MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

PROGRAM

Level of education:	**Master**
Major:	**Electrical engineering**
Code:	**8520201**
Educational orientation:	**Application-oriented program**
Type of education:	**Full-time**

Binh Dinh, 2024

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QUY NHON UNIVERSITY

SOCIALIST REPUBLIC OF VIET NAM
Independence - Freedom - Happiness

PROGRAM

(Issued together with Decision No. /QĐ-ĐHQN dated December, 2024 of the Rector of Quy Nhon University)

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1. PROGRAM OBJECTIVES

1.1. General objectives

The Master's program in Electrical Engineering focuses on applied engineering, equipping students with advanced knowledge in the field, analytical and synthesis skills, problem-solving skills, and the ability to apply their knowledge to practice. This enables them to undertake highly specialized jobs within the field and effectively meet the needs of the socio-economic landscape and international integration.

1.2. Specific objectives (POs)

Graduates with a Master's degree in Electrical Engineering are capable of:

- Regarding Knowledge

+ PO1: Possess in-depth industry knowledge to solve practical problems in the field of electrical engineering and energy.

- Regarding Skills

+ PO2: Capable of critical thinking and solving practical technical problems

+ PO3: Capable of researching and applying specialized knowledge to solve practical problems in the field of electrical engineering and energy

+ PO4: Possessing the necessary social skills to work effectively in a multidisciplinary and internationally integrated environment

+ PO5: Possesses strong foreign language skills for professional work

- Regarding Autonomy and Responsibility

+ PO6: A clear understanding of the importance of self-training, continuous knowledge updating, and independent scientific research; professional ethics and social responsibility.

2. EMPLOYMENT OPPORTUNITIES AND FURTHER STUDY PROSPECTS

Graduates from the Electrical Engineering program can:

- Working at power plants (hydroelectric, thermal, wind, solar) as a manager or technical coordination specialist.
- Working at electrical and energy engineering consulting and design companies as a manager or consultant.
- Working at power transmission companies as an expert or operational deployment manager.
- Working at agencies managing electrical and energy engineering, and electrical equipment manufacturing and fabrication companies as an expert or technical manager.
- Working at provincial departments of industry and trade as a manager in electrical and energy engineering.
- Starting your own business in the field of electrical and energy engineering and M&E consulting and design companies.
- Teaching at universities, colleges, and research institutes.
- Potentially pursuing a doctoral degree at universities in Vietnam and abroad.

3. LEARNING OUTCOMES

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

3.1. Regarding Knowledge

+ *Basic knowledge*

1) PLO1: Master the principles of Philosophy

2) PLO2: Applying techniques and principles currently being exploited and used in the field of electrical engineering and energy

+ *Specialized knowledge*

3) PLO3: Systematizing specialized knowledge in the calculation, operation, and control of equipment and systems in the field of electrical engineering and energy.

3.2. Regarding Skills

+ *General skills*

4) PLO4: Apply communication skills, teamwork skills, and leadership skills to work effectively in a multidisciplinary and internationally integrated environment

5) PLO5: Applying fundamental and advanced knowledge of the field to technical reasoning and problem-solving.

6) PLO6: Applying foreign language skills in research and utilizing specialized knowledge in a multidisciplinary and internationally integrated environment.

+ Professional skills

7) PLO7: Analyzing modern technological solutions such as the application of artificial intelligence and big data for computing, operating, and controlling power systems, as well as forecasting renewable energy sources.

3.3. Regarding Autonomy and Responsibility

8) PLO8: Adapt, self-direct, and guide others to independently update their knowledge of new techniques in the field of electrical and energy engineering for practical application.

9) PLO9: To uphold and guide others to uphold professional ethics and social responsibility.

4. ADMISSION REQUIREMENTS

- Graduated or have met the requirements for graduation from a university (or equivalent or higher qualification) in a field relevant to Business Administration;

- Possess foreign language proficiency at Level 3 or higher according to the 6-level Foreign Language Proficiency Framework for Vietnam;

Suitable university major category: Belongs to the Electrical, Electronic and Telecommunications Engineering group (73401) in the Regulations on Statistical Categories of Training Majors in Higher Education (issued together with Circular No. 09/2022/TT-BGDĐT dated June 6, 2022 of the Ministry of Education and Training).

No.	Master's program field of study	Suitable university degree field	Note
1	Electrical Engineering	Electrical Engineering	
2	Electrical Engineering	Radar and navigation technology	
3	Electrical Engineering	Acoustic techniques	
4	Electrical Engineering	Marine Engineering	
5	Electrical Engineering	Electronics and telecommunications engineering	
6	Electrical Engineering	Biomedical engineering	
7	Electrical Engineering	Control and Automation Engineering	

5. ADMISSION REQUIREMENTS

According to the current regulations on admission and training for master's degree programs of Quy Nhon University and the Ministry of Education and Training.

6. REQUIREMENTS FOR APPLICANTS

According to the current regulations of the Ministry of Education and Training (Regulations on Master's Degree Training issued together with Circular No. 15/2014/TT-BGDĐT dated May 15, 2014, of the Minister of Education and Training and Circular No. 25/2017/TT-BGDĐT dated October 10, 2017, of the Minister of Education and Training), including:

6.1. Requirements regarding qualifications and field of study

- ✓ Must have graduated from a university with a degree in the same field, a suitable field, or a field closely related to Electrical Engineering;
- ✓ Candidates with degrees in fields closely related to Electrical Engineering must complete supplementary courses before taking the exam. The content of these supplementary courses for each candidate will be determined by the Rector.

List of majors suitable for Electrical Engineering

No.	Department Name
1	Electrical Engineering
2	Electrical and Electronic Engineering
3	Electrical and Electronic Engineering Technology
4	Industrial and domestic electricity
5	Electrical and electronic equipment
6	Power System Engineering
7	Power Networks and Power Systems
8	Electrical Electrification and Power Supply
9	Technical Teacher Education in Electrical and Electronics

List of fields requiring additional knowledge

STT	Tên ngành

1	Control and automation technology
2	Control and Automation Engineering
3	Automation
4	Automatic control
5	Industrial Measurement and Informatics
6	Mechatronics Engineering
7	Mechatronics Engineering Technology
8	Other departments consider each case individually

Supplementary knowledge courses

Depending on the individual applicants, the School's Scientific Council will consider and decide on the content of the supplementary courses. The proposed list of supplementary courses for the various majors is as follows:

+ Electrical circuit theory
+ Electrical machines
+ Electrical equipment
+ Electrical networks (Power grids)
+ Electrical components in power plants and substations
+ Protection and control of power systems (Relay protection in power systems)
+ High voltage electrical engineering

6.2. Admission methods

The school will conduct admissions based on a combination of selection and examination, in accordance with the school's general plan and regulations.

6.3. Graduation requirements

According to regulations of the Ministry of Education and Training and Quy Nhon University.

7. TRAINING PROCESS AND GRADUATION REQUIREMENTS

7.1. Training process: Credit-based training

7.2. Graduation Requirements:

✓ Accumulate sufficient course credits and workload for the training program.;

✓Trainees who complete the training program and achieve an average grade of 5.5 or higher (on a 10-point scale) across all modules in the training program;

✓Meet the foreign language proficiency standards as prescribed by Quy Nhon University.

8. EVALUATION METHOD AND SCORING SCALE

The content in the training program description is graded on a 10-point scale and presented in detail for each module.

9. PROGRAM CONTENT

No	Course Code		Course Name	Semester	Course credit volume			Prerequisite Course Code	Managing Faculty	Note
	Letters	Numbers			Total	Theory	Practise, Pratical, Experimental, Tests			
I. General Knowledge					**3**					
1	TNTH	501	Philosophy	1	3				DPESM	
II. Basic and specialized knowledge sections					**42**					
II.1. Basic knowledge section					**15**					
II.1.1. Compulsory part					**6**					
2	KĐTT	504	Electromagnetic field calculation and simulation	1	3				DET	
3	KĐMN	506	Fuzzy systems and neural networks	1	3				DET	
II.1.2. Elective Courses (Select 3/5 Courses - 9/15 credits)					**9**					
4	KĐĐC	503	Control of power electronic devices		3				DET	
5	KĐĐS	505	Digital control		3				DET	
6	KĐPT	507	Power system analysis and calculation		3				DET	
7	KTĐB	509	Forecasting methods in power systems		3				DET	
8	KĐQĐ	510	Power demand management (DSM)		3				DET	
II.2. Specialized knowledge section					**27**					
II.2.1. Compulsory part					**9**					
9	KĐBĐ	511	Advanced electrical system protection and control	2	3				DET	
10	KĐTF	512	Flexible AC power transmission (FACTS) and direct current (HVDC)	2	3				DET	

11	KĐTM	513	Smart grid	2	3				DET	
II.2.2. Elective Courses (Select 6/12 Courses - 18/36 credits)					**18**					
12	KĐNL	508	Renewable energy and energy storage		3				DET	
13	KĐPO	514	Analysis and control of power system stability		3				DET	
14	KĐCS	515	Improvements in high-voltage electrical engineering		3				DET	
15	KĐTV	516	Optimizing power system operation		3				DET	
16	KĐTĐ	517	Electricity market		3				DET	
17	KĐTC	518	Calculating reliability in power systems.		3				DET	
18	KĐMĐ	519	Electric machine control		3				DET	
19	KĐCG	520	Diagnosis and monitoring of electrical machine condition		3				DET	
20	KĐGM	521	Control of wind and solar power systems		3				DET	
21	KĐSH	522	SCADA in power systems		3				DET	
22	KĐEM	525	AI-powered energy management systems for smart microgrids.		3				DET	
23	KĐMD	526	Applying machine learning and deep learning methods to power system problems.		3				DET	
II.3. Practical training					**6**					
24	KĐTT	523	Internship 1	3	3		3		DET	
25	KĐTT	524	Internship 2	4	3		3		DET	
II.4. Graduation Thesis										
26	Graduation Thesis			4	**9**				DET	
Total					**60**					

10. TENTATIVE TEACHING PLAN

No	Course code		Course name	Number of credits	Training Plan *(Semester)*				Expected instructors	Prerequisite Course Code
	Letters	Numbers			1	2	3	4		
I. General Knowledge				**3**						
1	TNTH	501	Philosophy	3	1				According to the assignment from the Department of Professional Management	DPESM

II. Basic and specialized knowledge sections				**42**						
II.1. II. Basic knowledge				**15**						
II.1.1. Basic knowledge section				**6**						
2	KĐTT	504	Electromagnetic field calculation and simulation	3	1				Assoc. Prof. Dr. Doan Thanh Bao Assoc. Prof. Dr. Doan Duc Tung	DET
3	KĐMN	506	Fuzzy systems and neural networks	3	1				Assoc. Prof. Dr. Doan Duc Tung Dr. Le Tuan Ho	DET
II.1.2. Elective Courses *(select 3 courses)*				**9**	**6**	**3**				
4	KĐĐC	503	Control of power electronic devices	3					Dr. Do Van Can Assoc. Prof. Dr. Huynh Duc Hoan	DET
5	KĐĐS	505	Digital control	3					Dr. Do Van Can Assoc. Prof. Dr. Doan Duc Tung	DET
6	KĐPT	507	Power system analysis and calculation	3					Assoc. Prof. Dr. Ngo Minh Khoa Dr. Le Tuan Ho	DET
7	KTĐB	509	Forecasting methods in power systems	3					Dr. Le Tuan Ho Assoc. Prof. Dr. Huynh Duc Hoan	DET
8	KĐQĐ	510	Power demand management (DSM)	3					Assoc. Prof. Dr. Ngo Minh Khoa Assoc. Prof. Dr. Huynh Duc Hoan	DET
II.2. Specialized knowledge section				**27**						
II.2.1. Compulsory part				**9**		9				
9	KĐBĐ	511	Advanced electrical system protection and control	3		3			Assoc. Prof. Dr. Huynh Duc Hoan Dr. Nguyen Duy Khiem	DET
10	KĐTF	512	Flexible AC power transmission (FACTS) and direct current (HVDC)	3		3			Dr. Le Tuan Ho Assoc. Prof. Dr. Ngo Minh Khoa	DET
11	KĐTM	513	Smart grid	3		3			Assoc. Prof. Dr. Ngo Minh Khoa Assoc. Prof. Dr. Doan Duc Tung	DET
II.2.2. Elective Courses *(select 6 courses)*				**18**	0	3	12	3		
12	KĐNL	508	Renewable energy and energy storage	3					Dr. Nguyen Duy Khiem Dr. Le Tuan Ho Assoc. Prof. Dr. Ngo Minh Khoa	DET
13	KĐPO	514	Analysis and control of power system stability	3					Dr. Le Tuan Ho Dr. Nguyen Duy Khiem	DET
14	KĐCC	515	Improvements in high-voltage electrical	3					Dr. Le Tuan Ho Assoc. Prof. Dr. Ngo Minh Khoa	DET

			engineering							
15	KĐTV	516	Optimizing power system operation	3					Dr. Le Tuan Ho Assoc. Prof. Dr. Ngo Minh Khoa	DET
16	KĐTĐ	517	Electricity market	3					Dr. Nguyen Duy Khiem Dr. Le Tuan Ho	DET
17	KĐTC	518	Calculating reliability in power systems	3					Dr. Nguyen Duy Khiem Dr. Le Tuan Ho	DET
18	KĐMĐ	519	Electric machine control	3					Dr. Do Van Can Assoc. Prof. Dr. Doan Thanh Bao	DET
19	KĐCG	520	Diagnosis and monitoring of electrical machine condition	3					Assoc. Prof. Dr. Doan Thanh Bao Assoc. Prof. Dr. Doan Duc Tung	DET
20	KĐGM	521	Control of wind and solar power systems	3					Assoc. Prof. Dr. Ngo Minh Khoa Dr. Nguyen Duy Khiem	DET
21	KĐSH	522	SCADA in power systems	3					Dr. Do Van Can Dr. Le Tuan Ho	DET
22	KĐEM	525	AI-powered energy management systems for smart microgrids	3					Dr. Le Tuan Ho Assoc. Prof. Dr. Doan Duc Tung	DET
23	KĐMD	526	Applying machine learning and deep learning methods to power system problems	3					Dr. Le Tuan Ho Assoc. Prof. Dr. Doan Duc Tung	DET
II.3. Practical training				**6**						
24	KĐTT	523	Internship 1	3			3		Assignment	DET
25	KĐTT	524	Internship 2	3				4	Assignment	DET
III. Graduation Thesis				**9**				4		DET
Total				**60**	**15**	**15**	**15**	**15**		

11. GUIDELINES FOR PROGRAM IMPLEMENTATION

- This training program will be applied from the 2024-2025 academic year enrollment period for students in the Electrical Engineering major.
- The training process is based on the designed curriculum, training objectives and target audience, human resource requirements, and specific training requirements. For elective courses, depending on the actual situation of development trends and social needs, the Postgraduate Training Department will advise students on choosing appropriate courses based on proposals from the faculties managing the training program in terms of expertise.

- Heads of departments responsible for course management are 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 training program is reviewed and updated at least twice every five years to meet the development of the Electrical Engineering industry and align with socio-economic development needs../.

Binh Dinh, December 19, 2024

VICE DEAN OF FACULTY	HEAD OF POSTGRADUATE TRAINING	BY THE DELEGATION OF THE RECTOR VICE-RECTOR
Dr. Nguyen Mai Chi Trung	**Assoc. Prof. Ho Xuan Quang**	**Dr. Đinh Anh Tuan**