry and Pharmacognosy	2	3	2.3	0.3	0.4	HHVC002	DNS	
14	HHVC 041	Green Chemistry	2	3	2		1	HHVC001 HHVC002	DNS	
15	HHVC 014	Materials for Energy and Environment Applications	2	3	2.7		0.3	HHVC001 HHVC002 HHVC003	DNS	
16	HHVC 042	Chemical Applications in Environmental Treatment	2	3	2.7		0.3	HHVC001 HHVC003	DNS	
17	HHVC 016	Solid Waste Recycling and Reuse Technology	2	3	2		1	HHVC001 HHVC002	DNS	
18	HHVC 043	Analytical Methods Applied in Inorganic Chemistry	2	3	2	0.7	0.3	HHVC001 HHVC003	DNS	
19	HHVC 018	Applied Computational Chemistry	2	3	2		1	HHVC003	DNS	

No.	Course Code	Course	Semester	Number of credits				Prerequisite Code	Department in charge	Notes
				Total	Lecture	Tutorial	Lab/Field			
20	HHVC 032	Inorganic Substances Production Technology	2	3	2.7		0.3	HHVC001	DNS	
21	HHVC 020	Applied Crystallography	2	3	2	1		HHVC001	DNS	
22	HHVC 044	Bioinorganic Chemistry	3	3	2.1		0.9	HHVC007	DNS	
23	HHVC 045	Food Biochemistry	3	3	2	1		HHVC001 HHVC002	DNS	
24	HHVC 023	Material Modelling and Computation	3	3	2		1	HHVC001 HHVC003	DNS	
25	HHVC 046	Spectroscopic Methods in Chemistry	3	3	2	0.6	0.4	HHVC001 HHVC002	DNS	
26	HHVC 047	Inorganic Pigments	3	3	2		1	HHVC003 HHVC007	DNS	
27	HHVC 026	Catalysis	3	3	2		1	HHVC001 HHVC002	DNS	
28	HHVC 048	Applied Electrochemistry	3	3	2.5	0.3	0.2	HHVC003	DNS	
29	HHVC 028	Surface Chemistry at The Nanoscale	3	3	2		1	HHVC001 HHVC002 HHVC003	DNS	
30	HHVC 029	Silicate Chemistry	3	3	2	1		HHVC001	DNS	
31	HHVC 033	Technology of Beverages	3	3	2	1		HHVC001 HHVC002	DNS	
32	HHVC 034	Applied Food Microbiology	3	3	2.3		0.7	HHVC001 HHVC002	DNS	
33	HHVC 035	Food Fermentation Technology	3	3	2	1		HHVC001 HHVC002	DNS	
II.3. Research Project				9						
34	HHVC 049	Research Project	4	9			9	HHVC004 HHVC005	DNS	
Total				60						

10. TEACHING PLAN

No.	Course Code	Course	Credits	Sem. 1	Sem. 2	Sem. 3	Sem. 4	Assigned Lecturers s	Department in charge
I. General Knowledge (Compulsory)									
1	TNTH501	Philosophy	3	3					
II. Fundamental and Specialized Knowledge Component									
II.1. Compulsory courses									
2	HHVC037	Advanced Inorganic Chemistry	3	3				Dr. Truong Thi Cam Mai Dr. Pham Ngoc Thach	DNS
3	HHVC002	Advanced Organic Chemistry	3	3				Assoc. Prof. Dr. Nguyen Thi Viet Nga Dr. Diep Thi Lan Phuong	DNS
4	HHVC003	Advanced Theoretical and Physical Chemistry	3	3				Assoc. Prof. Dr. Nguyen Tien Trung Assoc. Prof. Dr. Nguyen Phi Hung	DNS
5	HHVC036	Statistical Analysis of Chemical Experimental Data	2	2				Dr. Nguyen Le Tuan Assoc. Prof. Dr. Cao Van Hoang Dr. Dang Nguyen Thoi	DNS
6	HHVC005	Research Methodology in Specialized Chemistry	2	2				Prof. Dr. Vo Vien Assoc. Prof. Dr. Nguyen Tien Trung	DNS
7	HHVC038	Materials Characterization	3		3			Dr. Nguyen Van Thang Dr. Le Thi Thanh Lieu	DNS
8	HHVC039	Coordination Chemistry and Applications	2		2			Dr. Pham Ngoc Thach Dr. Le Canh Dinh Assoc. Prof. Dr. Huynh Thi Mien Trung	DNS
9	HHVC031	Selected Topics in Inorganic Chemistry	3		3			Dr. Le Canh Dinh Dr. Pham Ngoc Thach Dr. Truong Thi Cam Mai	DNS
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	DNS
11	HHVC010	Professional Internship 1	3			3		DNS	DNS

No.	Course Code	Course	Credits	Sem. 1	Sem. 2	Sem. 3	Sem. 4	Assigned Lecturers s	Department in charge
12	HHVC011	Professional Internship 2	3			3		DNS	DNS
II.2. Elective courses (Select 6 courses)									
13	HHVC012	Medicinal Chemistry and Pharmacognosy	3		3			Dr. Diep Thi Lan Phuong Assoc. Prof. Dr. Nguyen Thi Viet Nga	DNS
14	HHVC041	Green Chemistry	3		3			Prof. Dr. Vo Vien Assoc. Prof. Dr. Nguyen Van Kim	DNS
15	HHVC014	Materials for Energy and Environment Applications	3		3			Assoc. Prof. Dr. Nguyen Van Kim Assoc. Prof. Dr. Nguyen Thi Vuong Hoan	DNS
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	DNS
17	HHVC016	Solid Waste Recycling and Reuse Technology	3		3			Dr. Le Thi Thanh Lieu Dr. Truong Thanh Tam	DNS
18	HHVC043	Analytical Methods Applied in Inorganic Chemistry	3		3			Assoc. Prof. Dr. Cao Van Hoang Assoc. Prof. Dr. Huynh Thi Mien Trung	DNS
19	HHVC018	Applied Computational Chemistry	3		3			Assoc. Prof. Dr. Nguyen Tien Trung Assoc. Prof. Dr. Vu Thi Ngan Dr. Nguyen Ngoc Tri	DNS
20	HHVC032	Inorganic Substances Production Technology	3		3			Dr. Pham Ngoc Thach Dr. Huynh Thi Minh Thanh	DNS
21	HHVC020	Applied Crystallography	3		3			Dr. Truong Thi Cam Mai Dr. Le Canh Dinh	DNS
22	HHVC044	Bioinorganic Chemistry	3			3		Dr. Le Thi Thanh Lieu Dr. Hoang Duc An	DNS
23	HHVC045	Food Biochemistry	3			3		Dr. Hoang Duc An	DNS

No.	Course Code	Course	Credits	Sem. 1	Sem. 2	Sem. 3	Sem. 4	Assigned Lecturers s	Department in charge
								Dr. Huynh Thi Minh Thanh Dr. Le Duy Thanh	
24	HHVC023	Material Modelling and Computation	3			3		Assoc. Prof. Dr. Nguyen Tien Trung Dr. Nguyen Ngoc Tri	DNS
25	HHVC046	Spectroscopic Methods in Chemistry	3			3		Dr. Nguyen Le Tuan Dr. Le Canh Dinh	DNS
26	HHVC047	Inorganic Pigments	3			3		Dr. Pham Ngoc Thach Assoc. Prof. Dr. Nguyen Van Kim	DNS
27	HHVC026	Catalysis	3			3		Dr. Nguyen Van Thang Assoc. Prof. Dr. Nguyen Phi Hung Dr. Le Thi Thanh Lieu	DNS
28	HHVC048	Applied Electrochemistry	3			3		Assoc. Prof. Dr. Huynh Thi Mien Trung Prof. Dr. Vo Vien Dr. Huynh Thi Lan Phuong	DNS
29	HHVC028	Surface Chemistry at The Nanoscale	3			3		Assoc. Prof. Dr. Huynh Thi Mien Trung Prof. Dr. Vo Vien	DNS
30	HHVC029	Silicate Chemistry	3			3		Assoc. Prof. Dr. Nguyen Van Kim Dr. Pham Ngoc Thach	DNS
31	HHVC033	Technology of Beverages	3			3		Dr. Hoang Duc An Dr. Le Duy Thanh	DNS
32	HHVC034	Applied Food Microbiology	3			3		Dr. Hoang Duc An Dr. Le Duy Thanh	DNS
33	HHVC035	Food Fermentation Technology	3			3		Dr. Hoang Duc An Dr. Le Duy Thanh	DNS
III. Research Project									
34	HHVC049	Research Project	9				9	DNS	DNS
Total				60	16	17	18	9	

11. GUIDELINES FOR TRAINING PROGRAM IMPLEMENTATION

- 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 department 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