MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

UNDERGRADUATE PROGRAM

Level of education:	**Undergraduate**
Major:	**Artificial Intelligence**
Code:	**7480107**
Type of education:	**Full-time**

Binh Dinh, 2022

MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

SOCIALIST REPUBLIC OF VIET NAM
Independence - Freedom - Happiness

UNDERGRADUATE PROGRAM

(Issued together with Decision No. 1132/QĐ-ĐHQN dated May 12, 2022 of the Rector of Quy Nhon University)

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1. PROGRAM OBJECTIVES (POs)

1.1 General objectives

The goal of the Bachelor of Artificial Intelligence (AI) program at Quy Nhon University is to train highly qualified human resources with expertise in the field, capable of developing AI systems and analyzing big data, possessing practical skills and the ability to creatively apply specialized knowledge to solve real-world problems, demonstrating responsibility, professional ethics, and a self-learning and research mindset, and capable of working in large enterprises locally, nationally, and regionally, meeting society's need for high-quality human resources in the field of AI.

1.2 Specific objectives

Graduates with a Bachelor's degree in AI possess the following capabilities:

- Knowledge:

PO1: Possess basic knowledge of political science, law, and defense - security; have a comprehensive understanding of economic and social development linked to new achievements in science and technology.

PO2: Possess basic knowledge of computational science; have a solid foundation in Information Technology.

PO3: Possess basic knowledge of data analysis.

PO4: Possess basic and in-depth knowledge of the field of AI.

- Skills:

PO5: Possesses entrepreneurial and leadership skills; ability to work independently; teamwork and team organization skills. Possesses communication skills and the ability to use foreign languages in professional and specialized activities.

PO6: Possesses the skills to select and propose appropriate solutions to solve problems in the field of AI.

- Autonomy and responsibility:

PO7: Possesses professional ethics and responsibility towards work, community, and society.

PO8: Clearly understands the importance of lifelong learning and research.

2. EMPLOYMENT OPPORTUNITIES AND FURTHER STUDY PROSPECTS

Graduates from the AI program can:

- Participate in software development projects in fields related to artificial intelligence such as natural language processing, machine vision, data processing, big data analysis, etc.

- Have opportunities to work in businesses that analyze, process, visualize big data, and forecast in almost every sector of society during the Fourth Industrial Revolution.

- Working at institutes, universities, research centers, etc., in roles related to developing AI products, processing and analyzing big data.

- Starting a business in the field of providing and developing data analysis programs and applications of AI to serve life.

- Potentially working as a manager and developer of AI applications.

- Potentially working as a research specialist in AI and business analysis at technology, telecommunications, and manufacturing companies.

- Potentially continuing studies and research in technology at research centers and institutes.

3. LEARNING OUTCOMES

The program is designed to ensure that graduates will be able to:

3.1. Knowledge

PLO1: Possess fundamental knowledge of political science, law, and defense - security.

PLO2: Apply foundational knowledge of mathematics, computer science and engineering; basic and advanced knowledge of AI.

PLO3: Identify, formulate problems, research literature, and solve AI problems.

PLO4: Design, implement, and evaluate AI solutions to meet specific needs.

3.2. Skills

PLO5: Possess foreign language proficiency at level 3/6 of the Vietnamese Foreign Language Proficiency Framework.

PLO6: Create, select, adapt, and apply appropriate techniques, resources, and modern computing tools related to AI.

PLO7: Work effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.

PLO8: Communicate effectively with the community by being able to understand, write, and present reports and documents related to AI.

3.3. Autonomy and responsibility

PLO9: Be able to learn independently for continuous professional development.

PLO10: Be aware of professional responsibility and ethics.

4. PROGRAM DURATION AND TOTAL CREDITS

4.1. Program Duration: 04 years

4.2. Total credits: 135 (Does not include 3 credits of Physical Education and 8 credits of Defense - Security Education).

Program structure	Credits
General Knowledge	**24**
Professional Knowledge	**111**
- Fundamental knowledge	49
- Specialized knowledge	50
- Supplementary Knowledge	6
- Graduation thesis, Alternative courses	6
Total	**135**

5. ADMISSIONS

According to the regulations for university admissions to full-time undergraduate programs of the Ministry of Education and Training.

6. TRAINING METHOD, GRADUATION REQUIREMENTS

6.1. Training Method: Credit-based training.

6.2. Graduation Requirements

- Accumulate sufficient credits in the general education and professional education modules as described in Section 4.2 and Section 8 of this program.

- Meet the requirements of the current regulations on undergraduate and college-level training under the credit system of Quy Nhon University.

- Achieve a foreign language proficiency level of 3/6 according to the Vietnamese Foreign Language Proficiency Framework.

7. LEARNING ASSESSMENT, GRADING SCALE

7.1 Grading scale

Using a 10-point scale (0–10) for all assessments in the course.

7.2 Format, evaluation criteria, and scoring system

a. Theoretical courses

No	Format	Evaluation criteria	Weighting
1	Progress Asessment	Proactiveness, level of enthusiasm in preparing lessons and participating in classroom activities. Attendance is mandatory; absences must not exceed 20% of the total class time. The teacher will determine the grade based on the percentage of absences. * Assignments: Correct and complete work, demonstrating personal opinions. * Presentations: Level of preparation, knowledge content, and communication skills. * Written tests: Correct answers, evaluation based on the answer key. * Practical exercises: Correct answers. * Discussions and group activities: Level of preparation, knowledge content, communication skills, lively participation, and demonstration of personal opinions.	30% or 40% or 50%
2	Final Exam	* Written Exam: Correct answers, evaluation based on the answer key. * Written Report: - Format: Complies with regulations - Content: Information content * Presentation: Level of preparation, information content, communication skills. *Oral Exam: Correct answers, knowledge content, communication skills, expression of personal viewpoint. * Practical Exam: Correct answers, expression of personal viewpoint.	70% or 60% or 50%

b. Practical courses:

- Students must attend all experiments and practical sessions.

- The average score of all practical sessions during the semester, rounded to one decimal place, is the grade for the practical course.

c. Course project (CP):

The course grade includes 30% for progress asessment and 70% for the project content.

d. Graduation thesis:

In accordance with the regulations on undergraduate training issued together with Decision No. 1487/QD-DHQN dated July 1, 2021 of the Rector of Quy Nhon University.

7.3 Assessment Methods

The assessment methods used in the AI training program are divided into two main types: formative assessment and summative assessment. Mapping of assessment methods and program learning outcomes (PLOs):

Assessment Method	**Program learning outcomes (PLOs)**									
	1	**2**	**3**	***4***	***5***	***6***	***7***	**8**	**9**	**10**
I. Formative Assessment										
1. Attendance										x
2. Assignments	x	x	x	x		x	x	x	x	x
3. Presentations		x	x	x		x	x	x	x	x
4. Written tests	x	x	x	x	x	x				x
5. Practical exercises		x		x		x	x	x		x
6. Discussions, group activities	x	x	x	x		x	x	x	x	x
II. Summative Assessment										
1. Written test	x	x	x	x	x	x				
2. Written report		x	x	x	x	x	x	x	x	x
3. Presentation		x	x	x		x	x	x	x	x
4. Oral examination		x	x	x		x				x
5. Practical exercise		x	x	x		x	x	x		x

8. PROGRAM CONTENT

No	Course Code	Course Name	Semester	Number of credits	Class duration			Experimental/ Pratical	Others	Self-study time	Prerequisite Course Code	Managing Faculty	Note
					Theory	Practise	Tests						
I. General Knowledge				**24**									
Compulsory													
I.1. Political Science and Law				**13**									
1	1130299	Philosophy of Marxism and Leninism	1	3	40		10			85		FPLM	
2	1130300	Political Economics of Marxism and Leninism	2	2	27		6			57		FPLM	
3	1130301	Science Socialism	3	2	27		6			57		FPLM	
4	1130302	History of Vietnamese Communist Party	4	2	27		6			57		FPLM	
5	1130091	Ho Chi Minh's Thought	5	2	27		6			57		FPLM	
6	1130049	Fundamentals of Law	2	2	27		6			57		FPLM	

I.2. Physical Education, Defense - Security Education (PE-DS)				**12**									
I.2.1. Physical Education: Students choose one of the following seven physical education groups				3									
7	1120172	Physical Education 1 (Football 1)	1	1	4			26		21		FPE	
8	1120173	Physical Education 2 (Football 2)	2	1	4			26		21	1120172	FPE	
9	1120174	Physical Education 3 (Football 3)	3	1	4			26		21	1120173	FPE	
10	1120175	Physical Education 1 (Volleyball 1)	1	1	4			26		21		FPE	
11	1120176	Physical Education 2 (Volleyball 2)	2	1	4			26		21	1120175	FPE	
12	1120177	Physical Education 3 (Volleyball 3)	3	1	4			26		21	1120176	FPE	
13	1120178	Physical Education 1 (Basketball 1)	1	1	4			26		21		FPE	
14	1120179	Physical Education 2 (Basketball 2)	2	1	4			26		21	1120178	FPE	
15	1120180	Physical Education 3 (Basketball 3)	3	1	4			26		21	1120179	FPE	
16	1120181	Physical Education 1 (Badminton 1)	1	1	4			26		21		FPE	
17	1120182	Physical Education 2 (Badminton 2)	2	1	4			26		21	1120181	FPE	
18	1120183	Physical Education 3 (Badminton 3)	3	1	4			26		21	1120182	FPE	
19	1120184	Physical Education 1 (Vietnamese Traditional Martial Arts 1)	1	1	4			26		21		FPE	
20	1120185	Physical Education 2 (Vietnamese Traditional Martial Arts 2)	2	1	4			26		21	1120184	FPE	
21	1120186	Physical Education 3 (Vietnamese Traditional Martial Arts 3)	3	1	4			26		21	1120185	FPE	
22	1120187	Physical Education 1 (Taekwondo 1)	1	1	4			26		21		FPE	
23	1120188	Physical Education 2 (Taekwondo 2)	2	1	4			26		21	1120187	FPE	
24	1120189	Physical Education 3 (Taekwondo 3)	3	1	4			26		21	1120188	FPE	
25	1120190	Physical Education 1 (Karatedo 1)	1	1	4			26		21		FPE	
26	1120191	Physical Education 2 (Karatedo 2)	2	1	4			26		21	1120190	FPE	
27	1120192	Physical Education 3 (Karatedo 3)	3	1	4			26		21	1120191	FPE	
I.2.1. Defense - Security Education				9									
28	1120168	Defense - Security Education 1	2	3	37		8			82		NDSE Center	
29	1120169	Defense - Security Education 2	2	2	22		8			52		NDSE Center	
30	1120170	Defense - Security Education 3	2	2	14			16		44		NDSE Center	
31	1120171	Defense - Security Education 4	2	2	4			56		64		NDSE Center	
I.3. Foreign Languages				**7**									
32	1090061	English 1	1	3	30	15				90		FFL	
33	1090166	English 2	2	4	40	20				120	1090061	FFL	

I.4. Social Sciences/Mathematics, Natural Sciences - Environment, Management Sciences				**4**									
34	1150422	Entrepreneurship	5	2								FBA	
35	2030003	Communication Skills	3	2								FSSH	
***II.* Professional Knowledge**				***111***									
***II.1.* Fundamental Knowledge**				**49**									
36	1010038	Linear Algebra	1	3	33	12				90		FMS	
37	1010245	Calculus	1	3	33	12				90		FMS	
38	1010441	Optimization Theory	3	2	20	10				60		FMS	
39	1010387	Numerical methods	2	3	33	12				90		FMS	
40	1010126	Probability and Statistics	3	3	31	14				90		FMS	
41	1050075	Discrete Mathematics	3	3	33	12				90		FIT	
42	1050074	Mathematical Logic	1	2	24	6				60		FIT	
43	1050384	Introduction to Programming	1	4	30	15		30		90		FIT	
44	1050349	Data structures and Algorithms	3	4	30	15		30		90		FIT	
45	1050024	Object Oriented Programming	2	3	20	10		30		60		FIT	
46	1050352	Computer Network	4	3	30			30		90		FIT	
47	1050351	Operating System & Architecture Computer	4	4	48			24		90		FIT	
48	1050348	Database Management Systems	2	4	35	10		30		90		FIT	
49	1050353	Software Engineering	5	3	33	6		12		80		FIT	
50	1050029	Web Application Programming	4	3	30			30		75		FIT	
51	1050350	Ethics of artificial intelligence	4	2	20		20			40		FIT	
***II.2.* Specialized knowledge**				**50**									
II.2.1. Compulsory				32									
52	1050112	Introduction to Artificial Intelligence	3	3	40			10		90		FIT	
53	*1050354*	Machine Learning	4	4	40			40		120		FIT	
54	*1050355*	Deep Learning	5	3	30			30		90		FIT	
55	*1050359*	Digital Image Processing	6	3	30			30		90		FIT	
56	*1050362*	Computer Vision	7	4	45			30		120		FIT	
57	*1050357*	Introduction to Natural Language Processing	5	3	30			30		90		FIT	
58	*1050360*	Advanced Natural Language Processing	6	3	30			30		90		FIT	
59	*1050356*	Introduction to Big Data	5	3	30			30		80		FIT	
60	*105035*	Artificial Intelligence System Development	6	3	15			60		75		FIT	
61	1050361	Project 1	7	3					CP			FIT	
II.2.2. Optional				18									
62	1050364	Virtual Reality	6	3	30			30		90		FIT	
63	1050369	Speech Processing	7	3	30			30		90		FIT	
64	1050364	Data Visualization	6	3	30			30		90		FIT	
65	1050284	Cloud Computing	6	3	30			30		80		FIT	
66	1050367	Big Data Modeling and Management Systems	7	3	30			30		80		FIT	
67	1050366	Fuzzy theory and applications	7	3	25	5		30		90		FIT	
68	1050363	Some models of time series forcasting	6	3	25	5		30		90		FIT	
69	1050368	Robotics and Applications	7	3	30			30		90		FIT	
70	1050365	Blockchain and Applications	7	3	30			30		90		FIT	
***II.3.* Supplementary Knowledge**				6									
II.3.1. Professional training													
71	1050370	Scientific Seminars	7	3	45					90		FIT	
III.3.2. Internships (Inte.)													
72	1050371	Internship	8	3					Inte.			FIT	
II.4. Graduation Thesis (GT), Alternative courses				6									
73	1050372	**Graduation Thesis**	8	6								FIT	
Alternative courses													
74	1050373	Final Project	8	4					CP			FIT	

75	1050374	Some contemporary issues in Information Technology	8	2	30					80		FIT	
TOTAL				**135**									

** Note: The list of faculties responsible for course management is described as follows:*

Acronym	Faculty Name
FPLM	Faculty of Political Science-Law and State Management
FPE	Faculty of Physical Education
FBA	Faculty of Finance, Banking, and Business Administration
FSSH	Faculty of Social Sciences and Humanities
FMS	Faculty of Mathematics and Statistics
FIT	Faculty of Information Technology
FFL	Faculty of Foreign Languages
NDSE Center	National Defence and Security Education Center

9. TENTATIVE TEACHING PLAN

Semester 1

No	Course Code	Course Name	Number of credits	Class duration			Experimental Pratical	Others	Self-study time	Prerequisite Course Code	Managing Faculty	Note
				Theory	Practise	Tests						
1.	1010038	Linear Algebra	3	33	12				90		FMS	
2.	1010245	Calculus	3	33	12				90		FMS	
3.	1050384	Introduction to Programming	4	30	15		30		90		FIT	
4.	1090061	English 1	3	30	15				90		FFL	
5.	1050074	Mathematical Logic	2	24	6				60		FIT	
6.	1130299	Philosophy of Marxism and Leninism	3	40		10			85		FPLM	
Total:			**18**									

Semester 2

No	Course Code	Course Name	Number of credits	Class duration			Experimental Pratical	Others	Self-study time	Prerequisite Course Code	Managing Faculty	Note
				Theory	Practise	Tests						
1.	1050348	Database Management Systems	4	35	10		30		90		FIT	
2.	1130300	Political Economics of Marxism and Leninism	2	27		6			57		FPLM	
3.	1050024	Object Oriented Programming	3	20	10		30		60		FIT	
4.	1130049	Fundamentals of Law	2	27		6			57		FPLM	

5.	1010387	Numerical methods	3	33	12				90		FMS	
6.	1090166	English 2	4	40	20				120	1090061	FFL	
Total:			**18**									

Semester 3

No	Course Code	Course Name	Number of credits	Class duration			xperimenta Pratical	Others	Self-study time	Prerequisite Course Code	Managing Faculty	Note
				Theory	Practise	Tests						
1	1050349	Data structures and Algorithms	4	30	15		30		90		FIT	
2	1130301	Science Socialism	2	27		6			57		FPLM	
3	2030003	Communication Skills	2								FSSH	
4	1010441	Optimization Theory	2	20	10				60		FMS	
5	1050112	Introduction to Artificial Intelligence	3	40			20		90		FIT	
6	1050075	Discrete Mathematics	3	33	12				90		FIT	
7	1010126	Probability and Statistics	3	31	14				90		FMS	
Total:			**19**									

Semester 4

No	Course Code	Course Name	Number of credits	Class duration			xperimenta Pratical	Others	Self-study time	Prerequisite Course Code	Managing Faculty	Note
				Theory	Practise	Tests						
1	1050350	Ethics of artificial intelligence	2	20		20			40		FIT	
2	1050351	Operating System & Architecture Computer	4	48			24		90		FIT	
3	*1050354*	Machine Learning	4	40			40		120		FIT	
4	1050029	Web Application Programming	3	30			30		75		FIT	
5	1130302	History of Vietnamese Communist Party	2	27		6			57		FPLM	
6	1050352	Computer Network	3	30			30		90		FIT	
Total:			**18**									

Semester 5

No	Course Code	Course Name	Number of credits	Class duration			xperimenta Pratical	Others	Self-study time	Prerequisite Course Code	Managing Faculty	Note
				Theory	Practise	Tests						
1	1050353	Software Engineering	3	33	6		12		80		FIT	

2	*1050355*	Deep Learning	3	30			30		90		FIT	
3	1150422	Entrepreneurship	2								FBA	
4	*1050356*	Introduction to Big Data	3	30			30		80		FIT	
5	*1050357*	Introduction to Natural Language Processing	3	30			30		90		FIT	
6	1130091	Ho Chi Minh's Thought	2	27		6			57		FPLM	
Total:			**16**									

Semester 6:

No	Course Code	Course Name	Number of credits	Class duration			xperimenta Pratical	Others	Self-study time	Prerequisite Course Code	Managing Faculty	Note
				Theory	Practise	Tests						
1	*1050359*	Digital Image Processing	3	30			30		90		FIT	
2	*1050360*	Advanced Natural Language Processing	3	30			30		90		FIT	
3	*1050358*	Artificial Intelligence System Development	3	15			60		75		FIT	
Choose 3 out of 4 courses (9 credits)												
4	1050363	Some models of time series forcasting	3	25	5		30		90		FIT	
5	1050284	Cloud Computing	3	30			30		80		FIT	
6	1050364	Virtual Reality	3	30			30		90		FIT	
7	1050301	Data Visualization	3	30			30		90		FIT	
Total:			**18**									

Semester 7

No	Course Code	Course Name	Number of credits	Class duration			xperimenta Pratical	Others	Self-study time	Prerequisite Course Code	Managing Faculty	Note
				Theory	Practise	Tests						
1	*1050362*	Computer Vision	4	45			30		120		FIT	
2	1050370	Scientific Seminars	3	45					90		FIT	
3	1050361	Project 1	3					CP			FIT	
Choose 3 out of 5 courses (9 credits)												
4	1050365	Blockchain and Applications	3	30			30		90		FIT	
5	1050366	Fuzzy theory and applications	3	25	5		30		90		FIT	

6	1050367	Big Data Modeling and Management Systems	3	30			30		80		FIT	
7	1050369	Speech Processing	3	30			30		90		FIT	
8	1050368	Robotics and Applications	3	30			30		90		FIT	
Total:			**19**									

Semester 8

No	Course Code	Course Name	Number of credits	Class duration			xperimenta Pratical	Others	Self-study time	Prerequisite Course Code	Managing Faculty	Note
				Theory	Practise	Tests						
1	1050371	Internship	3					Inte.			FIT	
2	1050372	Graduation Thesis	6					GT			FIT	
Alternative courses												
3	1050374	Some contemporary issues in Information Technology	2	30					80		FIT	
4	1050373	Final Project	4					CP			FIT	
Total:			**9**									

10. GUIDELINES FOR PROGRAM IMPLEMENTATION

- This program is applied from the admissions period for the year 2022 for students majoring in AI.

- The training process is based on the designed curriculum, training objectives and target audience, and specific training requirements.\. For elective courses, depending on the actual situation of development trends and social needs, the Faculty will advise students on choosing appropriate courses.

- The Dean of Faculty is responsible for organizing and guiding the principles for developing detailed syllabi to ensure that objectives, content, and requirements are met, while also satisfying the needs of learners and society.

- The program is reviewed and updated at least every two years to meet the development of the AI industry and align with socio-economic development needs./.

Binh Dinh, May 12, 2022

DEAN OF FACULTY	*HEAD OF TRAINING OFFICE*	*RECTOR*
Dr. Le Xuan Viet	**Dr. Le Xuan Vinh**	**Assoc. Prof. Dr. Do Ngoc My**