

MINISTRY OF EDUCATION AND TRAINING
QUY NHON UNIVERSITY

MASTER PROGRAM

Level: **Master**
Major: **Electrical Engineering**
Code: **8520201**
Educational orientation: **Application-oriented program**
Mode of study: **Full-time**

Binh Dinh, 2024

MASTER PROGRAM

*(Issued together with Decision No. 4501/QĐ-ĐHQN dated December 19, 2024
of the Rector of Quy Nhon University)*

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1. PROGRAM OBJECTIVES (POs)

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

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

- Knowledge

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

- Skills

+ PO2: Be capable of critical thinking and solving practical engineering problems

+ PO3: Be capable of conducting research and applying specialized knowledge to solve practical problems in the field of electrical engineering and energy

+ PO4: Possess the necessary interpersonal skills to work effectively in multidisciplinary and international environments.

+ PO5: Possess strong foreign language skills for professional practice.

- 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. JOB OPPORTUNITIES AND PROFESSIONAL DEVELOPMENT

Graduates from the Master of 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. Knowledge

+ *Basic knowledge*

- 1) PLO1: Demonstrate mastery of the principles of philosophy
- 2) PLO2: Apply current techniques and engineering principles used in electrical engineering and energy systems.

+ *Specialized knowledge*

- 3) PLO3: Systematically apply specialized knowledge in the design, operation, and control of electrical engineering and energy systems.

3.2. 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: Apply fundamental and advanced knowledge to engineering reasoning and problem-solving.

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

+ *Professional skills*

7) PLO7: Analyze and apply modern technologies such as artificial intelligence and big data for computing, operating, and controlling power systems, as well as forecasting renewable energy sources.

3.3. *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 Electrical Engineering;

- 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. ELIGIBLE APPLICANTS

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
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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:

- ✓ Complete all required coursework and earn the required number of credits for the training program.;
- ✓ Learners 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. ASSESSMENT METHODS 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	Seme ster	Course credit volume			Prere quisit e Cour se	Departme nt in charge	Note
	Alph abeti cal	Num erical			Total	The ory	Practi ce, Practical, Experime ntal, Tests			
I. General Knowledge					3					
1	TNTH	501	Philosophy	1	3				DPSLM	
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 (Choose 9 out of 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 courses					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 (Choose 18 out of 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	Research Project			4	9				DET	
Total					60					

10. TEACHING PLAN

No	Course code		Course name	Number of credits	Semester				Expected professor	Department/Faculty in charge
	Letters	Numbers				1	2	3		
I. General Knowledge				3						
1	TNTH	501	Philosophy	3	1				According to the assignment from the Department of	DPSLM

									Professional Management	
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 (Choose 9 out of 15 credits)				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 courses				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 (Choose 18 out of 36 credits)				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 engineering	3					Dr. Le Tuan Ho Assoc. Prof. Dr. Ngo Minh Khoa	DET
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. Internship				6						
24	KĐTT	523	Internship 1	3			3		Assignment	DET
25	KĐTT	524	Internship 2	3				4	Assignment	DET
III. Research Project				9				4		DET
Total				60	15	15	15	15		

11. GUIDELINES FOR TRAINING 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, date 19 month 12 year 2024

***DEAN OF
DEPARTMENT/FACULTY***

***HEAD OF TRAINING
OFFICE***

***BY THE DELEGATION OF
THE RECTOR
VICE-RECTOR***

Dr. Tran Thanh Thai

Dr. Le Xuan Vinh

Dr. Dinh Anh Tuan