

MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

UNDERGRADUATE PROGRAM

Level: Undergraduate

Major: Applied Mathematics

Specialization: Applied Mathematics-Informatics

Code: 7460112

Mode of Study: Full-time

Gia Lai, 2025

UNDERGRADUATE PROGRAM

(Issued together with Decision No. 2178/QĐ-ĐHQN dated August 1, 2025 of the Rector of Quy Nhon University)

Level:	Undergraduate
Major:	Applied Mathematics
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1. PROGRAM OBJECTIVES (POs)

1.1. General objectives

This program aims to train undergraduate students in Applied Mathematics gained comprehensive and modern knowledge, professional skills, diverse practical abilities, and innovative approaches in the field of mathematics and its applications; possessing good political qualities, professional ethics, and health; capable of lifelong learning; and demonstrating professional responsibility and a sense of community service, meeting the requirements of socio-economic development, national defense, security, and international integration.

1.2. Specific objectives

The program trains undergraduate students in Applied Mathematics (specializing in Applied Mathematics-Informatics) gained the following knowledge, skills, and qualities:

PO1: Modern and professional knowledge and skills in the fields of applied mathematics, informatics, computer science, and professional practice in an integrated and digital transformation environment;

PO2: Critical thinking, teamwork skills, and the ability to collaborate in solving problems within Gia Lai province, neighboring provinces, in Vietnam as well as in the world;

PO3: Independent learning and working skills, effective communication and foreign language proficiency, digital skills in professional activities, innovation capabilities, entrepreneurial mindset, and digital competence;

PO4: Political and moral qualities, responsibility in working, good health, and sense of community service.

2. JOB OPPORTUNITIES AND PROFESSIONAL DEVELOPMENT

Students who have graduated from this program are eligible for various job positions below:

- Lecturer teaching subjects related to Mathematics, Computer Science at universities and colleges;
- Teachers of Mathematics and Informatics at high schools and vocational schools;
- Researchers in the field of Mathematics and Computer Science at institutes, research centers, universities, and colleges;
- Data analysts and specialists in the application of mathematics and computer science in banks, financial corporations, economic and technology sectors, government agencies, and businesses;
- Specialists responsible for research and development, software development, system analysis and design, etc., in the fields of information technology, industry, biomedical science, finance, and insurance;

- Eligible to pursue a master's degree through master's programs at the Faculty of Mathematics and Statistics, Quy Nhon University, as well as other reputable training institutions in the country, or to continue studies abroad through international postgraduate programs.

3. PROGRAM LEARNING OUTCOMES (PLOs)

Program Learning Outcomes (PLOs)

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

PLO1: Applying general knowledge of politics, law, English for mathematics and informatics, and communication skills to practical work.

PLO2: Applying mathematical knowledge and skills to solve practical problems while upholding ethical standards and professional responsibility in an integrated environment.

PLO3: Applying knowledge and skills in information technology to solve practical problems based on professional ethics and responsibility in an integrated environment.

PLO4: Applying mathematical thinking, entrepreneurial thinking, and digital skills to propose innovative ideas that adapt to the environment.

PLO5: Knowing how to coordinate and effectively manage professional activities towards the sustainable.

PLO6: Be able to acquire and apply new knowledge in learning, research, and professional activities in mathematics and applications.

Mapping of Program Learning Outcomes (PLOs) and Program Objectives (POs):

	PO1	PO2	PO3	PO4
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PLO1				x
PLO2	x			
PLO3	x			
PLO4		x	x	
PLO5		x		
PLO6			x	x

Performance Indicators (PIs) of Program Learning Outcomes (PLOs) in the Program.

Program Learning Outcomes	Performance Indicators
PLO1: Applying general knowledge of politics, law, English for mathematics and informatics, and communication skills to practical work.	PI.1.1: Understanding political and legal knowledge and developing political and ethical qualities in practical life
	PI.1.2: Applying specialized foreign language knowledge and communication skills to in-depth study, research, and practical work.
PLO2: Applying mathematical knowledge and skills to solve practical problems while upholding ethical standards and professional responsibility in an integrated environment.	PI.2.1: Applying modern knowledge of fundamental mathematics, applied mathematics, statistics, and optimization to build mathematical models to solve practical problems arising in research, teaching, and practical applications.

	PI.2.2: Applying professional skills in mathematics and algorithms to practice, develop, and implement algorithms to solve real-world problems in professional activities related to mathematics in daily life.
PLO3: Applying knowledge and skills in information technology to solve practical problems based on professional ethics and responsibility in an integrated environment.	PI.3.1: Applying modern knowledge of computer science and information technology to solve practical problems arising in research, teaching, and practical applications.
	PI.3.2: Applying professional computer skills to practice, develop, and implement algorithms to solve real-world problems in professional activities related to Mathematics and Computer Science.
PLO4: Apply mathematical thinking, entrepreneurial thinking, and digital skills to propose innovative ideas that adapt to the environment.	PI.4.1: Applying critical and creative thinking in solving professional problems.
	PI.4.2: Applying an entrepreneurial mindset and exploring new software tools in work and study can lead to the discovery of new and creative ideas in professional activities.
PLO5: Knowing how to coordinate and effectively manage professional activities towards the sustainable	PI.5.1: Knowing how to work collaboratively in a team to complete assigned projects.

development goals of the locality, nation, and region.	PI.5.2: Knowing how to organize and lead a team to complete a professional project.
PLO6: Be able to acquire and apply new knowledge in learning, research, and professional activities in mathematics and applications.	PI.6.1: Understanding the role and importance of self-study and independent reading to identify and solve problems; being aware of lifelong learning and research.
	PI.6.2: Knowing how to apply digital technology products to learning, research, and practical work in applied mathematics.

4. PROGRAM DURATION AND TOTAL ACADEMIC WORKLOAD

4.1. Program Duration: 04 years.

4.2. Total academic workload: 135 credits (Excluding Physical Education and National Defense and Security Education)

Program structure	Number of credits
General Knowledge	24
Professional Knowledge	111
- Fundamental knowledge	52
- Specialized knowledge (if any)	40
- Supplementary Knowledge: Training and professional development in vocational skills and expertise.	4

- Supplementary Knowledge: Internships	9
- Bachelor Thesis, Alternative courses	6
Total:	135

5. ADMISSION REQUIREMENTS

Applicants must have graduated from high school or equivalent according to the current admission regulations of the Ministry of Education and Training and Quy Nhon University.

6. TRAINING METHOD, GRADUATION REQUIREMENTS

6.1. Training method: Training under the credit system is regulated by the Training Regulations of the Ministry of Education and Training and of Quy Nhon University.

6.2. Graduation Requirements:

- a) Academic Requirements: Accumulate sufficient credits and workload for the training program.
- b) Physical Education and National Defense and Security Education: Complete the prerequisite courses: Physical Education and obtain a certificate in National Defense and Security Education.
- c) Foreign Language Requirement: Possess a foreign language proficiency level that meets the program's output standards before graduation; this must be evidenced by one of the following: a foreign language diploma or certificate equivalent to Level 3 according to the 6-level Foreign Language Proficiency Framework for Vietnam as stipulated in the Appendix of this Regulation; or other equivalent certificates published by the Ministry of Education and Training; or a university degree or higher in a foreign language; or a university degree or higher in another field where the program is conducted entirely in a foreign language.
- d) Information Technology Requirement: Meets the IT proficiency standards as prescribed by Quy Nhon University.

7. TEACHING METHODS AND LEARNING ASSESSMENT

7.1. Teaching Methods

a) *Teaching methods:*

Teaching and learning methods	PLOs											
	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
	PI 1. 1	PI 1. 2	PI 2. 1	PI 2. 2	PI 3. 1	PI 3. 2	PI 4. 1	PI 4. 2	PI 5. 1	PI 5. 2	PI 6. 1	PI 6. 2
I. Face-to-Face Teaching												
1. Lecture	x	x	x	x	x	x					x	
2. Discussion		x	x	x	x	x	x	x				x
II. Indirect Teaching												
3. Open-ended questions		x	x	x	x	x	x	x			x	x
4. Problem solving			x	x	x	x				x	x	x
5. Situational learning	x	x		x	x	x					x	x
III. Experiential Learning												
6. Internship, practical experience		x	x	x	x	x				x		

IV. Interactive Teaching and Learning												
7. Discussion	x	x	x	x	x	x	x	x			x	
8. Group study							x	x	x		x	x
V. Self-Study												
9. Homework	x	x	x	x	x	x				x		x

7.2 Learning Assessment

* Grading scale:

A 10-point grading scale is used for all assessment components of the course.

* Assessment Methods, Evaluation Criteria, and Weighting:

a) Theoretical courses: The course grade consists of continuous assessment points and final exam points, with a weighting of 40%-60%, 30%-70%, or 50%-50%.

No.	Assessment Methods	Evaluation criteria	Weighting groups
1	Formative Assessment	Attendance: Required attendance time for all classes; absences should not exceed 20% of the total class time.	40% (or 30%, or 50%)
		Discussions: Proactiveness, level of enthusiasm in preparing lessons and participating in classroom activities.	
		Homeworks: Students complete one or more assignments at home. The instructor assigns specific assignments to individual students or groups of students.	

		Midterm Exam: choose one of the following assessment methods and criteria: - Students take the test in class; the lecturer specifies the criteria for evaluating the test. - Students conduct seminars or complete major assignments as required by the lecturer teaching the course; the criteria for evaluating reports, seminars, and major assignments will be specified by the lecturer.	
2	<i>Summative Assessment</i>	The evaluation criteria are based on the choice of final exam format as follows: - Students take a final written exam: The instructor specifies the content and evaluation criteria in the answer key for the final exam. - Students take an oral exam: The evaluation criteria are determined by the instructors in charge of the exam, based on the students' attitude and the content of their answers to the questions. - Students complete an essay exam: Evaluation criteria are based on the content and quality of the report.	60% (or 70% or 50%)

b) Practical courses:

Students must attend all laboratory and practical sessions. The average score of all practical sessions during the semester, rounded to one decimal place, will be the grade for the practical courses.

c) Workplace Observation, Internship/Graduation Internship

Students must attend all laboratory and practical sessions. The average score of all practical sessions during the semester, rounded to one decimal place, will be the grade for the practical courses.

d) Graduation Thesis

This is in accordance with the Regulations on undergraduate and college-level training in the credit system issued with Decision No. 1241/QĐ-DHQN dated May 15, 2014, of Quy Nhon University.

*** *Assessment Methods***

The assessment methods used in the Applied Mathematics program are divided into two main types: formative assessment and summative assessment.

8. COURSES AND THEIR RELATIONSHIP WITH PROGRAM LEARNING OUTCOMES (PLOs)

* Note: X = Direct contribution; Y = Indirect contribution; L, M, H = Level of contribution to the PLOs (Low, Medium, High);
A = Assessment of the corresponding PLO Performance Indicator (PI) conducted within the course.

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
1	1050240	Basic Information Technology	1	Fundamental knowledge	3	compulsory course					X,M							
2	1130299	Marxist-Leninist Philosophy	1	General knowledge	3	compulsory course	X,M						Y,L					
3	1090061	English 1	1	General knowledge	3	compulsory course	X,M											
4	1010443	Linear Algebra 1	1	Fundamental knowledge	3	compulsory course			X,M									
5	1010444	Calculus 1	1	Fundamental knowledge	3	compulsory course			X,M									

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
6	1010452	Discrete mathematics	1	Fundamental knowledge	3	compulsory course			X,M									
7	1120172	Physical education 1 (Football 1)	1	General knowledge	1	elective course		X,M										
8	1120175	Physical education 1 (Volleyball 1)	1	General knowledge	1	elective course		X,M										
9	1120178	Physical education 1 (Basketball 1)	1	General knowledge	1	elective course		X,M										
10	1120181	Physical education 1 (Badminton 1)	1	General knowledge	1	elective course		X,M										
11	1120184	Physical education 1	1	General knowledge	1	elective course		X,M										

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
		(Traditional Vietnamese Martial Arts 1)																
12	1120187	Physical education 1 (Taekwondo 1)	1	General knowledge	1	elective course		X,M										
13	1120190	Physical education 1 (Karatedo 1)	1	General knowledge	1	elective course		X,M										
14	1130300	Marxist-Leninist Political Economy	2	General knowledge	3	compulsory course	X, M											
15	1130049	Introduction to Law	2	General knowledge	2	compulsory course	X, M											
16	1090166	English 2	2	General knowledge	4	compulsory	X, M											

N o	Course code	Course	Se mes ter	Knowled ge	Nu mb er of cre dit s	Type Categ ory	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
						cours e												
17	2030003	Commun ication skills	2	General knowledg e	2	comp ulsor y cours e									X,L			
18	1010462	Linear Algebra 2	2	Fundame ntal knowledg e	2	comp ulsor y cours e			X,M									
19	1010445	Calculus 2	2	Fundame ntal knowledg e	3	comp ulsor y cours e			X,M									
20	1050231	Introduct ion to Database	2	Fundame ntal knowledg e	3	comp ulsor y cours e					X,M							
21	1120173	<i>Physical education</i> 2 (Football 2)	2	General knowledg e	1	electi ve cours e		X,M										
22	1120176	<i>Physical education</i> 2	2	General knowledg e	1	electi ve cours e		X,M										

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
		(Volleyball 2)																
23	1120179	Physical education 2 (Basketball 2)	2	General knowledge	1	elective course		X,M										
24	1120182	Physical education 2 (Badminton 2)	2	General knowledge	1	elective course		X,M										
25	1120185	Physical education 2 (Traditional Vietnamese Martial Arts 2)	2	General knowledge	1	elective course		X,M										
26	1120188	Physical education 2 (Taekwondo 2)	2	General knowledge	1	elective course		X,M										

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
27	1120191	Physical education 2 (Karatedo 2)	2	General knowledge	1	elective course		X,M										
28	1130301	Scientific socialism	3	General knowledge	2	compulsory course	X,M											
29	1050375	Data structures and algorithms	3	Fundamental knowledge	3	compulsory course					X,M							
30	1010446	Calculus 3	3	Fundamental knowledge	3	compulsory course			X,M									
31	1010262	Linear programming	3	Fundamental knowledge	3	compulsory course			X,M									
32	1010448	Applied Probability and Statistics	3	Fundamental knowledge	3	compulsory course			X,M									

N o	Course code	Course	Se mes ter	Knowled ge	Nu mb er of cre dit s	Type Categ ory	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
33	1010467	Industria l Internshi p	3	Internshi p	1	comp ulsor y cours e				Y,L		Y,L						
34	1010465	Soft skills	3	Supplem entary Knowled ge	2	comp ulsor y cours e									X,M	X,M		
35	1120174	<i>Physical educatio n 3 (Football 3)</i>	3	General knowledg e	1	electi ve cours e		X,M										
36	1120177	<i>Physical educatio n 3 (Volleyb all 3)</i>	3	General knowledg e	1	electi ve cours e		X,M										
37	1120180	<i>Physical educatio n 3 (Basketb all 3)</i>	3	General knowledg e	1	electi ve cours e		X,M										
38	1120183	<i>Physical educatio n 3 (Badmin ton 3)</i>	3	General knowledg e	1	electi ve cours e		X,M										

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
39	1120186	Physical education 3 (Traditional Vietnamese Martial Arts 3)	3	General knowledge	1	elective course		X,M										
40	1120189	Physical education 3 (Taekwondo 3)	3	General knowledge	1	elective course		X,M										
41	1120192	Physical education 3 (Karatedo 3)	3	General knowledge	1	elective course		X,M										
42	1130302	History of the Communist Party of Vietnam	4	General knowledge	2	compulsory course	X, M											
43	1010265	Numerical analysis	4	Fundamental knowledge	3	compulsory course			X, M,A									

N o	Course code	Course	Se mes ter	Knowled ge	Nu mb er of cre dit s	Type Categ ory	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
44	1010450	Partial and ordinary differential equations	4	Fundamental knowledge	3	compulsory course			X,M									
45	1050250	Object oriented programming	4	Specialized knowledge	3	compulsory course						X,M						
46	1050376	Algorithm analysis, design, and	4	Specialized knowledge	3	compulsory course					X,M							
47	1010466	English for mathematics and informatics	4	Supplementary Knowledge	2	compulsory course		X,M, A										
48	1120168	National Defense and Security Education I	4	General knowledge	3	compulsory course		X,M										
49	1120169	National Defense and Security	4	General knowledge	2	compulsory		X,M										

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
		Education 2				course												
50	1120170	National Defense and Security Education 3	4	General knowledge	2	compulsory course		X,M										
51	1120171	National Defense and Security Education 4	4	General knowledge	2	compulsory course		X,M										
52	1130091	Ho Chi Minh Thought	5	General knowledge	2	compulsory course	X, M, A											
53	1150422	Entrepreneurship	5	General knowledge	2	compulsory course								X,M, A				
54	1010447	Convex analysis	5	Fundamental knowledge	2	compulsory course			X,M									
55	1050377	Programming	5	Specialized	3	compulsory						X,H ,A						

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
		technique		knowledge		course												
56	1010449	Algebraic structures and applications	5	Fundamental knowledge	3	compulsory course			X,M									
57	1050378	Computer systems and networks	5	Fundamental knowledge	3	compulsory course					X,M							
58	1010468	Internship 1	5	Internship	2	compulsory course				X,M		X,M			X,M	X,M	X,M	X,M
59	1010358	Algorithmic arithmetics	6	Fundamental knowledge	3	compulsory course			X,M									
60	1010413	Machine learning	6	Specialized knowledge	3	compulsory course					X,M, A							
61	1010463	Programming with R	6	Specialized knowledge	2	compulsory				X,M								

N o	Course code	Course	Se mes ter	Knowled ge	Nu mb er of cre dit s	Type Categ ory	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
						cours e												
62	1010461	Mathem atical logic	6	Specializ ed knowledg e	3	comp ulsor y cours e			X,M									
63	1050379	Digital image processi ng	6	Specializ ed knowledg e	3	electi ve cours e						X, M						
64	1050380	Web program ming	6	Specializ ed knowledg e	3	electi ve cours e						X, M						
65	1010458	Stochasti c simulatio n and applicati ons	6	Specializ ed knowledg e	3	electi ve cours e				X,M								
66	1010456	Mathem atical models in economi cs	6	Specializ ed knowledg e	3	electi ve cours e				X,M								
67	1010459	Financial mathema tics	6	Specializ ed knowledg e	3	electi ve cours e			X,M									

N o	Course code	Course	Se mes ter	Knowled ge	Nu mb er of cre dit s	Type Cate gory	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
68	1010454	Real functions and functional analysis	7	Specialized knowledge	3	compulsory course			X,M									
69	1010453	Nonlinear optimization	7	Specialized knowledge	3	compulsory course			X,M,A									
70	1010469	Internship 2	7	Internship	2	compulsory course				X,H,A		X,M,A			X,M,A	X,M,A	X,M	X,M
71	1010455	Optimal control theory	7	Specialized knowledge	3	elective course			X,M									
72	1010359	Computer algebra	7	Specialized knowledge	3	elective course			X,M									
73	1020460	Systems and control theory	7	Specialized knowledge	3	elective course			X,M									
74	1010464	Difference and finite	7	Specialized knowledge	3	elective course			X,M									

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
		element methods																
75	1010406	Regression analysis	7	Specialized knowledge	3	elective course				X,M								
76	1010421	Calculation methods on data analytics	7	Specialized knowledge	3	elective course						X,M						
77	1050381	Introduction to time series forecasting	7	Specialized knowledge	3	elective course					X,M							
78	1050382	Introduction to Artificial Intelligence	7	Specialized knowledge	3	elective course					X,M							
79	1010470	Graduation internship	8	Internship	4	compulsory course				X,H,A		X,H,A	Y,M		X,M,A	X,M,A		
80	1010435	Mathematical modelling	8	Specialized knowledge	2	compulsory course				X,M								

No	Course code	Course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6	
							PI. 1.1	PI. 1.2	PI. 2.1	PI. 2.2	PI. 3.1	PI. 3.2	PI. 4.1	PI. 4.2	PI. 5.1	PI. 5.2	PI. 6.1	PI. 6.2
81	1010451	Complex analysis and applications	8	Specialized knowledge	3	compulsory course			X,M									
82	1010471	Graduate Thesis	8	Graduate Thesis/ Alternative courses	6	compulsory course				X,M		X,M	X,M,A				X,M,A	X,M,A
83	1010442	Theory of cryptography	8	Dissertation/ Alternative courses	2	compulsory course			X,M									
84	1010472	Mathematical modeling of control systems	8	Dissertation/ Alternative courses	2	compulsory course			X,M									
85	1050383	Contemporary issues of information technology	8	Dissertation/ Alternative courses	2	compulsory course					X,M							X,M

9. PROGRAM CONTENT

No	Course Code	Course	Semester	Number of credits	Class duration			Experimental / Practical	Others	Self-study time	Prerequisite Course Code	Department/Faculty in charge	Note
					Theory	Practice	Tests						
I. General Knowledge				24									
Compulsory courses													
I.1. Political science and law				13									
1	1130299	Marxist-Leninist Philosophy	1	3	40		10			85		DPSLM	
2	1130300	Marxist-Leninist Political Economy	2	2	27		6			57		DPSLM	
3	1130301	Scientific Socialism	3	2	27		6			57		DPSLM	
4	1130302	History of the Communist Party of Vietnam	4	2	27		6			57		DPSLM	

5	1130091	Ho Chi Minh Thought	5	2	27		6			57		DPSLM	
6	1130049	Introduction to Law	2	2	27		6			57		DPSLM	
<i>I.2. Physical Education, National Defense and Security Education</i>				12									
<i>National Defense and Security Education</i>													
7	1120168	National Defense and Security Education 1	4	3	37		16			82		CNDSE	
8	1120169	National Defense and Security Education 2	4	2	22		16			52	1120168	CNDSE	
9	1120170	National Defense and Security Education 3	4	2	14			32		44	1120169	CNDSE	
10	1120171	National Defense and	4	2	4			52		34	1120170	CNDSE	

		Security Education 4											
Physical Education: choose one of the following modules													
<i>Module 1: Football</i>													
11	1120172	Physical education (Football 1)	1	1	1	4		26		21		DPE	
12	1120173	Physical education (Football 2)	2	2	1	4		26		21	1120172	DPE	
13	1120174	Physical education (Football 3)	3	3	1	4		26		21	1120173	DPE	
<i>Module 2: Volleyball</i>													
14	1120175	Physical education (Volleyball 1)	1	1	1	4		26		21		DPE	
15	1120176	Physical education (Volleyball 2)	2	2	1	4		26		21	1120175	DPE	

16	1120177	Physical education (Volleyball 3)	3	3	1	4		26		21	1120176	DPE	
<i>Module 3: Basketball</i>													
17	1120178	Physical education (Basketball 1)	1	1	1	4		26		21		DPE	
18	1120179	Physical education (Basketball 2)	2	2	1	4		26		21	1120178	DPE	
19	1120180	Physical education (Basketball 3)	3	3	1	4		26		21	1120179	DPE	
<i>Module 4: Badminton</i>													
20	1120181	Physical education (Badminton 1)	1	1	1	4		26		21		DPE	
21	1120182	Physical education (Badminton 2)	2	2	1	4		26		21	1120181	DPE	

22	1120183	Physical education 3 (Badminton 3)	3	3	1	4			26		21	1120182	DPE	
<i>Module 5: Traditional martial arts, Viet Nam</i>														
23	1120184	Physical education 1 (Traditional Vietnamese Martial Arts 1)	1	1	1	4			26		21		DPE	
24	1120185	Physical education 2 (Traditional Vietnamese Martial Arts 2)	2	1	1	4			26		21	1120184	DPE	
25	1120186	Physical education 3 (Traditional Vietnamese Martial Arts 3)	3	1	1	4			26		21	1120185	DPE	
<i>Module 6: Taekwondo</i>														

26	1120187	Physical education 1 (Taekwondo 1)	1	1	4			26		21		DPE	
27	1120188	Physical education 2 (Taekwondo 2)	2	1	4			26		21	1120187	DPE	
28	1120189	Physical education 3 (Taekwondo 3)	3	1	4			26		21	1120188	DPE	
<i>Module 7: Karatedo</i>													
29	1120190	Physical education 1 (Karatedo 1)	1	1	4			26		21		DPE	
30	1120191	Physical education 2 (Karatedo 2)	2	1	4			26		21	1120190	DPE	
31	1120192	Physical education 3 (Karatedo 3)	3	1	4			26		21	1120191	DPE	
<i>I.3. Foreign language</i>				7									

32	1090061	English 1	1	3	30	15				90		DFL	
33	1090166	English 2	2	4	40	20				120	1090061	DFL	
<i>I.4. Social Sciences and Humanities /Mathematics, Natural Sciences- Environment, Management Science</i>				4									
34	1150422	Entrepreneurship	5	2	20	5	10			55		DFBA	
35	2030003	Communication skills	2	2	18		4	20		48		DSSH	
II. Professional Knowledge				111									
<i>II.1. Fundamental knowledge (52 credits)</i>													
36	1050240	Basic Information Technology	1	3	24	6		30		90		DIT	
37	1010443	Linear Algebra 1	1	3	30	15				90		DMS	
38	1010462	Linear Algebra 2	2	2	18	12				60	1010443	DMS	
39	1010444	Calculus 1	1	3	30	15				90		DMS	
40	1010445	Calculus 2	2	3	30	15				90	1010444	DMS	

41	1010446	Calculus 3	3	3	30	15				90	1010445	DMS	
42	1010265	Numerical analysis	4	3	35	10				90	1010443, 1010444	DMS	
43	1010447	Convex analysis	5	2	20	10				60	1010444	DMS	
44	1010262	Linear programming	3	3	30	15				90	1010443, 1010445	DMS	
45	1010358	Algorithmic arithmetics	6	3	30	15				90	1010449	DMS	
46	1010448	Applied Probability and Statistics	3	3	30	15				90	1010445	DMS	
47	1010449	Algebraic structures and applications	5	3	30	15				90	1010462	DMS	
48	1010450	Partial and ordinary differential equations	4	3	33	12				90	1010446	DMS	
49	1050231	Introduction to Database	2	3	35	10				90		DIT	

50	1050378	Computer systems and networks	5	3	30			30		90		DIT	
51	1010451	Complex analysis and applications	8	3	33	12				90		DMS	
52	1010452	Discrete Mathematics	1	3	30	15				90		DMS	
53	1050375	Data structures and algorithms	3	3	22	8		30		90		DIT	
II.2. Specialized knowledge													
II.2.1. Compulsory courses (25 credits)													
54	1010453	Nonlinear optimization	7	3	30	15				90		DMS	
55	1050376	Algorithm analysis, design, and evaluation	4	3	27	18				90		DIT	
56	1050250	Object oriented programming	4	3	20	10		30		90		DIT	
57	1050377	Programming technique	5	3	27			36		90		DIT	

58	1010463	Programming with R	6	2	20	10				60		DMS	
59	1010413	Machine learning	6	3	30	7	1	15		90		DMS	
60	1010435	Mathematical modelling	8	2	20	10				60		DMS	
61	1010454	Real functions and functional analysis	7	3	30	15				90		DMS	
62	1010461	Mathematical logic	6	3	30	15				90		DMS	
<i>II.2.1.2. Elective courses (15 credits)</i>													
<i>Choose 1 course from the following list</i>													
63	1050379	Digital image processing	6	3	30			30		90		DIT	
64	1050380	Web programming	6	3	30			30				DIT	

65	1010458	Stochastic simulation and applications	6	3	30	15				90		DMS	
<i>Choose 1 course from the following list</i>													
66	1010456	Mathematical models in economics	6	3	30	15				90		DMS	
67	1010459	Financial mathematics	6	3	30	15				90		DMS	
<i>Choose 1 course from the following list</i>													
68	1010359	Computer algebra	7	3	30	15				90		DMS	
69	1010455	Optimal control theory	7	3	30	15				90		DMS	
70	1010460	Systems and control theory	7	3	30	15				90		DMS	
<i>Choose 1 course from the following list</i>													

71	1010464	Difference and finite element methods	7	3	30	15				90		DMS	
72	1010406	Regression analysis	7	3	30			30		90		DMS	
73	1010421	Calculation methods on data analytics	7	3	25	5		30		90		DMS	
<i>Choose 1 course from the following list</i>													
74	1050381	Introduction to time series forecasting	7	3	27	6		24		90		DIT	
75	1050382	Introduction to artificial intelligence	7	3	35	5		10		90		DIT	
<i>II.3. Supplementary Knowledge</i>													
<i>Compulsory courses</i>													

II.3.1. Training and professional development in vocational skills (4 credits)													
76	1010465	Soft skills	3	2	20	8	4			60		DMS	
77	1010466	English for mathematics and informatics	4	2	20	10				60		DMS	
II.3.2. Internships (9 credits)													
78	1010467	Industrial internship	3	1					TT			DMS	
79	1010468	Internship 1	5	2					ĐA			DMS	
80	1010469	Internship 2	7	2					ĐA			DMS	
81	1010470	Graduation internship	8	4					TT			DMS	
II.4. Bachelor thesis, alternative courses													
	Bachelor thesis												
82	1010471	Bachelor thesis	8	6					KL			DMS	
	Alternative courses (6 credits)												

83	1010442	Theory of cryptography	8	2	20	10				60		DMS	
84	1010472	Mathematical modeling of control systems	8	2	20	10				60		DMS	
85	1050383	Contemporary issues of information technology	8	2	20		20			60		DIT	
Total				135									

10. TENTATIVE TEACHING PLAN

Semester 1

No	Course code	Course	N o. cr ed its	Class duration			Experi mental / Practi cal	Othe rs	Self - stud y Hou rs
				Theo ry	Prac tise	Tests			
1	1050240	Basic Information Technology	3	24	6		30		90
2	1130299	Marxist-Leninist Philosophy	3	40		10			85
3	1090061	English 1	3	30	15				90
4	1010443	Linear Algebra 1	3	30	15				90
5	1010444	Calculus 1	3	30	15				90
6	1010452	Discrete Mathematics	3	30	15				90
Total			18						
<i>Choose 1 from the list of following courses in Physical Education 1:</i>									
7	1120172	Physical education 1 (Football 1)	1	4			26		21
	1120175	Physical education 1 (Volleyball 1)	1	4			26		21
	1120178	Physical education 1 (Basketball 1)	1	4			26		21
	1120181	Physical education 1 (Badminton 1)	1	4			26		21
	1120184	Physical education 1 (Traditional Vietnamese Martial Arts 1)	1	4			26		21
	1120187	Physical education 1 (Taekwondo 1)	1	4			26		21
	1120190	Physical education 1 (Karatedo 1)	1	4			26		21

Semester 2

No	Course code	Course	N o. cr ed its	Class duration			Experi mental / Practi cal	Othe rs	Self - stud y Hou rs
				Theo ry	Prac tise	Tests			

1	1130300	Marxist-Leninist Political Economy	2	27		6			57
2	1130049	Introduction to Law	2	27		6			57
3	1090166	English 2	4	40	20				120
4	2030003	Communication skills	2	18		4	20		48
5	1010462	Linear Algebra 2	2	18	12				60
6	1010445	Calculus 2	3	30	15				90
7	1050231	Introduction to Database	3	35	10				90
Total			18						
<i>Choose 1 from the list of following courses in Physical Education 2:</i>									
12	1120173	Physical education 2 (Football 2)	1	4			26		21
	1120176	Physical education 2 (Volleyball 2)	1	4			26		21
	1120179	Physical education 2 (Basketball 2)	1	4			26		21
	1120182	Physical education 2 (Badminton 2)	1	4			26		21
	1120185	Physical education 2 (Traditional Vietnamese Martial Arts 2)	1	4			26		21
	1120188	Physical education 2 (Taekwondo 2)	1	4			26		21
	1120191	Physical education 2 (Karatedo 2)	1	4			26		21

Semester 3

No	Course code	Course	N o. cr ed its	Class duration			Experi mental / Practi cal	Othe rs	Self - stud y Hou rs
				Theo ry	Prac tise	Tests			
1	1130301	Scientific Socialism	2	27		6			57
2	1010446	Calculus 3	3	30	15				90
3	1010262	Linear programming	3	30	15				90
4	1010448	Applied Probability and Statistics	3	30	15				90
5	1050375	Data structures and algorithms	3	22	8		30		90

6	1010467	Industrial Internship	1					TT	
7	1010465	Soft skills	2	20	8	4			60
Total			17						
<i>Choose 1 from the list of following courses in Physical Education 3:</i>									
8	1120174	Physical education 3 (Football 3)	1	4			26		21
	1120177	Physical education 3 (Volleyball 3)	1	4			26		21
	1120180	Physical education 3 (Basketball 3)	1	4			26		21
	1120183	Physical education 3 (Badminton 3)	1	4			26		21
	1120186	Physical education 3 (Traditional Vietnamese Martial Arts 3)	1	4			26		21
	1120189	Physical education 3 (Taekwondo 3)	1	4			26		21
	1120192	Physical education 3 (Karatedo 3)	1	4			26		21

Semester 4

No	Course code	Course	N o. cr ed its	Class duration			Experi mental / Practi cal	Othe rs	Self - stud y Hou rs
				Theo ry	Prac tise	Tests			
1	1130302	History of the Communist Party of Vietnam	2	27		6			57
2	1010265	Numerical analysis	3	35	10				90
3	1010450	Partial and ordinary differential equations	3	33	12				90
4	1050250	Object oriented programming	3	20	10		30		90
5	1050376	Algorithm analysis, design, and evaluation	3	27	18				90
6	1010466	English for mathematics and informatics	2	20	10				60
Total			16						
<i>National Defense and Security Education (4 weeks)</i>									

7	1120168	National Defense and Security Education 1	3	37		16			82
8	1120169	National Defense and Security Education 2	2	22		16			52
9	1120170	National Defense and Security Education 3	2	14			32		44
10	1120171	National Defense and Security Education 4	2	4			52		34

Semester 5

No	Course code	Course	N o. cr ed its	Class duration			Experi mental / Practi cal	Othe rs	Self - stud y Hou rs
				Theo ry	Prac tise	Tests			
1	1130091	Ho Chi Minh Thought	2	27		6			57
2	1150422	Entrepreneurship	2	20	5	10			55
2	1010447	Convex analysis	2	20	10				60
3	1050377	Programming technique	3	27			36		90
4	1010449	Algebraic structures and applications	3	30	15				90
5	1050378	Computer systems and networks	3	30			30		90
6	1010468	Internship 1	2					ĐA	
Total			17						

Semester 6

No	Course code	Course	N o. cr ed its	Class duration			Experi mental / Practi cal	Othe rs	Self - stud y Hou rs
				Theo ry	Prac tise	Tests			
1	1010413	Machine learning	3	30	7	1	15		90
2	1010358	Algorithmic arithmetics	3	30	15				90
3	1010463	Programming with R	2	20	10				60

4	1010461	Mathematical logic	3	30	15				90
Choose 1 course from the following ones:									
5	1050379	Digital image processing	3	30			30		90
	1050380	Web programming		30			30		90
	1010458	Stochastic simulation and applications		30			30		90
Choose 1 course from the following ones:									
6	1010456	Mathematical models in economics	3	30	15				90
	1010459	Financial mathematics		30	15				90
Total			17						

Semester 7

No	Course code	Course	N o. cr ed its	Class duration			Experi mental / Practi cal	Othe rs	Self - stud y Hou rs
				Theo ry	Prac tise	Tests			
1	1010454	Real functions and functional analysis	3	30	15				90
2	1010453	Nonlinear optimization	3	30	15				90
3	1010469	Internship 2	2					ĐA	
Choose 1 course from the following ones:									
4	1010455	Optimal control theory	3	30	15				90
	1010359	Computer algebra		30	15				90
	1010460	Systems and control theory		30	15				90
Choose 1 course from the following ones:									
5	1010464	Difference and finite element methods	3	30	15				90
	1010406	Regression analysis		30			30		90

	1010421	Calculation methods on data analytics		25	5		30		90
<i>Choose 1 course from the following ones:</i>									
6	1050381	Introduction to time series forecasting	3	27	6		24		90
	1050382	Introduction to Artificial Intelligence		35	5		10		90
	Total		17						

Semester 8

No	Course code	Course	N o. cr ed its	Class duration			Experi mental / Practi cal	Othe rs	Self - stud y Hou rs
				Theo ry	Prac tise	Tests			
1	1010451	Complex analysis and applications	3	33	12				90
2	1010435	Mathematical modelling	2	20	10				60
3	1010470	Graduation internship	4					TT	
Bachelor Thesis/Alternative courses									
	<i>Bachelor Thesis</i>								
4	1010471	Bachelor Thesis	6					KL	180
	<i>Alternative courses</i>								
5	1010442	Theory of cryptography	2	20	10				60
6	1010472	Mathematical modeling of control systems	2	20	10				60
7	1050383	Contemporary issues of information technology	2	20		20			60
Total			15						

11. GUIDELINES FOR PROGRAM IMPLEMENTATION

- This training program will be implemented from the 2025-2026 academic year for students majoring in Applied Mathematics (code 7460112).
- The entire body of knowledge in the program is taught intensively over 8 semesters (4 academic years).
- The list and volume of courses presented in section 9 consist of two parts: compulsory courses that students must complete and elective courses that students can take according to the university's guidelines to diversify their specialization in line with their field of study and accumulate the required number of credits for the program.
- Each course listed in Section 9 must have a detailed course syllabus (including elective courses); Training Office, in coordination with the relevant Faculties, will develop the detailed course syllabus (according to the University's standard template) and submit it to the Rector for approval before teaching begins.
- The detailed syllabus for each course should clearly state the core content, the required periodic assessments, and the textbooks, learning materials, and reference books (specifying the title, author, and year of publication). To enable students to self-study, it should specify which relevant materials and where they can be found for this chapter.

Gia Lai, August 1, 2025

DEAN OF DEPARTMENT

***HEAD OF TRAINING
OFFICE***

***BY THE DELEGATION OF
THE RECTOR
VICE-RECTOR***

Assoc. Prof. Dr. Le Cong Trinh

Dr. Le Xuan Vinh

Dr. Đinh Anh Tuan