MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

UNDERGRADUATE PROGRAM

Level of education: **Undergraduate**

Major: **Data Science**

Specialization:

Code: **7460108**

Mode of Study: Full-time

Gia Lai, 2025

MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

SOCIALIST REPUBLIC OF VIET NAM
Independence - Freedom - Happiness

PROGRAM

(Issued together with Decision No. 1487/QĐ-ĐHQN dated July 1, 2025 of the Rector of Quy Nhon University)

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1. PROGRAM OBJECTIVES (POs)

1.1. General objectives

The program provides modern and full specialized knowledge for students in Data Science; the students will have the ability to apply necessary tools, techniques and methods to analysis and work with data; they will have the ability to self-study, acquire new knowledge on science and technology related to Data Science.

1.2. Specific objectives

The program helps learners:

- PO1: Possess foundational and advanced knowledge in mathematics, statistics, programming, computer science, and data science to solve real-world problems in professional practice.
- PO2: Have skills in collecting, analyzing, and processing data, modelling, constructing and programming algorithms for solving problems in Data Science.
- PO3: Be able to work independently, collaborate in teams, communicate effectively, and demonstrate foreign language proficiency as well as digital competence in professional activities and lifelong learning.
- PO4: Demonstrate professional ethics, personal responsibility, and accountability to the team, community, and society.

2. JOB OPPORTUNITIES AND PROFESSIONAL DEVELOPMENT

Students graduate from this program be able to:

- Work as a data analyst in areas as finance, banking, electronic commerce, medical, telecommunication, information technology;

- Work as a data analyst, construct predictive models and apply artificial intelligence in enterprises and organizations;

- Work as a data engineer, design, construct and manage big data system;

- Work as a data management specialist, ensuring data quality, security, and compliance with regulations in government agencies and enterprises.

- Work as a researcher and apply data science at research institutes, data analysis centers and universities, colleges;

- Teach subjects related to Data Science, applied mathematics, machine learning at universities, colleges, vocational and technical secondary schools;

- Pursue Master and Doctoral programs at prestigious domestic institutions/universities or continue to study abroad through international Master programs.

3. LEARNING OUTCOMES

Students graduate from this program be able to:

PLO1: Apply knowledge of politics, law, and communication skills to the practice of integration.	**PI1.1:** Able to present knowledge about politics and law.
	PI1.2: Able to apply communication and teamwork skills to complete data science projects and present data analysis results.
PLO2: Apply fundamental knowledge of mathematics, statistics, optimization for analyzing and data modelling.	**PI2.1:** Apply statistical methods to analysis practical data.
	PI2.2: Apply mathematics to construct optimization models in Data Science
PLO3: Apply the principles of computer science, programming language and artificial intelligence into data science.	**PI3.1:** Write and optimize source code in Python or related programming language.
	PI3.2: Construct and deploy machine learning and artificial intelligence models in data analysis.
PLO4: Develop and implement algorithms, data analysis models for solving practical problems.	**PI4.1**: Construct algorithms to analysis and process data in finance, medical, insurance.
	PI4.2: Assess the quality of models and optimize performance of algorithms.
	PI5.1: Use English in professional activity

PLO5: Use foreign language and digital tools for supporting work.	**PI5.2**: Use digital tools, modern software to process and visualize data.
PLO6: Demonstrate professional ethics, critical thinking, and lifelong learning ability in a constantly evolving data environment.	**PI6.1**: Able to express professional ethics and obey regulations on data security
	PI6.2: Update technology and new trends in Data Science.
	PI6.3: Demonstrate critical thinking and creativity in problem-solving.

4. PROGRAM DURATION AND TOTAL CREDITS

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	47
- Specialized knowledge (if any)	48
- Supplementary knowlegde	10
- Bachelor thesis, Alternative courses	6
Total	**135**

5. ADMISSION REQUIREMENTS

- Graduated from high school or an equivalent program in accordance with the current admission regulations.

6. TRAINING METHOD, GRADUATION REQUIREMENTS

6.1. Training method: Training under the credit-based education system

6.2. Graduation requirements: (specialization, prerequisite course, foreign language proficiency standard, information technology)

- Specialization: Accumulate sufficient credits and the full study load of the training program;

- Physical education, National Defense and Security Education: Finish physical education courses and obtain certificate of National Defense and Security Education;

- Foreign language: Achieve the standard of foreign language level by the regulations of the university;

- Information standard: Achieve the standard of information technology level by the regulations of the university;

7. TEACHING METHODS AND LEARNING ASSESSMENT

7.1 Teaching methods

The organization of teaching in the program is designed with a competency-based orientation, placing learners at the center. Lecturers flexibly apply methods appropriate to the characteristics of each course to foster the activeness, creativity, and self-learning capacity of students.

Main teaching methods include:

- **Deliver a presentation combined with Q&A** to convey foundational knowledge and create opportunities for two-way interaction.
- **Discuss in groups and learn in situations** aiming to train critical thinking, problem-solving and collaboration skills.
- **Guide exercises, projects, essays** helping students to apply knowledge in practical situations and develop self-study ability**.**
- **Practice, experiments, and real-world experiences** to enhance professional skills and bridge theory with practice.
- **E-learning and learning via digital foundation** to support learning flexibly, personalizing the learning process and style of students.

The choice of teaching methods is flexibly modified according to the object of each course, character of learners and learning outcomes of the training program.

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%.

STT	Format	Evaluation criteria	Weight
1	**Progress Assessment**	*Regular attendance:* The time for attending compulsory classes, with absences limited to no more than 20% of the total class hours.	40% (or 30%, or 50%)
		Discussion: Initiative and active engagement in lesson preparation and classroom activities.	

		Homework: Students do one or several homeworks. Lecturers assign specific exercises to each student or student group.	
		Mid-semester assessment: Choose one in the following forms and assessment criteria: - Students do tests at class; lecturers show specific assessment criteria for each test; - Students do seminars or do major assignments in the regulations of the teaching lecturer; The evaluation criteria for reports, seminars, and major assignments are specified by the lecturer.	
2	**Final exam**	The evaluation criteria based on the choice of final exam form as follows: - Student does a test at final exam: Lecturer gives specific content and evaluation criteria in the key answer for final exam. - Students take the oral examination: the evaluation criteria are determined by the lectures based on the students'attitude and the content of their responses. - Students take an essay examination: the 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 Implemented in accordance with the Undergraduate Training Regulations issued under Decision No. 1487/QĐ-ĐHQN dated July 1, 2021 by Quy Nhon University

**** Assessment method***

The assessment method used in the training program of Data science is divided into two main types: Formative assessment and summative assessment.

The above assessment methods help the training program achieve the learning outcomes, as given in the following table.

Matrix of the relationship between assessment methods and learning outcomes of the training program (PLOs)

Assessment method	**Learning outcomes (PLOs)**					
	1	**2**	**3**	**4**	**5**	**6**
I. Formative assessment						
1. Attendance assessment	x					x
2. Exercises assessment	x	x	x	x	x	x
3. Presentation assessment	x	x	x	x	x	x
II. Summative assessment						
4. Writing test	x	x	x	x		x
5. Multiple-choice test		x	x	x		
6. Thesis defense and oral examination	x	x	x	x	x	x
7. Report	x	x	x	x	x	x
8. Presentation assessment	x	x	x	x	x	x
9. Team-work assessment	x	x	x	x		x
10. Practice		x	x	x	x	x

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		
							1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	6.3
1	1050240	Basic Information	1	Fundamental knowledge	3	Compulsory				Y, L	X, L								
2	1130299	Marxist-Leninist Philosophy	1	General knowledge	3	Compulsory	X, L	Y, L											
3	1090061	English 1	1	General knowledge	3	Compulsory									X, L				
4	1010396	Linear Algebra	1	Fundamental knowledge	4	Compulsory				X, L	Y, L	Y, L							Y, L
5	1010397	Analysis 1	1	Fundamental knowledge	3	Compulsory				X, L		Y, L							Y, L
6	1010427	Cognition intership	1	Supplementary Knowledge	1	Compulsory											X, L	X, L	
7	1120172	Physical Education 3 (Football 1)	1	General knowledge	1	Elective course	Y, L	Y, L											
8	1120175	Physical Education 1 (Volley-ball 1)	1	General knowledge	1	Elective course	Y, L	Y, L											
9	1120178	Physical Education 1 (Basket-ball 1)	1	General knowledge	1	Elective course	Y, L	Y, L											
10	1120181	Physical Education 1 (Badminton 1)	1	General knowledge	1	Elective course	Y, L	Y, L											
11	1120184	Physical Education1 (Traditional martial arts, Viet Nam 1)	1	General knowledge	1	Elective course	Y, L	Y, L											

No	Course code	course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6		
							1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	6.3
12	1120187	Physical Education1 (Taekwondo 1)	1	General knowledge	1	Elective course	Y, L	Y, L											
13	1120190	Physical Education 1 (Karate do 1)	1	General knowledge	1	Elective course	Y, L	Y, L											
14	1130300	Marxism-Leninism Political Economy	2	General knowledge	2	Compulsory course	X, L	Y, L											
15	1130049	General Law	2	General knowledge	2	Compulsory course	X, L												
16	1090166	English 2	2	General knowledge	4	Compulsory course		Y, M							X, M, A				
17	2030003	Communication skills	2	General knowledge	2	Compulsory course		X, M	Y, L				Y, L					Y, L	
18	1010408	Introduction to Data science	3	Specialized knowledge	3	Compulsory course					X, M, A		X, L						Y, L
19	1010398	Analysis 2	2	Fundamental knowledge	4	Compulsory course				X, L		Y, L							Y, L
20	1120168	National Defense and Security Education_1	2	General knowledge	3	Compulsory course	Y, L	Y, L											
21	1120169	National Defense and Security Education_2	2	General knowledge	2	Compulsory course	Y, L	Y, L											
22	1120170	National Defense and Security Education 3	2	General knowledge	2	Compulsory course	Y, L	Y, L											
23	1120171	National Defense and Security Education 4	2	General knowledge	2	Compulsory course	Y, L	Y, L											
24	1120173	Physical Education 2 (Football 2)	2	General knowledge	1	Elective course	Y, L	Y, L											
25	1120176	Physical Education 2 (Volley-ball 2)	2	General knowledge	1	Elective course	Y, L	Y, L											

No	Course code	course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6		
							1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	6.3
26	1120179	Physical Education 2 (Basket-ball 2)	2	General knowledge	1	Elective course	Y, L	Y, L											
27	1120182	Physical Education 2 (Badminton 2)	2	General knowledge	1	Elective course	Y, L	Y, L											
28	1120185	Physical Education2 (Traditional martial arts, Viet Nam 2)	2	General knowledge	1	Elective course	Y, L	Y, L											
29	1120188	Physical Education2 (Taekwondo 2)	2	General knowledge	1	Elective course	Y, L	Y, L											
30	1120191	Physical Education 2 (Karate do 2)	2	General knowledge	1	Elective course	Y, L	Y, L											
31	1130301	Scientific Socialism	3	General knowledge	2	Compulsory course	X, M												
32	1050342	Object-Oriented Programming with Python	3	Fundamental knowledge	3	Compulsory course					X, M		Y, L						
33	1010400	Discrete mathematics	3	Fundamental knowledge	2	Compulsory course				X, M	Y, L			Y, M					
34	1010401	Linear and discrete programing	3	Fundamental knowledge	2	Compulsory course				X, M		Y, M	Y, M						
35	1010404	Probability and statistics	3	Fundamental knowledge	3	Compulsory course			X, M	X, M		Y, M							
36	1050341	Data structure and algorithms	2	Fundamental knowledge	4	Compulsory course					X, M	Y, L		X, L		Y, L			
37	1050340	Database Management System	3	Fundamental knowledge	3	Compulsory course					X, M	Y, L		Y, M		Y, M			
38	1120174	Physical Education 3 (Footbal l 3)	3	General knowledge	1	Elective course	Y, L	Y, L											

No	Course code	course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6		
							1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	6.3
39	1120177	Physical Education 3 (Volleyball 3)	3	General knowledge	1	Elective course	Y, L	Y, L											
40	1120180	Physical Education 3 (Basketball 3)	3	General knowledge	1	Elective course	Y, L	Y, L											
41	1120183	Physical Education 3 (Badminton 3)	3	General knowledge	1	Elective course	Y, L	Y, L											
42	1120186	Physical Education3 (Traditional martial arts, Viet Nam 3)	3	General knowledge	1	Elective course	Y, L	Y, L											
43	1120189	Physical Education 3 (Taekwondo 3)	3	General knowledge	1	Elective course	Y, L	Y, L											
44	1120192	Physical Education 3 (Karatedo 3)	3	General knowledge	1	Elective course	Y, L	Y, L											
45	1130302	History of Communist Party of Vietnam	4	General knowledge	2	Compulsory course	X, M												
46	1010406	Regression analysis	4	Fundamental knowledge	3	Compulsory course			X, M	X, M						Y, L			
47	1010402	Optimization Theory	4	Fundamental knowledge	3	Compulsory course				X, M		Y, M		Y, M					
48	1010415	Programming for Data Science	4	Specialized knowledge	3	Compulsory course					X, M, A		X, M			X, M			
49	1010405	Statistics Software	4	Fundamental knowledge	2	compulsory course			X, M, A							X, M			
50	1050343	Architecture and Operation of computer System	4	Specialized knowledge	3	Compulsory course						Y, L				Y, L			Y, L
51	1010428	Project course 1	4	Supplementary Knowledge	2	Compulsory course		X, M							Y, M	Y, M	X, M	X, M	X, M

No	Course code	course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6		
							1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	6.3
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		Y, M										Y, M	
54	1010399	Numerical analysis	5	Fundamental knowledge	3	Compulsory course				X, H, A				Y, M					X, M
55	1010411	Artificial intelligence	5	Specialized knowledge	3	Compulsory course			-	-		X, M				X, M, A		Y, M	
56	1010407	Multivariate Statistics	5	Fundamental knowledge	2	Compulsory course			X, H			Y, M				Y, M			
57	1010410	Data Visualization	5	Specialized knowledge	3	Elective course		Y, M								X, H, A			
58	1150489	Basic Finance	5	Specialized knowledge	3	Elective course		Y, M					X, M						
59	1010412	Data Mining	6	Specialized knowledge	3	Compulsory course						X, M, A	X, M						
60	1010413	Machine Learning	6	Specialized knowledge	3	Compulsory course						X, H, A		X, M					
61	1010403	Number theory	6	Fundamental knowledge	3	Compulsory course				X, H									X, M
62	1010416	Big data	6	Specialized knowledge	3	Compulsory course			Y, M							Y, M			
63	1010429	Project course 2	6	Supplementary Knowledge	3	Compulsory course		X, H, A							Y, M	Y, M	X, H, A		
64	1010424	Algorithm Design and Analysis	6	Specialized knowledge	3	Elective course				Y, M				X, H, A					Y, M
65	1010423	Stationary process and Applications	6	Specialized knowledge	3	Elective course				Y, M		Y, M	Y, M						
66	1050345	Computer Vision	6	Specialized knowledge	3	Elective course						X, H				X, M			
67	1010417	Digital image processing	6	Specialized knowledge	3	Elective course				Y, M								Y, M	

No	Course code	course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6		
							1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	6.3
68	1010409	Building and Managing Data Warehouses	7	Specialized knowledge	3	Compulsory course			Y, M			Y, M				Y, H,			
69	1010414	Time-Series processing	7	Specialized knowledge	3	Compulsory course							X, H, A	X, H, A					
70	1010418	Big Data Analysis	7	Specialized knowledge	3	Elective course			Y, M				X, H			X, M			
71	1050344	Natural Language Processing	7	Specialized knowledge	3	Elective course			Y, M				X, H, A			X, M			
72	1010419	Data Analysis in Finance	7	Specialized knowledge	3	Elective course			Y, M				Y, M			Y, M			
73	1010420	Data Analysis in Business	7	Specialized knowledge	3	Elective course			Y, M				Y, M			Y, M			
74	1010421	Computational Methods in Data Analysis	7	Specialized knowledge	3	Elective course			Y, M				Y, M			Y, M			
75	1010422	Statistical Theory	7	Specialized knowledge	3	Elective course			X, M			X, M	Y, M						
76	1050385	Cloud Computing	7	Specialized knowledge	3	Elective course						Y, M	Y, M			Y, M			
77	1010430	Business Internship	8	Specialized knowledge	4	Elective course		X, H, A								Y, H	X, H	X, H, A	X, H, A
78	1010375	**Bachelor thesis**	8	Graduation thesis	6	Elective course									Y, H,	Y, H,		Y, H	Y, H
79	1010432	Modern Topics in Data Science	8	**alternative courses**	2	Elective course						Y, H,						Y, H	Y, H
80	1010433	Forecasting Theory	8	**alternative courses**	2	Elective course				Y, H,			Y, H,						Y, H
81	1010434	Bayesian Statistics	8	**alternative courses**	2	Elective course			X, H, A									Y, H	
82	1010435	Mathematical Modelling	8	**alternative courses**	2	Elective course				X, H, A						Y, H			Y, H

No	Course code	course	Semester	Knowledge	Number of credits	Type Category	PLO1		PLO2		PLO3		PLO4		PLO5		PLO6		
							1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	6.3
83	1010436	Cryptography and Data Security	8	**alternative courses**	2	Elective course				Y, H							X, H, A	Y, H	

9. PROGRAM CONTENT

No	Course Code	Course name	Semester	Number of credits	Class duration			Experimental / Practical	Others (Practice, project, major assignment)	Self-study time	Prerequisite Course Code	Department/Faculty in charge	Note
					Theory	Practise	Tests						
I. General Knowledge				**24**	**(Not including 12 credits of physical education and National Defense and Security Education)**								
Compulsory													
I.1. Political science and law				***13***									
1	1130299	Marxist-Leninist Philosophy	1	3	40		10			85		Department of Political Science, Law and State Management	
2	1130300	Marxist-Leninist Political Economy	2	2	27		6			57		Department of Political Science, Law and State Management	
3	1130301	Scientific Socialism	3	2	27		6			57		Department of Political Science, Law and State Management	

4	1130302	History of the Communist Party of Vietnam	4	2	27		6			57		Department of Political Science, Law and State Management
5	1130091	Ho Chi Minh Thought	5	2	27		6			57		Department of Political Science, Law and State Management
6	1130049	Introduction to Law	2	2	27		6			57		Department of Political Science, Law and State Management
I.2. Physical education, national Defense and Security Education				12								
National Defense and Security Education												
7	1120168	National Defense and Security Education 1	2	3	37		16			82		Center for National Defense and Security Education
8	1120169	National Defense and Security Education 2	2	2	22		16			52	1120168	Center for National Defense and Security Education
9	1120170	National Defense and Security Education 3	2	2	14			32		44	1120169	Center for National Defense and Security Education
10	1120171	National Defense and Security Education 4	2	2	4			52		34	1120170	Center for National Defense and Security Education

Physical Education*: S*tudents choose one in seven groups below:													
Group 1: Football													
11	11201 72	Physical Education 1 (Football 1)	1	1	4			26		21		Departme nt of Physical Education	
12	11201 73	Physical Education 2 (Football 2)	2	1	4			26		21	1120172	Departme nt of Physical Education	
13	11201 74	Physical Education 3 (Football 3)	3	1	4			26		21	1120173	Departme nt of Physical Education	
Group 2: Volley-ball													
14	11201 75	Physical Education 1 (Volley-ball 1)	1	1	4			26		21		Departme nt of Physical Education	
15	11201 76	Physical Education 2 (Volley-ball 2)	2	1	4			26		21	1120175	Departme nt of Physical Education	
16	11201 77	Physical Education 3 (Volley-ball 3)	3	1	4			26		21	1120176	Departme nt of Physical Education	
Group 3: Basket-ball													
17	11201 78	Physical Education 1 (Basket-ball 1)	1	1	4			26		21		Departme nt of Physical Education	
18	11201 79	Physical Education 2 (Basket-ball 2)	2	1	4			26		21	1120178	Departme nt of Physical Education	
19	11201 80	Physical Education 3 (Basket-ball 3)	3	1	4			26		21	1120179	Departme nt of Physical Education	
Group 4: Badminton													
20	11201 81	Physical Education 1 (Badminton 1)	1	1	4			26		21		Departme nt of Physical Education	
21	11201 82	Physical Education 2 (Badminton 2)	2	1	4			26		21	1120181	Departme nt of	

												Physical Education	
22	1120183	Physical Education 3 (Badminton 3)	3	1	4			26		21	1120182	Department of Physical Education	
Group 5: Traditional Vietnamese Martial Arts													
23	1120184	Physical Education1 (Traditional Vietnamese Martial Arts 1)	1	1	4			26		21		Department of Physical Education	
24	1120185	Physical Education2 (Traditional Vietnamese Martial Arts 2)	2	1	4			26		21	1120184	Department of Physical Education	
25	1120186	Physical Education3 (Traditional Vietnamese Martial Arts 3)	3	1	4			26		21	1120185	Department of Physical Education	
Group 6: Taekwondo													
26	1120187	Physical Education1 (Taekwondo 1)	1	1	4			26		21		Department of Physical Education	
27	1120188	Physical Education2 (Taekwondo 2)	2	1	4			26		21	1120187	Department of Physical Education	
28	1120189	Physical Education 3 (Taekwondo 3)	3	1	4			26		21	1120188	Department of Physical Education	
Group 7: Karatedo													
29	1120190	Physical Education 1 (Karatedo 1)	1	1	4			26		21		Department of Physical Education	
30	1120191	Physical Education 2 (Karatedo 2)	2	1	4			26		21	1120190	Department of Physical Education	
31	1120192	Physical Education 3 (Karatedo 3)	3	1	4			26		21	1120191	Department of Physical Education	
I.3. Foreign language				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	
I.4. Social science/Mathematics, Natural-environment science, management science				4									
34	1150422	Entrepreneurship	5	2	20	5	10			55		Finance - Banking and Business Administration	
35	2030003	Communication Skills	2	2	18		4	20		48		Social science and Human	
II. Professional Knowledge				**111**									
II.1. **Fundamental Knowledge** ***(47 credits)***													
36	1010396	Linear Algebra	1	4	40	20				120		Mathematics and Statistics	
37	1050240	Basic Informatics	1	3	24	6		30		75		Information Technology	
38	1010397	Analysis 1	1	3	30	15				90		Mathematics and Statistics	
39	1010398	Analysis 2	2	4	40	20				120	1010397	Mathematics and Statistics	
40	1010399	Numerical Analysis	5	3	30	15				90		Mathematics and Statistics	
41	1010400	Discrete mathematics	3	2	22	8				60		Mathematics and Statistics	
42	1010401	Linear and discrete programing	3	2	22	8				60		Mathematics and Statistics	
43	1010402	Optimization theory	4	3	30	15				90		Mathematics and Statistics	

44	10104 03	Number theory	6	3	37	8				90		Mathematics and Statistics	
45	10104 04	Probability and statistics	3	3	30	15				90		Mathematics and Statistics	
46	10104 05	Statistics software	4	2	15			30		60		Mathematics and Statistics	
47	10104 06	Regression Analysis	4	3	30	15				80		Mathematics and Statistics	
48	10104 07	Multivariate Statistics	5	2	15	15				60		Mathematics and Statistics	
49	10503 40	Database Management System	3	3	20	10		30		80		Information Technology	
50	10503 41	Data structures and Algorithms	2	4	33	12		30		80		Information Technology	
51	10503 42	Object-Oriented Programming with Python	3	3	20	10		30		90		Information Technology	
II.2. **Specialized knowledge**													
II.2.1. Compulsory (33 credits)													
52	10104 08	Introduction to Data Science	3	3	24	6		30		75		Mathematics and Statistics	
53	10104 09	Building and Managing Data Warehouses	7	3	30			30		90		Mathematics and Statistics	
54	10104 10	Data Visualization	5	3	30			30		75		Mathematics and Statistics	
55	10104 11	Artificial Intelligence	5	3	30			30		90		Mathematics and Statistics	
56	10104 12	Data Mining	6	3	30			30		90		Mathematics and Statistics	

57	10104 13	Machine Learning	6	3	30	5		20		90		Mathematics and Statistics	
58	10104 14	Time-Series processing	7	3	25	5		30		90		Mathematics and Statistics	
59	10503 43	Architecture and Operation of computer System	4	3	39	6				90		Information Technology	
60	10104 15	Programming for Data Science	4	3	30			30		90		Mathematics and Statistics	
61	11504 89	Fundamental Finance	5	3	30	12	6			90		Finance-Banking and Business Management	
62	10104 16	Big Data	6	3	27	3		30		80		Mathematics and Statistics	
II.2.2. Elective courses (15 credits) *Choose 5 subjects in the list*													
63	10104 17	Digital image processing	6	3	30			30		75		Mathematics and Statistics	
64	10104 18	Big Data Analysis	7	3	30			30		80		Mathematics and Statistics	
65	10503 44	Natural Language Processing	7	3	30			30		80		Information Technology	
66	10503 45	Computer Vision	6	3	30			30		90		Information Technology	
67	10104 19	Data Analysis in Finance	7	3	30			30		90		Mathematics and Statistics	
68	10104 20	Data Analysis in Business	7	3	30			30		80		Mathematics and Statistics	

69	10104 21	Computational Methods in Data Analysis	7	3	25	5		30		90		Mathematics and Statistics	
70	10104 22	Statistical Theory	7	3	30	15				90		Mathematics and Statistics	
71	10104 23	Stationary process and Applications	6	3	30	15				90		Mathematics and Statistics	
72	10104 24	Algorithm Design and Analysis	6	3	27	18				90		Mathematics and Statistics	
73	10503 85	Cloud Computing	7	3	30			30					
II.3. **Supplementary Knowledge**													
Compulsory courses													
II.3.1. Professional training													
II.3.2. Internships (10 credits)													
74	10104 27	Cognitive Internship	1	1					45			Mathematics and Statistics	
75	10104 28	Course Project 1	4	2					90			Mathematics and Statistics	
76	10104 29	Course Project 2	6	3					135			Mathematics and Statistics	
77	10104 30	Business Internship	8	4					180			Mathematics and Statistics	
II.4. Bachelor thesis, alternative courses													
	Bachelor Thesis												
78	10103 75	Bachelor Thesis	8	6					270			Mathematics and Statistics	
	Alternative courses ***(Choose 3 from the following courses)***												

79	10104 32	Modern Topics in Data Science	8	2	22	8				60		Mathematics and Statistics	
80	10104 33	Forecasting Theory	8	2	22	8				60		Mathematics and Statistics	
81	10104 34	Bayesian Theory	8	2	23	7				60		Mathematics and Statistics	
82	10104 35	Mathematical modelling	8	2	20	10				60		Mathematics and Statistics	
83	10104 36	Cryptography and Data Security	8	2	18	12				60		Mathematics and Statistics	
Total (not including 12 credits of physical education and national defense-security education)				**135**									

10. TENTATIVE TEACHING PLAN

Semester 1

No	Course code	Course name	Number of Credits	Class duration			Experimental/ Practical	Others (Practice, project, major assigment)	Self-study time
				Theory	Practice	Tests			
1	1050240	Basic Informatics	3	24	6		30		75
2	1130299	Marxist-Leninist Philosophy	3	40		10			85
3	1090061	English 1	3	30	15				90
4	1010396	Linear Algebra	4	40	20				120
5	1010397	Analysis 1	3	30	15				90
6	1010427	Cognitive Internship	1					45	
7	*Choose one in seven courses of Physical Education 1:*								
	1120172	Physical Education 1 (Football 1)	1	4			26		21
	1120175	Physical Education1 (Volley-ball 1)	1	4			26		21
	1120178	Physical Education 1 (Basket-ball 1)	1	4			26		21
	1120181	Physical Education 1 (Volley-ball 1)	1	4			26		21

	1120184	Physical Education 1 (Traditional martial arts, Viet Nam 1)	1	4			26		21
	1120187	Physical Education 1 (Taekwondo 1)	1	4			26		21
	1120190	Physical Education1 (Karatedo 1)	1	4			26		21
Total			**17**						

Semester 2

No	Course code	Course name	Number of credits	Class duration			Experimental/Practical	Others (Practice, project, major assignment)	Self-study time
				Theory	Practice	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	1010408	Introduction to Data Science	3	24	6		30		75
6	1010398	Analysis 2	4	40	20				120
	National Defense and Security Education *(4 weeks)*								
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
11	*Choose one of the seven courses in Physical Education 2:*								
	1120173	Physical Education 2 (Football 2)	1	4			26		21
	1120176	Physical Education 2 (Volley-ball 2)	1	4			26		21
	1120179	Physical Education 2 (Basket-ball 2)	1	4			26		21
	1120182	Physical Education 2 (Volley-ball 2)	1	4			26		21

	1120185	Physical Education 2 (Traditional martial arts, Viet Nam 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
Total			**18**						

Semester 3

No	Course code	Course name	Number of Credits	Class duration			Experimental/Practical	Others (Practice, project, major assigment)	Self-study time
				Theory	Practise	Tests			
1	1130301	Scientific Socialism	2	27		6			57
2	1050342	Object-Oriented Programming with Python	3	20	10		30		90
3	1010400	Discrete Mathematics	2	22	8				60
4	1010401	Linear and Discrete Programming	2	22	8				60
5	1010404	Probability and Statistics	3	30	15				90
6	1050340	Database Management System	3	20	10		30		80
7	1050341	Data structures and Algorithms	4	33	12		30		80
8	*Choose one of the seven courses in Physical Education 3:*								
	1120174	Physical Education 3 (Football 3)	1	4			26		21
	1120177	Physical Education 3 (Volley-ball 3)	1	4			26		21
	1120180	Physical Education 3 (Basket-ball 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
Total			**19**						

Semester 4

No	Course code	Course name	Number of Credits	Class duration			Experimental/Practical	Others (Practice, project, major assigment)	Self-study time
				Theory	Practise	Tests			
1	1130302	History of the Communist Party of Vietnam	2	27		6			57
2	1010406	Regression analysis	3	30	15				80
3	1010402	Optimization theory	3	30	15				90
4	1010415	Programming for Data Science	3	30			30		90
5	1010405	Statistical Software	2	15			30		60
6	1050343	Architecture and Operation of Computer Systems	3	39	6				90
7	1010428	Course project 1	2					90	
Total			**18**						

Semester 5

No	Course code	Course name	Number of Credits	Class duration			Experimental/Practical	Others (Practice, project, major asigment)	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	1010399	Numerical analysis	3	30	15				90
3	1010411	Artificial Intelligence	3	30			30		90
4	1010407	Multivariate Statistics	2	15	15				60
5	1010410	Data Visualization	3	30			30		90
6	1150489	Fundamental Finance	3	30	12	6			90
Total			**18**						

Semester 6

No	Course code	Course name	Number of credits	Class duration			Experimental/Practical	Others (Practice, project, major assignment)	Self-study time
				Theory	Practise	Tests			
1	1010412	Data mining	3	30			30		90
2	1010413	Machine Learning	3	30	5		20		90

3	1010403	Number theory	3	37	8				90
4	1010416	Big data	3	27	3		30		80
5	1010429	Course project 2	3					135	
Choose one in five courses below									
6	1010424	Algorithm Design and Analysis	3	27	18				90
	1010423	Stationary process and Applications		30	15				90
	1050345	Computer Vision		30			30		90
	1010417	Digital Image Processing		30			30		75
Total			**18**						

Semester 7

No	**Course code**	**Course name**	**Number of credits**	**Class duration**			**Experimental/Practical**	**Others (Practice, project, major assignment)**	**Self-study time**
				Theory	**Practise**	**Tests**			
1	1010409	Building and Managing Data Warehouses	3	30			30		90
2	1010414	Time-series data processing	3	25	5		30		90
	Choose one in four courses below								
4	1010418	Big Data Analysis	3	30			30		80
5	1050344	Natural Language Processing	3	30			30		80
6	1010419	Data Analysis in Finance	3	30			30		90
7	1010420	Data Analysis in Business	3	30			30		80
8	1010421	Computational Methods in Data Analysis	3	25	5		30		90
9	1010422	Statistical Theory	3	30	15				90
10	1050385	Cloud Computing	3	30			30		
Total			**18**						

Semester 8

No	Course code	Course name	Number of Credits	Class duration			Experimental/Practical	Others (Practice, project, major assignment)	Self-study time
				Theory	Practise	Tests			
1	1010430	Business Internship	4					180	
Bachelor Thesis/Alternative courses									
Bachelor Thesis									
2	1010375	Graduation thesis	6					270	
Alternative courses									
	Choose the following three courses								
4	1010432	Modern Topics in Data Science	2	22	8				60
5	1010433	Forecasting Theory	2	22	8				60
6	1010434	Bayesian Statistics	2	22	8				60
7	1010435	Mathematical Modelling	2	20	10				60
8	1010436	Cryptography and Data Security	2	18	12				60
Total			**10**						

11. GUIDELINES FOR PROGRAM IMPLEMETATION

- This training program will be implemented from the 2025–2026 academic year for students majoring in Data Science.

- The entire program is organized to train full-time in 8 semesters (4 years).

- The list and content of courses presented in Section 8 consist of two parts:

+ The compulsory courses that students must complete;

+ Elective courses that students implement according to the guideline of the university aim to diversify specialized direction, are suitable for training major in order to accumulate enough number of regular credits of the program.

- Each course listed in the curriculum table (Section 8) must have a detailed syllabus (including elective courses); The training office, in collaboration with the relevant faculties, carries out to construct the detailed syllabus of each course (based on the standard template of the university) and submits them to the Rector for approval prior to teaching.

- 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, March 8th, 2026

DEAN OF FACULTY	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**