

MINISTRY OF EDUCATION AND TRAINING  
**QUY NHON UNIVERSITY**

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**UNDERGRADUATE PROGRAM**

Level of training : **Undergraduate**

Major: **Applied Mathematics**

Code: **7460112**

Type of education: **Full-time**

## UNDERGRADUATE PROGRAM

*(Issued together with Decision No. 2094/QĐ-ĐHQN dated July 22, 2025  
of the Rector of Quy Nhon University)*

Level of education:	<b>Undergraduate</b>
Major:	Applied Mathematics
Speciality (if any):	Applied Mathematics-Informatics
Code:	<b>7460112</b>
Type of education:	<b>Full-time</b>

### 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. EMPLOYMENT OPPORTUNITIES AND FURTHER STUDY PROSPECTS**

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. 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) used to assess the Program Learning Outcomes (PLOs) of the Auditing Program**

Program Learning Outcomes	Performance Indicators
<p><b>PLO1:</b> Applying general knowledge of politics, law, English for mathematics and informatics, and communication skills to practical work.</p>	<p><b>PI.1.1:</b> Understanding political and legal knowledge and developing political and ethical qualities in practical life</p>
	<p><b>PI.1.2:</b> Applying specialized foreign language knowledge and communication skills to in-depth study, research, and practical work.</p>
<p><b>PLO2:</b> Applying mathematical knowledge and skills to solve practical problems while upholding ethical standards and professional responsibility in an integrated environment.</p>	<p><b>PI.2.1:</b> 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.</p>

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

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

#### 4. PROGRAM DURATION AND TOTAL CREDITS

**4.1. Program Duration: 04 years.**

**4.2. Total credits: 135 credits**

<b>Program structure</b>	<b>No. Credits</b>
<b>General Knowledge</b>	<b>24</b>
<b>Professional Knowledge</b>	<b>111</b>
- Fundamental knowledge	52
- Specialized knowledge (if any)	40
- Supplementary Knowledge: Training and professional development in vocational skills and expertise.	4
- Supplementary Knowledge: Internships	9

- Dissertation, Alternative courses	6
<b>Total:</b>	<b>135</b>

## **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 METHODS, GRADUATION REQUIREMENTS**

**6.1. Training methods:** 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) Regarding Academic achievements: Accumulate sufficient credits and workload for the training program.

b) Regarding 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) Regarding foreign language proficiency: 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) Regarding IT proficiency: 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	PI 2	PI 1	PI 2	PI 1	PI 2	PI 1	PI 2	PI 1	PI 2	PI 1	PI 2
<b>I. In-person teaching</b>												
1. Lecture	x	x	x	x	x	x					x	
2. Discussion		x	x	x	x	x	x	x				x
<b>II. Indirect teaching</b>												
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
<b>III. Experiential learning</b>												
6. Internship, practical experience		x	x	x	x	x				x		

<b>IV. Interactive teaching</b>												
7. Discussion	x	x	x	x	x	x	x	x			x	
8. Group study							x	x	x		x	x
<b>V. Self-study</b>												
9. Homework	x	x	x	x	x	x				x		x

## 7.2 Learning Assessment

### \* Grading scale:

Use a 10-point scale for all forms of assessment in the course.

### \* Format, evaluation criteria, and scoring system:

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.	Format	Evaluation criteria	Weightings
1	Progress 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.	

		<p>Midterm Exam: choose one of the following assessment methods and criteria:</p> <ul style="list-style-type: none"> <li>- Students take the test in class; the lecturer specifies the criteria for evaluating the test.</li> <li>- 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.</li> </ul>	
2	<b><i>Final Exam</i></b>	<p>The evaluation criteria are based on the choice of final exam format as follows:</p> <ul style="list-style-type: none"> <li>- Students take a final written exam: The instructor specifies the content and evaluation criteria in the answer key for the final exam.</li> <li>- 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.</li> <li>- Students complete an essay exam: Evaluation criteria are based on the content and quality of the report.</li> </ul>	<p>60% (or 70% or 50%)</p>

*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) Dissertation:*

This is in accordance with the Regulations on undergraduate and college-level training in the credit system issued with Decision No. 1241/QD-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: directly related, Y: indirectly related ; L, M, H: Low/Middle/High ; A: Assessment.

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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	1	Fundamental knowledge	3	compulsory course					X,M							
2	1130299	Philosophy of Marx – Lenin	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 name	Semester	Modules	No. credits	Type of course	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 name	Semester	Modules	No. credits	Type of course	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 martial arts, Viet Nam 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	Marxism - Leninism Political Economy	2	General knowledge	3	compulsory course	X, M											
15	1130049	General law	2	General knowledge	2	compulsory course	X, M											
16	1090166	English 2	2	General knowledge	4	compulsory	X, M											

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
						course												
17	2030003	Communication skills	2	General knowledge	2	compulsory course								X,L				
18	1010462	Linear Algebra 2	2	Fundamental knowledge	2	compulsory course			X,M									
19	1010445	Calculus 2	2	Fundamental knowledge	3	compulsory course			X,M									
20	1050231	Introduction to Database	2	Fundamental knowledge	3	compulsory course				X,M								
21	1120173	Physical education 2 (Football 2)	2	General knowledge	1	elective course		X,M										
22	1120176	Physical education 2	2	General knowledge	1	elective course		X,M										

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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	<i>Physical education 2</i> (Basketball 2)	2	General knowledge	1	elective course		X,M										
24	1120182	<i>Physical education 2</i> (Badminton 2)	2	General knowledge	1	elective course		X,M										
25	1120185	<i>Physical education 2</i> (Traditional martial arts, Viet Nam 2)	2	General knowledge	1	elective course		X,M										
26	1120188	<i>Physical education 2</i> (Taekwondo 2)	2	General knowledge	1	elective course		X,M										
27	1120191	<i>Physical education</i>	2	General knowledge	1	elective		X,M										

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
		n 2 (Karatedo 2)				course												
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									
33	1010467	Industrial Internship	3	Internship	1	compulsory course				Y, L		Y, L						

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
34	1010465	Soft skills	3	Supplementary Knowledge	2	compulsory course									X,M	X,M		
35	1120174	<i>Physical education 3</i> (Football 3)	3	General knowledge	1	elective course		X,M										
36	1120177	<i>Physical education 3</i> (Volleyball 3)	3	General knowledge	1	elective course		X,M										
37	1120180	<i>Physical education 3</i> (Basketball 3)	3	General knowledge	1	elective course		X,M										
38	1120183	<i>Physical education 3</i> (Badminton 3)	3	General knowledge	1	elective course		X,M										
39	1120186	<i>Physical education 3</i> (Traditional)	3	General knowledge	1	elective course		X,M										

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
		martial arts, Viet Nam 3)																
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									
44	1010450	Partial and ordinary differential	4	Fundamental knowledge	3	compulsory course			X,M									

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
		equations																
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 1	4	General knowledge	3	compulsory course		X, M										
49	1120169	National Defense and Security Education 2	4	General knowledge	2	compulsory course		X, M										

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
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's Ideology	5	General knowledge	2	compulsory course	X, M, A											
53	1150422	Startup course	5	General knowledge	2	compulsory course							X,M, A					
54	1010447	Convex analysis	5	Fundamental knowledge	2	compulsory course			X,M									
55	1050377	Programming technique	5	Specialized knowledge	3	compulsory course					X,H, A							

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
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	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 course			X,M									

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
62	1010461	Mathematical logic	6	Specialized knowledge	3	compulsory course			X,M									
63	1050379	Digital image processing	6	Specialized knowledge	3	elective course					X,M							
64	1050380	Web programming	6	Specialized knowledge	3	elective course					X,M							
65	1010458	Stochastic simulation and applications	6	Specialized knowledge	3	elective course				X,M								
66	1010456	Mathematical models in economics	6	Specialized knowledge	3	elective course				X,M								
67	1010459	Financial mathematics	6	Specialized knowledge	3	elective course			X,M									
68	1010454	Real functions and	7	Specialized knowledge	3	compulsory			X,M									

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
		functional analysis				course												
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 element methods	7	Specialized knowledge	3	elective course			X,M									
75	1010406	Regression analysis	7	Specialized	3	elective				X,M								

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
				knowledge		course												
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							
81	1010451	Complex analysis and	8	Specialized knowledge	3	compulsory			X, M									

No	Course code	Course name	Semester	Modules	No. credits	Type of course	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
		applications				course												
82	1010471	Graduate dissertation	8	Dissertation/ 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				Class duration						

		Course Name	Semester	Number of credits	Theory	Practise	Tests	Experimental / Practical	Others	Self-study time	Prerequisite Course Code	Managing Department	Note
<b>I. General Knowledge</b>				<b>24</b>									
<b>Compulsory courses</b>													
<b><i>I.1. Political science and law</i></b>				<b><i>13</i></b>									
1	1130299	Philosophy of Marx – Lenin	1	3	40		10			85		Department of Political Education-Law-State Management	
2	1130300	Marxism-Leninism Political Economy	2	2	27		6			57		Department of Political Education-Law-State Management	
3	1130301	Scientific socialism	3	2	27		6			57		Department of Political Education-Law-State Management	

4	1130302	History of the Communist Party of Vietnam	4	2	27	6			57		Department of Political Education-Law-State Management
5	1130091	Ho Chi Minh's Ideology	5	2	27	6			57		Department of Political Education-Law-State Management
6	1130049	General law	2	2	27	6			57		Department of Political Education-Law-State Management
<b><i>I.2. Physical Education, National Defense and Security Education</i></b>			12								
<b><i>National Defense and Security Education</i></b>											
7	1120168	National Defense and Security Education 1	4	3	37	16			82		Department of Physical Education and National Defense and Security Education

8	1120169	National Defense and Security Education 2	4	2	22		16			52	1120168	Department of Physical Education and National Defense and Security Education
9	1120170	National Defense and Security Education 3	4	2	14			32		44	1120169	Department of Physical Education and National Defense and Security Education
10	1120171	National Defense and Security Education 4	4	2	4			52		34	1120170	Department of Physical Education and National Defense and Security Education
<b><i>Physical Education: choose one of the following modules</i></b>												
<b><i>Module 1: Football</i></b>												
11	1120172	Physical education (Football 1)	1	1	1	4		26		21		Department of Physical Education and National Defense and Security Education

12	1120173	Physical education (Football 2)	2	2	1	4			26		21	1120172	Department of Physical Education and National Defense and Security Education
13	1120174	Physical education (Football 3)	3	3	1	4			26		21	1120173	Department of Physical Education and National Defense and Security Education
<i>Module 2: Volleyball</i>													
14	1120175	Physical education (Volleyball 1)	1	1	1	4			26		21		Department of Physical Education and National Defense and Security Education
15	1120176	Physical education (Volleyball 2)	2	2	1	4			26		21	1120175	Department of Physical Education and National Defense and Security Education

16	1120177	Physical education (Volleyball 3)	3	3	1	4			26		21	1120176	Department of Physical Education and National Defense and Security Education
<i>Module 3: Basketball</i>													
17	1120178	Physical education (Basketball 1)	1	1	1	4			26		21		Department of Physical Education and National Defense and Security Education
18	1120179	Physical education (Basketball 2)	2	2	1	4			26		21	1120178	Department of Physical Education and National Defense and Security Education
19	1120180	Physical education (Basketball 3)	3	3	1	4			26		21	1120179	Department of Physical Education and National Defense and Security Education
<i>Module 4: Badminton</i>													

20	1120181	Physical education 1 (Badminton 1)	1	1	4			26		21		Department of Physical Education and National Defense and Security Education
21	1120182	Physical education 2 (Badminton 2)	2	1	4			26		21	1120181	Department of Physical Education and National Defense and Security Education
22	1120183	Physical education 3 (Badminton 3)	3	1	4			26		21	1120182	Department of Physical Education and National Defense and Security Education
<i>Module 5: Traditional martial arts, Viet Nam</i>												
23	1120184	Physical education 1 (Traditional martial arts, Viet Nam 1)	1	1	4			26		21		Department of Physical Education and National Defense and Security Education

24	1120185	Physical education 2 (Traditional martial arts, Viet Nam 2)	2	1	4			26		21	1120184	Department of Physical Education and National Defense and Security Education
25	1120186	Physical education 3 (Traditional martial arts, Viet Nam 3)	3	1	4			26		21	1120185	Department of Physical Education and National Defense and Security Education
<i>Module 6: Taekwondo</i>												
26	1120187	Physical education 1 (Taekwondo 1)	1	1	4			26		21		Department of Physical Education and National Defense and Security Education
27	1120188	Physical education 2 (Taekwondo 2)	2	1	4			26		21	1120187	Department of Physical Education and National Defense and Security Education

28	1120189	Physical education (Taekwondo 3)	3	3	1	4			26		21	1120188	Department of Physical Education and National Defense and Security Education
<i>Module 7: Karatedo</i>													
29	1120190	Physical education (Karatedo 1)	1	1	1	4			26		21		Department of Physical Education and National Defense and Security Education
30	1120191	Physical education (Karatedo 2)	2	2	1	4			26		21	1120190	Department of Physical Education and National Defense and Security Education
31	1120192	Physical education (Karatedo 3)	3	3	1	4			26		21	1120191	Department of Physical Education and National Defense and Security Education
<b><i>I.3. Foreign language</i></b>					7								

32	1090061	English 1	1	3	30	15				90		Department of Foreign Languages	
33	1090166	English 2	2	4	40	20				120	1090061	Department of Foreign Languages	
<b><i>I.4. Social Sciences and Humanities /Mathematics, Natural Sciences-Environment, Management Science</i></b>				4									
34	1150422	Startup course	5	2	20	5	10			55		Department of Finance, Banking and Business Administration	
35	2030003	Communication skills	2	2	18		4	20		48		Department of Social Sciences and Humanities	
<b>II. Professional Knowledge</b>				<b>111</b>									
<b><i>II.1. Fundamental knowledge (52 credits)</i></b>													
36	1050240	Basic Information	1	3	24	6		30		90		Department of Information Technology	

37	1010443	Linear Algebra 1	1	3	30	15				90		Department of Mathematics and Statistics	
38	1010462	Linear Algebra 2	2	2	18	12				60	1010443	Department of Mathematics and Statistics	
39	1010444	Calculus 1	1	3	30	15				90		Department of Mathematics and Statistics	
40	1010445	Calculus 2	2	3	30	15				90	1010444	Department of Mathematics and Statistics	
41	1010446	Calculus 3	3	3	30	15				90	1010445	Department of Mathematics and Statistics	
42	1010265	Numerical analysis	4	3	35	10				90	1010443, 1010444	Department of Mathematics and Statistics	
43	1010447	Convex analysis	5	2	20	10				60	1010444	Department of Mathematics and Statistics	

44	1010262	Linear programming	3	3	30	15				90	1010443, 1010445	Department of Mathematics and Statistics	
45	1010358	Algorithmic arithmetics	6	3	30	15				90	1010449	Department of Mathematics and Statistics	
46	1010448	Applied Probability and Statistics	3	3	30	15				90	1010445	Department of Mathematics and Statistics	
47	1010449	Algebraic structures and applications	5	3	30	15				90	1010462	Department of Mathematics and Statistics	
48	1010450	Partial and ordinary differential equations	4	3	33	12				90	1010446	Department of Mathematics and Statistics	
49	1050231	Introduction to Database	2	3	35	10				90		Department of Information Technology	
50	1050378	Computer systems and networks	5	3	30			30		90		Department of Information Technology	

51	1010451	Complex analysis and applications	8	3	33	12				90		Department of Mathematics and Statistics	
52	1010452	Discrete Mathematics	1	3	30	15				90		Department of Mathematics and Statistics	
53	1050375	Data structures and algorithms	3	3	22	8		30		90		Department of Information Technology	
<b>II.2. Specialized knowledge</b>													
<b>II.2.1. Compulsory courses (25 credits)</b>													
54	1010453	Nonlinear optimization	7	3	30	15				90		Department of Mathematics and Statistics	
55	1050376	Algorithm analysis, design, and evaluation	4	3	27	18				90		Department of Information Technology	
56	1050250	Object oriented programming	4	3	20	10		30		90		Department of Information Technology	

57	1050377	Programming technique	5	3	27			36		90		Department of Information Technology	
58	1010463	Programming with R	6	2	20	10				60		Department of Mathematics and Statistics	
59	1010413	Machine learning	6	3	30	7	1	15		90		Department of Mathematics and Statistics	
60	1010435	Mathematical modelling	8	2	20	10				60		Department of Mathematics and Statistics	
61	1010454	Real functions and functional analysis	7	3	30	15				90		Department of Mathematics and Statistics	
62	1010461	Mathematical logic	6	3	30	15				90		Department of Mathematics and Statistics	
<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		Department of Information Technology	
64	1050380	Web programming	6	3	30			30				Department of Information Technology	
65	1010458	Stochastic simulation and applications	6	3	30	15				90		Department of Mathematics and Statistics	
<i>Choose 1 course from the following list</i>													
66	1010456	Mathematical models in economics	6	3	30	15				90		Department of Mathematics and Statistics	
67	1010459	Financial mathematics	6	3	30	15				90		Department of Mathematics and Statistics	
<i>Choose 1 course from the following list</i>													
68	1010359	Computer algebra	7	3	30	15				90		Department of Mathematics and Statistics	

69	1010455	Optimal control theory	7	3	30	15				90		Department of Mathematics and Statistics	
70	1010460	Systems and control theory	7	3	30	15				90		Department of Mathematics and Statistics	
<i>Choose 1 course from the following list</i>													
71	1010464	Difference and finite element methods	7	3	30	15				90		Department of Mathematics and Statistics	
72	1010406	Regression analysis	7	3	30			30		90		Department of Mathematics and Statistics	
73	1010421	Calculation methods on data analytics	7	3	25	5			30	90		Department of Mathematics and Statistics	
<i>Choose 1 course from the following list</i>													

74	1050381	Introduction to time series forecasting	7	3	27	6		24		90		Department of Information Technology	
75	1050382	Introduction to artificial intelligence	7	3	35	5		10		90		Department of Information Technology	
<b>II.3. Supplementary Knowledge</b>													
<i>Compulsory courses</i>													
<b>II.3.1. Training and professional development in vocational skills (4 credits)</b>													
76	1010465	Soft skills	3	2	20	8	4			60		Department of Mathematics and Statistics	
77	1010466	English for mathematics and informatics	4	2	20	10				60		Department of Mathematics and Statistics	
<b>II.3.2. Internships (9 credits)</b>													

78	1010467	Industrial internship	3	1					TT			Department of Mathematics and Statistics	
79	1010468	Internship 1	5	2					ĐA			Department of Mathematics and Statistics	
80	1010469	Internship 2	7	2					ĐA			Department of Mathematics and Statistics	
81	1010470	Graduation internship	8	4					TT			Department of Mathematics and Statistics	
<b>II.4. Dissertation, alternative courses</b>													
	Dissertation												
82	1010471	Graduate dissertation	8	6					KL			Department of Mathematics and Statistics	
	<b>Alternative courses (6 credits)</b>												

83	1010442	Theory of cryptography	8	2	20	10				60		Department of Mathematics and Statistics	
84	1010472	Mathematical modeling of control systems	8	2	20	10				60		Department of Mathematics and Statistics	
85	1050383	Contemporary issues of information technology	8	2	20		20			60		Department of Information Technology	
<b>Total</b>				<b>135</b>									

## 10. TENTATIVE TEACHING PLAN

### Semester 1

No	Course code	Course name	N o. credits	Class duration			Experimental / Practical	Others	Self - study time
				Theory	Practise	Tests			
1	1050240	Basic Information	3	24	6		30		90
2	1130299	Philosophy of Marx – Lenin	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
<b>Total</b>			<b>18</b>						

*Choose 1 from the list of following courses in Physical Education 1:*

7	1120172	<i>Physical education 1 (Football 1)</i>	1	4			26		21
	1120175	<i>Physical education 1 (Volleyball 1)</i>	1	4			26		21
	1120178	<i>Physical education 1 (Basketball 1)</i>	1	4			26		21
	1120181	<i>Physical education 1 (Badminton 1)</i>	1	4			26		21
	1120184	<i>Physical education 1 (Traditional martial arts, Viet Nam 1)</i>	1	4			26		21
	1120187	<i>Physical education 1 (Taekwondo 1)</i>	1	4			26		21
	1120190	<i>Physical education 1 (Karatedo 1)</i>	1	4			26		21

### Semester 2

No	Course code	Course name	N o. credits	Class duration			Experimental / Practical	Others	Self - study time
				Theory	Practise	Tests			

1	1130300	Marxism-Leninism Political Economy	2	27		6			57
2	1130049	General 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
<b>Total</b>			<b>18</b>						
<i>Choose 1 from the list of following courses in Physical Education 2:</i>									
12	1120173	<i>Physical education 2 (Football 2)</i>	1	4			26		21
	1120176	<i>Physical education 2 (Volleyball 2)</i>	1	4			26		21
	1120179	<i>Physical education 2 (Basketball 2)</i>	1	4			26		21
	1120182	<i>Physical education 2 (Badminton 2)</i>	1	4			26		21
	1120185	<i>Physical education 2 (Traditional martial arts, Viet Nam 2)</i>	1	4			26		21
	1120188	<i>Physical education 2 (Taekwondo 2)</i>	1	4			26		21
	1120191	<i>Physical education 2 (Karatedo 2)</i>	1	4			26		21

### Semester 3

No	Course code	Course name	N o. cred its	Class duration			Experi mental / Pratic al	Othe rs	Self - stud y tim e
				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
<b>Total</b>			<b>17</b>						
<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 martial arts, Viet Nam 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 name	N o. cr ed its	Class duration			Experi mental / Pratic al	Othe rs	Self - stud y tim e
				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	
<b>Total</b>			<b>16</b>						
<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 name	N o. credits	Class duration			Experimental / Practical	Others	Self - study time
				Theory	Practise	Tests			
1	1130091	Ho Chi Minh's Ideology	2	27		6			57
2	1150422	Startup course	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	
<b>Total</b>			<b>17</b>						

### Semester 6

No	Course code	Course name	N o. credits	Class duration			Experimental / Practical	Others	Self - study time
				Theory	Practise	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
<i>Choose 1 course from the following ones:</i>									
5	1050379	Digital image processing	3	30			30		90
	1050380	Web programming		30			30		90
	1010458	Stochastic simulation and applications		30			30		90
<i>Choose 1 course from the following ones:</i>									
6	1010456	Mathematical models in economics	3	30	15				90
	1010459	Financial mathematics		30	15				90
<b>Total</b>			<b>17</b>						

### Semester 7

No	Course code	Course name	N o. credits	Class duration			Experimental / Practical	Others	Self-study time
				Theory	Practise	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	
<i>Choose 1 course from the following ones:</i>									
4	1010455	Optimal control theory	3	30	15				90
	1010359	Computer algebra		30	15				90
	1010460	Systems and control theory		30	15				90
<i>Choose 1 course from the following ones:</i>									
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
	<b>Total</b>			<b>17</b>					

### Semester 8

No	Course code	Course name	N o. cred its	Class duration			Experi mental / Pratic al	Othe rs	Self - stud y tim e
				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		
<b><i>Dissertation/Alternative courses</i></b>									
	<i>Dissertation</i>								
4	1010471	Graduate dissertation	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	
<b>Total</b>			<b>15</b>						

## 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, July 22, 2025*

**RECTOR**

**Assoc. Prof. Dr. Doan Duc Tung**