THAI NGUYEN UNIVERSITY
UNIVERSITY OF INFORMATION AND COMMUNICATION TECHNOLOGY

SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

PROGRAM LEARNING OUTCOMES (PLOs)
OF AUTOMATION UNDERGRADUATE PROGRAM

Issued under Decision No. 690/QĐ-ĐHCNTT&TT dated on 30/06/2017 by Rector Of The University of Information and Communication Technology

Major: Automation and Control Engineering Technology
Program name: Automation undergraduate program
Level of training: Undergraduate
Training period: 4.5 years

I. OBJECTIVES

Training Automation engineers in Automation and Control Engineering Technology aim to train human resources to meet social needs, have in-depth knowledge of electrical engineering, electronics, metrology, power electronics, electrical machines, PLC control, SCADA and automation of the production process; have professional ethics, health, have the ability to study independently and work in teams, have the ability to communicate and present specialized issues in English.

II. LEARNING OUTCOMES

2.1. Knowledge

- General education knowledge

+ Have knowledge of the basic principles of Marxism-Leninism, Ho Chi Minh's ideology and the revolutionary ways of the Communist Party of Vietnam; have basic knowledge in the field of social sciences and humanities, knowledge of national security and defense; have good health, meet the requirements of national construction and defense;

+ Be able to apply the knowledge of mathematics and physics to serve the basic knowledge of the industry and industry knowledge.

- Disciplinary foundational knowledge

+ Have knowledge of labor safety, industrial environment to raise awareness and recognize the importance of environmental issues;

+ Knowledge of the field of mechanics: Including mechanical engineering, machine principles, technical drawing, CAD/CAM/CNC technology;

+ Knowledgeable in the field of mechanics: Including mechanical engineering, machine principle, technical drawing, CAD/CAM/CNC technology;

+ Ability to program with languages C/C++, c#, Matlab;

+ Be able to master the knowledge of the principles and methods of analyzing the operation of electrical circuits, analog electronic circuits - digital electronics, power electronic circuits, sensors and measurement;

+ Be able to master the knowledge of the principles and features of driving energy in industry such as electrical equipment, electric drives; hydraulic, pneumatic drives and renewable forms of energy;

+ Mastering the knowledge of control, measurement and monitoring: Relay control; industrial control and programming PLC, microcontroller; industrial robot control; CNC digital programmable control machine; control, measurement and monitoring of automatic control systems;

+ Mastering the knowledge of simulation, calculation and design of circuits, electronic circuits, electrical equipment, electric drives and automatic control systems in industry: Autocad, Ocad, Matlab, WinCC, SCADA, SolidWorks.

- Specialized knowledge

+ Having in-depth knowledge of the principles and methods of analyzing the operation of electrical - electronic equipment systems for industrial machines, automation production lines in industry; integrating flexible production modul systems (MPs), PCs process control systems, communication networks in industry;

+ Having practical knowledge of the principles and methods of analyzing the operation of small and medium-scale industrial electric automatic control systems, especially high quality electric automatic drive systems to apply calculation, design, repair and ensure optimal operation features of equipment in the system and save energy;

+ Proficiently apply professional knowledge to calculate, repair, operate and inspect industrial electrical systems, computer applications in the process of developing maintenance plans of industrial systems in companies and enterprises.

2.2. Skills

- Job skills

+ Proficiently using specialized software in control engineering technology and automation;

+ Repair, operation and inspection of electrical equipment (AC, DC and transformers), measuring and control equipment in industry and civil;

+ Skills in analysis, design, operation, operation and maintenance of small and medium industrial automated control systems, service and public systems: PLC system, microprocessor, mini SCADA, industrial production lines;

+ Propose and design automation solutions for control systems, flexible production modules, process control systems with control, monitoring and data collection functions; propose and implement energy management and power saving solutions.

+ Designing, simulating, programming microcontrollers, industrial programming for control circuits, machines and production lines: Drives of Robots, CNC machines, industrial lines;

+ Having scientific working methods, creative thinking, skills to detect, analyze, handle situations and solve problems arising in the practice of automation and experience to form thinking and reasoning skills.

- Soft skills

+ Be able to conduct, communicate, prepare reports, make presentations in a thorough,

professional and persuasive manner in the process of operating and managing production as well as other economic activities of the company or factory;

+ Ability to work in groups and production groups through discussion and the use of modern tools and means; in the process of creation, emulation, scientific research to improve production capacity and product development.

2.3. Foreign languages, informatics

- Foreign language proficiency (English) level 3/6 (B1) according to the Vietnamese 6-level competency framework or equivalent;
- Informatics level: Requires one of the following certificates: IC3, MOS, ICDL, Certificate of information technology application (according to Circular 03/2014/TT - BTTTT of the Ministry of Information and Communications) or equivalent certificate.

2.4. Moral qualities

- In life: Honesty, integrity, confidence, flexibility, enthusiasm; know how to behave culturally in work and society;
- Having ethical qualities, professional sense and civic responsibility;
- Have a sense of discipline and industrial style, work seriously and scientifically;
- Be persistent, unobtrusive; meet the requirements of actual production;
- Regularly update and cultivate knowledge and creativity in bulking.

2.5. Competence of learners after graduation

- Having professional competence to meet the work: Design, installation, operation and maintenance of automated measurement and control systems in industrial enterprises; in construction and exploitation sites; in food production and processing companies, petrochemical, cast iron, steel rolling, ...and assembly companies (motorcycles, cars, electronic equipment,...), power transmission and distribution companies; in research and development companies in electrical engineering, control engineering; building automation management companies,...
- Being able to self-study, self-fostering to improve qualifications and capabilities to meet job requirements;
- Being able to organize, manage and administer the work;
- Ability to communicate and train in Automation;
- Knowing the organization of the workplace, organization of implementation and alignment of work; positioning yourself to perform your role and integrate with the multinational environment;
- Recognizing the importance of learning and willingness to continue learning programs to improve professional qualifications;
- Mastering science, technology and advanced labor tools in practice; withstanding work pressure, solving arising problems and proposing solutions to perform work effectively.

2.6. Working position after graduation

- Be an engineer to design automated system control software; test, operate, test and accept projects on automated control lines at companies and factories;

- Research and teaching in research institutes, in training institutions (colleges and universities), vocational training related to automation solutions;
- Perform management, design, operation, technical director in foreign joint ventures, facilities with modern production lines with high level automation and automated control systems;
- Acting as a specialist in the measurement departments, measurement and inspection centers of the provinces such as: Department of Science and Technology; Provincial Department of Metrology; Metering, measuring and laboratory departments of Power Company; automatic measurement workshops of factories;
- Acting as an engineer, manager and operator at consulting companies, designing production lines, automation systems; companies and factories that apply automated systems in production, ...
- Acting as an engineer, technical manager at thermal, hydroelectric power plants, power consulting and construction companies; power transmission and distribution companies;
- Continue to study and study in deep majors at the postgraduate level such as: Automation, management and production field

2.7. Learning outcomes of training programs

Learning outcomes of the training program in Automation and Control Engineering Technology (Specialization in Automation undergraduate program) issued under Decision No. 690/QĐ-ĐHCNTT&TT expressed in the following contents (codified: L1 - L12):

Notation of PLOs	Content of PLOs
L1	Understand the fundamental knowledge of mathematics and physics to solve theoretical and practical problems related to the industry and major.
L2	Understand the basic of the theory of Marxism-Leninism, Ho Chi Minh's Ideology, the contents of the Revolutionary Way of the Communist Party of Vietnam, the law of the state, security - defense.
L3	Achieve a foreign language level 3/6 (English) foreign language competence framework of Vietnam; skills in using specialized English
L4	Apply fundamental knowledge of electronic and electrical engineering, control theory, electrical machines, ... and the quality criteria of control and automation systems to reason and solve theoretical and practical problems in the automation field.
L5	Apply specialized knowledge to the operation, exploitation and maintaining small and medium-sized industrial control systems, service and public systems, PLC system, microprocessor, mini SCADA, industrial production lines.
L6	Analyze, model design, microcontroller programming, industrial programming for control circuits, machines and production lines: drives of robots, machine tools and CNC, industrial lines.

L7	Repair, operation and inspection of electrical equipment (AC generators, DC generators and transformers), measuring and control equipment in industry and civil engineering;
L8	Formulate ideas, propose solutions for control systems, flexible production modules, process control systems with control, monitoring and data collection functions; propose and implement energy management and power saving solutions.
L9	Have ability to competently use the necessary tools and specialized software to solve problems related to the discipline and specialized training.
L10	Have the skills to work independently and in groups; write reports, give presentations on technical issues.
L11	Have the capacity to lead on the trained professional; proposing initiatives in performing assigned tasks; have the ability to self-study, accumulate knowledge and experience to improve professional qualifications; have the capacity to plan, coordinate and promote collective wisdom; have an understanding of professional responsibility and professional ethics.
L12	Achieve one of the following certificates: IC3, MOS, ICDL, Certificate of Information Technology Application (according to Circular 03/2014/TT-BTTTT of the Ministry of Information and Communications)

VICE RECTOR

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