

MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

UNDERGRADUATE PROGRAM

Level:	Undergraduate
Major:	Artificial Intelligence
Program Code:	7480107
Mode of study:	Full-time

Binh Dinh, 2022

UNDERGRADUATE PROGRAM

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

Level:	Undergraduate
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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. JOB OPPORTUNITIES AND PROFESSIONAL DEVELOPMENT

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 ACADEMIC WORKLOAD 4.1. Program

Duration: 04 years

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

Program structure	Number of Credits
General Education Knowledge	24
Professional Knowledge	111
- Fundamental knowledge	49
- Specialized knowledge	50
- Supplementary Knowledge	6
- Bachelor thesis, Alternative courses	6
Total	135

5. ADMISSIONS REQUIREMENTS

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 Assessment	Proactiveness, level of enthusiasm in preparing lessons and participating in classroom activities.	30% or 40% or 50%
		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.	
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 assessment and 70% for the project content.

d. Graduation thesis:

In accordance with the regulations on undergraduate training issued together with Decision No. 1487/QĐ-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):

<i>Assessment Method</i>	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	Semester	Number of credits	Class duration			Experimental/Practical	Others	Self-study time	Prerequisite Course Code	Department in charge	Note
					Theory	Practise	Tests						
I. General Education Knowledge				24									
Compulsory													
I.1. Political Science and Law				13									
1	1130299	Marxist-Leninist Philosophy	1	3	40		10			85		DPSLM	
2	1130300	Marxist-Leninist Political Economy	2	2	27		6			57		DPSLM	
3	1130301	Scientific Socialism	3	2	27		6			57		DPSLM	
4	1130302	History of the Communist Party of Vietnam	4	2	27		6			57		DPSLM	
5	1130091	Ho Chi Minh Thought	5	2	27		6			57		DPSLM	
6	1130049	Introduction to Law	2	2	27		6			57		DPSLM	

I.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		DPE	
8	1120173	Physical Education 2 (Football 2)	2	1	4			26		21	1120172	DPE	
9	1120174	Physical Education 3 (Football 3)	3	1	4			26		21	1120173	DPE	
10	1120175	Physical Education 1 (Volleyball 1)	1	1	4			26		21		DPE	
11	1120176	Physical Education 2 (Volleyball 2)	2	1	4			26		21	1120175	DPE	
12	1120177	Physical Education 3 (Volleyball 3)	3	1	4			26		21	1120176	DPE	
13	1120178	Physical Education 1 (Basketball 1)	1	1	4			26		21		DPE	
14	1120179	Physical Education 2 (Basketball 2)	2	1	4			26		21	1120178	DPE	
15	1120180	Physical Education 3 (Basketball 3)	3	1	4			26		21	1120179	DPE	
16	1120181	Physical Education 1 (Badminton 1)	1	1	4			26		21		DPE	
17	1120182	Physical Education 2 (Badminton 2)	2	1	4			26		21	1120181	DPE	
18	1120183	Physical Education 3 (Badminton 3)	3	1	4			26		21	1120182	DPE	
19	1120184	Physical Education 1 (Vietnamese Traditional Martial Arts 1)	1	1	4			26		21		DPE	
20	1120185	Physical Education 2 (Vietnamese Traditional Martial Arts 2)	2	1	4			26		21	1120184	DPE	
21	1120186	Physical Education 3 (Vietnamese Traditional Martial Arts 3)	3	1	4			26		21	1120185	DPE	
22	1120187	Physical Education 1 (Taekwondo 1)	1	1	4			26		21		DPE	
23	1120188	Physical Education 2 (Taekwondo 2)	2	1	4			26		21	1120187	DPE	
24	1120189	Physical Education 3 (Taekwondo 3)	3	1	4			26		21	1120188	DPE	
25	1120190	Physical Education 1 (Karatedo 1)	1	1	4			26		21		DPE	
26	1120191	Physical Education 2 (Karatedo 2)	2	1	4			26		21	1120190	DPE	
27	1120192	Physical Education 3 (Karatedo 3)	3	1	4			26		21	1120191	DPE	
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		DFL	
33	1090166	English 2	2	4	40	20				120	1090061	DFL	

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

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

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

Acronym	Department Name
DPSLM	Department of Political Science, Law and State Management
DPE	Department of Physical Education
DDFBA	Department of Finance, Banking and Business Administration
DSSH	Department of Social Sciences and Humanities
DMS	Department of Mathematics and Statistics
DIT	Department of Information Technology
DFL	Department of Foreign Languages
CNDSE	Center for National Defense and Security Education

9. TENTATIVE TEACHING PLAN

Semester 1

No	Course Code	Course	Number of credits	Class duration			Experimental Practical	Others	Self-study time	Prerequisite Course Code	Department in charge	Note
				Theory	Practise	Tests						
1.	1010038	Linear Algebra	3	33	12				90		DMS	
2.	1010245	Calculus	3	33	12				90		DMS	
3.	1050384	Introduction to Programming	4	30	15		30		90		DIT	
4.	1090061	English 1	3	30	15				90		DFL	
5.	1050074	Mathematical Logic	2	24	6				60		DIT	
6.	1130299	Marxist-Leninist Philosophy	3	40		10			85		DPSLM	
Total:			18									

Semester 2

No	Course Code	Course	Number of credits	Class duration			Experimental Practical	Others	Self-study time	Prerequisite Course Code	Department in charge	Note
				Theory	Practise	Tests						
1.	1050348	Database Management Systems	4	35	10		30		90		DIT	
2.	1130300	Marxist-Leninist Political Economy	2	27		6			57		DPSLM	
3.	1050024	Object Oriented Programming	3	20	10		30		60		DIT	
4.	1130049	Introduction to Law	2	27		6			57		DPSLM	

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

Semester 3

No	Course Code	Course	Number of credits	Class duration			Experimental Practical	Others	Self-study time	Prerequisite Course Code	Department in charge	Note
				Theory	Practise	Tests						
1	1050349	Data structures and Algorithms	4	30	15		30		90		DIT	
2	1130301	Scientific Socialism	2	27		6			57		DPSLM	
3	2030003	Communication Skills	2								DSSH	
4	1010441	Optimization Theory	2	20	10				60		DMS	
5	1050112	Introduction to Artificial Intelligence	3	40			20		90		DIT	
6	1050075	Discrete Mathematics	3	33	12				90		DIT	
7	1010126	Probability and Statistics	3	31	14				90		DMS	
Total:			19									

Semester 4

No	Course Code	Course	Number of credits	Class duration			Experimental Practical	Others	Self-study time	Prerequisite Course Code	Department in charge	Note
				Theory	Practise	Tests						
1	1050350	Ethics of artificial intelligence	2	20		20			40		DIT	
2	1050351	Operating System & Architecture Computer	4	48			24		90		DIT	
3	1050354	Machine Learning	4	40			40		120		DIT	
4	1050029	Web Application Programming	3	30			30		75		DIT	
5	1130302	History of the Communist Party of Vietnam	2	27		6			57		DPSLM	
6	1050352	Computer Network	3	30			30		90		DIT	
Total:			18									

Semester 5

No	Course Code	Course	Number of credits	Class duration			Experimental Practical	Others	Self-study time	Prerequisite Course Code	Department in charge	Note
				Theory	Practise	Tests						
1	1050353	Software Engineering	3	33	6		12		80		DIT	

2	1050355	Deep Learning	3	30			30		90		DIT	
3	1150422	Entrepreneurship	2								DFBA	
4	1050356	Introduction to Big Data	3	30			30		80		DIT	
5	1050357	Introduction to Natural Language Processing	3	30			30		90		DIT	
6	1130091	Ho Chi Minh Thought	2	27		6			57		DPSLM	
Total:			16									

Semester 6:

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

Semester 7

No	Course Code	Course	Number of credits	Class duration			Experimental Practical	Others	Self-study time	Prerequisite Course Code	Department in charge	Note
				Theory	Practise	Tests						
1	1050362	Computer Vision	4	45			30		120		DIT	
2	1050370	Scientific Seminars	3	45					90		DIT	
3	1050361	Project 1	3					CP			DIT	
Choose 3 out of 5 courses (9 credits)												
4	1050365	Blockchain and Applications	3	30			30		90		DIT	
5	1050366	Fuzzy theory and applications	3	25	5		30		90		DIT	

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

Semester 8

No	Course Code	Course	Number of credits	Class duration			Experimental Practical	Others	Self-study time	Prerequisite Course Code	Department in charge	Note
				Theory	Practise	Tests						
1	1050371	Internship	3					Inte.			DIT	
2	1050372	Graduation Thesis	6					GT			DIT	

Alternative courses

3	1050374	Some contemporary issues in Information Technology	2	30					80		DIT	
4	1050373	Final Project	4					CP			DIT	
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 Department will advise students on choosing appropriate courses.

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

- The 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 DEPARTMENT

***HEAD OF TRAINING
OFFICE***

RECTOR

Dr. Le Xuan Viet

Dr. Le Xuan Vinh

Assoc. Prof. Dr. Do Ngoc My