

ACADEMIC TRAINING PROGRAM

(Issued under Decision No: 2551/QĐ-DCT dated 19/08/2024 by the Rector of Ho Chi Minh City University of Industry and Trade)

- **Program Name (Vietnamese):** CÔNG NGHỆ KỸ THUẬT CƠ ĐIỆN TỬ
- **Program Name (English):** Mechatronics Engineering Technology
- **Training Level:** Undergraduate (Bachelor)
- **Major:** Mechatronics Engineering Technology
- **Major Code:** 7510203
- **Field of Study:** Engineering Technology
- **Mode of Study:** Full-time
- **Accreditation Information:** The Undergraduate Program in Mechatronics Engineering Technology has met the educational quality standards issued by the Ministry of Education and Training (MOET) since 2019.

1. Training Objectives

1.1 General Objectives

The application-oriented undergraduate program in Mechatronics Engineering Technology aims to develop human resources with the ethics, knowledge, and skills to solve problems related to the design, manufacture, operation, improvement, and maintenance of mechatronic systems and equipment in production processes, factories, and enterprises.

The program trains learners to participate in production development projects; organize, manage, and direct production processes to meet social needs; conduct scientific research, technology transfer, and industrial/commercial/service development; demonstrate

creativity and adaptability in the working environment; and uphold professional and social responsibilities in serving the community.

1.2 Specific Objectives

- **a) Knowledge:** Provides fundamental knowledge of law, politics, national defense education, social sciences, humanities, and natural sciences. Equips learners with general knowledge of mechanical materials, principles of mechanisms and machine parts, measurement devices, and mechatronic actuators. Provides in-depth knowledge of classical and modern controller design, programming, and device interfacing in mechatronic systems.
- **b) Skills:** Provides skills in machine design, industrial automation, and production systems; skills in organizing the design and manufacturing of mechatronic systems; management and operation of assembly processes; maintenance and troubleshooting; information processing and problem-solving through analytical tools. Additionally, it develops teamwork, presentation, technical writing, and foreign language proficiency.
- **c) Autonomy and Responsibility:** Fosters professional ethics, honesty, and accountability. Develops a spirit of solidarity, adaptability to change, lifelong learning habits, and the ability to lead or work effectively within diverse groups.

2. Program Learning Outcomes (PLOs)

Upon completion of the course, learners will possess the following knowledge, skills, and professional competencies:

Code	Program Learning Outcomes (PLOs)	Proficiency Level (Bachelor)	Proficiency Level (Engineer)
a	Knowledge		
PLO1	Apply fundamental knowledge of science and society (Math, IT, political theory, law, management) in engineering and daily life.	C3	C3
PLO2	Analyze solid practical knowledge and broad theoretical knowledge to evaluate issues in Mechatronics Engineering Technology.	C4	
	Synthesize practical and deep theoretical knowledge to evaluate issues in Mechatronics Engineering Technology.		C5
b	Skills and Personal Attributes		
PLO3	Proficiently perform necessary skills including systems thinking and analysis to solve problems.	P3	
	Master the skills of analyzing, synthesizing, and evaluating data to provide scientific solutions.		P4
PLO4	Master self-study and research skills for lifelong learning and updating mechatronic knowledge.	P3	P3

Code	Program Learning Outcomes (PLOs)	Proficiency Level (Bachelor)	Proficiency Level (Engineer)
PLO5	Demonstrate personal qualities, professional ethics, and responsibility (honesty, integrity, discipline).	A3	A3
c	Interaction Skills		
PLO6	Master collaboration, organization, and teamwork skills.	P3	P3
PLO7	Master communication and information exchange skills, including foreign languages for professional work.	P4	P4
d	Professional Competency (Autonomy)		
PLO8	Analyze social/business contexts to provide professional conclusions, ideas, and solutions for businesses or startups.	R4	R4
PLO9	Proficiently plan, coordinate, and evaluate professional activities in mechatronics.	P3	
	Master the organization, management, and improvement of professional mechatronic activities.		P4

Note: Proficiency levels are measured according to:

- **C (Cognitive):** Bloom's Taxonomy.

- **P (Psychomotor):** Bloom’s Taxonomy.
- **A (Affective):** Bloom’s Taxonomy.
- **R (Proficiency Rating):** Crawley scale.

3. TOTAL CREDIT SUMMARY (PROGRAM WORKLOAD)

No.	Knowledge Block	Credits	Percentage (%)
1	General Education	30	19.87%
2	Fundamental Engineering	38	25.17%
3	Specialized Knowledge (Incl. Corporate Semester)	53	35.10%
4	Advanced Specific Specialization	30	19.87%
	TOTAL ACCUMULATED CREDITS	151	100%

Note: The above workload excludes Physical Education and National Defense & Security Education.

(*) **Core Courses:** Mandatory courses that are fundamental to the professional qualification, including Internships and Graduation Thesis.

4. TRAINING PROGRAM CONTENT

Abbreviations:

- **Pre-requisite (a):** Must complete and pass before taking the current course.
 - **Mandatory (b):** Must be taken as a core requirement.
 - **Co-requisite (c):** Must be taken simultaneously with another course.
 - **Credits (x,y):** x = Total credits; (Theory credits, Practical/Lab credits).
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I. GENERAL EDUCATION KNOWLEDGE (30 Credits)

No.	Course Name	Credits	Note/Conditions
A	Compulsory Courses	24	
1	Marxist - Leninist Philosophy	3(3,0)	
2	Marxist - Leninist Political Economy	2(2,0)	(a) 0101100651
3	Scientific Socialism	2(2,0)	(a) 0101100651
4	History of the Communist Party of Vietnam	2(2,0)	(a) 0101100651
5	Ho Chi Minh Ideology	2(2,0)	(a) 0101100651
6	English 1	2(1,1)	
7	English 2	2(1,1)	(a) English 1
8	English 3	2(1,1)	(a) English 2
9	Application Programming	2(1,1)	
10	Physical Education 1	2(0,2)	
11	Physical Education 2	2(0,2)	(a) Phys Ed 1
12	Physical Education 3	1(0,1)	(a) Phys Ed 2
13	National Defense & Security Education 1	3(3,0)	(c) NDSE 2, 3, 4

No.	Course Name	Credits	Note/Conditions
14	National Defense & Security Education 2	2(2,0)	(c) NDSE 1, 3, 4
15	National Defense & Security Education 3	1(0,1)	(c) NDSE 1, 2, 4
16	National Defense & Security Education 4	2(0,2)	(c) NDSE 1, 2, 3
17	Advanced Mathematics A1 (Calculus 1)	3(3,0)	
18	Advanced Mathematics A2 (Calculus 2)	2(2,0)	
B	Elective Courses (Choose min 1 per group)	6	
<i>Group A</i>	<i>Logic / Research Methods / Innovation</i>	2(2,0)	
<i>Group B</i>	<i>Technical Physics / General Physics / Prob & Stats</i>	2(2,0)	
<i>Group C</i>	<i>General Law / Management / General Economics</i>	2(2,0)	

II. FUNDAMENTAL ENGINEERING KNOWLEDGE (38 Credits)

No.	Course Name	Credits	Note
1	Technical Drawing	2(1,1)	
2	Introduction to Engineering	2(2,0)	
3	General Mechanical Engineering	3(3,0)	
4	Engineering Mechanics	3(3,0)	

No.	Course Name	Credits	Note
5	Electrical Engineering	2(2,0)	
6	General Mechanical Engineering Practice	2(0,2)	
7	Electronic Engineering	2(2,0)	
8	Electronic Engineering Practice	1(0,1)	(c) Course 7
9	Digital Engineering (Digital Electronics)	2(2,0)	
10	Theory of Machines	2(2,0)	
11	Mechanical Drawing	3(2,1)	
12	Mechanical Measurement Practice	1(0,1)	
13	Occupational Safety	2(2,0)	
14	Strength of Materials	3(3,0)	
15	Machine Elements	3(3,0)	
<i>Group D</i>	<i>Sensors & Actuators / Tolerances / Exp. Planning</i>	2(2,0)	Elective
<i>Group E</i>	<i>Project Management / Maintenance / Product Design</i>	3(3,0)	Elective

III. MAJOR KNOWLEDGE (53 Credits)

No.	Course Name	Credits	Note
1	Automatic Control Theory	3(3,0)	
2	Industrial Robotics	3(3,0)	(a) Eng. Mechanics
3	MATLAB Programming and Applications	3(1,2)	
4	Microcontrollers	3(1,2)	(a) Digital Eng.
5	Mechatronics Control Programming	3(1,2)	
6	CNC Technology	3(3,0)	
7	CAD/CAM Practice	2(0,2)	
8	CNC Practice	2(0,2)	
9	Technical English for Mechanical Engineering	2(1,1)	(a) English 3
10	Mechatronics Project 1	1(0,1)	(a) Microcontrollers
11	Mechatronics Project 2	1(0,1)	(a) Control Prog.
12	Automated Manufacturing Systems	3(2,1)	
13	Hydraulic and Pneumatic Drives	3(3,0)	
14	Hydraulic and Pneumatic Practice	1(0,1)	
15	Graduation Internship	4(0,4)	

No.	Course Name	Credits	Note
16	Graduation Thesis	6(0,6)	(a) Project 2
<i>Group F</i>	<i>PLC / Mechatronics Communication Systems</i>	3(1,2)	Elective
<i>Group G</i>	<i>Power Electronics / Fluid Mechanics / Materials</i>	3(3,0)	Elective
<i>Group H</i>	<i>Fuzzy Logic & Neural Networks / Thermal Eng.</i>	2(2,0)	Elective
<i>Group I</i>	<i>Advanced PLC / Advanced Micro / Adv. Control</i>	2(0,2)	Elective

IV. SPECIALIZED ADVANCED KNOWLEDGE (30 Credits)

No.	Course Name	Credits	Note
1	Industrial Robot Programming	2(0,2)	(a) Robot Ind.
2	System Modeling and Simulation	2(1,1)	(a) Control Theory
3	Servo System Control	3(3,0)	
4	Smart Manufacturing Systems	3(3,0)	
5	Process Control	3(3,0)	
6	Engineering Internship	8(0,8)	(a) Grad Internship
7	Engineering Project	3(0,3)	(b) Grad Thesis

No.	Course Name	Credits	Note
<i>Group K</i>	<i>Renewable Energy / Mechatronics Dynamics</i>	6(6,0)	Elective

SUMMARY

- **Total Theory Credits: 96 (Excluding Phys Ed & Defense)**
- **Total Practical/Internship/Thesis Credits: 55**
- **Total Credits for Graduation: 151**