# ACADEMIC TRAINING PROGRAM

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

- **Program Name (Vietnamese): CÔNG NGHỆ CHẾ TẠO MÁY**
- **Program Name (English): Machine Manufacturing Technology**
- **Training Level:** Undergraduate (Bachelor)
- **Major:** Machine Manufacturing Technology
- **Major Code:** 7510202
- **Field of Study:** Engineering Technology
- **Mode of Study:** Full-time
- **Accreditation Information:** The Undergraduate Program in Machine Manufacturing Technology has met the educational quality standards issued by the Ministry of Education and Training (MOET) since 2019.

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## 1. Training Objectives

### 1.1 General Objectives

The training program in Machine Manufacturing Technology aims to produce Bachelors and Mechanical Engineers with professional competence, political qualities, ethics, and good health, ready to work in sectors including industry, agriculture, education, commerce, and services. Students are equipped with a solid foundational knowledge, the ability to independently solve technical problems, and the capacity to develop research in the field of Machine Manufacturing Technology to meet the country's demand for high-tech labor.

### 1.2 Specific Objectives

Graduates will possess the following knowledge, skills, autonomy, and responsibility:

- **a) Knowledge:** Core engineering foundations, in-depth specialized knowledge, and basic knowledge of planning, organizing, and supervising processes. Management and operation of professional activities in machine manufacturing; Information Technology (IT) proficiency; and basic knowledge of natural sciences, social sciences, politics, law, and national defense education.
- **b) Skills and Personal Attributes:** Proficiency in using tools (theory, software, calculation tools, etc.) to design machines; organizing and managing machining and manufacturing processes for machines and parts; drafting operation, preservation, and

maintenance procedures for equipment. Skills in critical thinking, evaluating work quality, leadership, and entrepreneurship. English proficiency at Level 3/6 of the Vietnamese Foreign Language Competency Framework (VSTEP).

- **c) Interaction Skills and Professional Competency:** Ability to work independently and in teams with integrity and solidarity; self-direction of ethical and professional standards; ability to formulate ideas, plan, coordinate resources, and improve activity efficiency.

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## 2. Program Learning Outcomes (PLOs)

Upon completion of the course, learners will possess the following:

| 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 life. | C3 | C3 |
| **PLO2** | Analyze solid practical knowledge and broad theoretical knowledge to evaluate issues in Mechanical Engineering Technology. | C4 | |
| | Synthesize practical and deep theoretical knowledge to evaluate issues in Mechanical Engineering Technology. | | C5 |
| **b** | **Skills and Personal Attributes** | | |
| **PLO3** | Proficiently perform necessary skills to solve problems in the mechanical field. | P3 | |

| Code | Program Learning Outcomes (PLOs) | Proficiency Level (Bachelor) | Proficiency Level (Engineer) |
|---|---|---|---|
| | Master the skills of analyzing, synthesizing, and evaluating data to provide scientific solutions for mechanical systems. | | P4 |
| **PLO4** | Master self-study and research skills for lifelong learning and updating innovation in the mechanical field. | P3 | P3 |
| **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 and solutions for businesses or startups. | R4 | R4 |
| **PLO9** | Master planning, coordination, and evaluation of professional mechanical activities. | P3 | |
| | Master the organization, management, and improvement of professional mechanical 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. TRAINING WORKLOAD (CREDIT DISTRIBUTION)

| No. | Knowledge Block | Credits | Percentage |
|---|---|---|---|
| 1 | **General Education** | 30 | 19% |
| 2 | **Fundamental Engineering** | 39 | 27% |
| 3 | **Specialized Knowledge** (Incl. Corporate Semester) | 52 | 34% |
| 4 | **Advanced Specialized Knowledge** | 30 | 20% |
| | **TOTAL ACCUMULATED CREDITS** | **151** | **100%** |

## 4. TRAINING PROGRAM CONTENT

**Note on Conditions:** (a) Prerequisite; (b) Pre-condition; (c) Corequisite.

**Note on Credits:** X(Y,Z) where X is total credits, Y is theory, Z is practice/lab.

### I. GENERAL EDUCATION (30 Credits)

| No. | Course Name | Credits | Condition |
|---|---|---|---|
| **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 Vietnamese Communist Party | 2(2,0) | (a) 0101100651 |

| No. | Course Name | Credits | Condition |
|---|---|---|---|
| **5** | Ho Chi Minh Ideology | 2(2,0) | (a) 0101100651 |
| **6** | English 1 | 2(1,1) | |
| **7** | English 2 | 2(1,1) | (a) 0101102246 |
| **8** | English 3 | 2(1,1) | (a) 0101102247 |
| **9** | Advanced Mathematics A1 | 3(3,0) | |
| **10** | Advanced Mathematics A2 | 2(2,0) | |
| **11-13** | Physical Education 1, 2, 3 | 5 total | (a) Sequential |
| **14-17** | National Defense & Security Education 1, 2, 3, 4 | 8 total | (c) Concurrent |
| **18** | Introduction to Engineering | 2(2,0) | |
| **Electives** | **Students choose 1 course from each Group A, B, and C** | **6(6,0)** | |
| *A1* | General Physics | 2(2,0) | |
| *B1* | Innovation and Entrepreneurship | 2(2,0) | |
| *C1* | General Law | 2(2,0) | |

## II. FUNDAMENTAL ENGINEERING (39 Credits)

| No. | Course Name | Credits | Condition |
|---|---|---|---|
| **1** | Technical English for Mechanical Engineering | 2(1,1) | (a) English 3 |
| **2** | Technical Drawing | 2(1,1) | |

| No. | Course Name | Credits | Condition |
|---|---|---|---|
| **3** | General Mechanical Practice | 2(0,2) | |
| **4** | Engineering Mechanics | 3(3,0) | |
| **5** | Mechanical Drawing | 3(2,1) | (a) Technical Drawing |
| **6** | Thermal Engineering | 2(2,0) | |
| **7** | Manufacturing Processes | 3(3,0) | |
| **8** | Occupational Safety | 2(2,0) | |
| **9** | Theory of Machines | 2(2,0) | |
| **10** | Strength of Materials | 3(3,0) | |
| **11** | Machine Elements | 3(3,0) | (a) Theory of Machines, Eng. Mechanics, Strength of Materials |
| **12** | Fluid Mechanics | 3(3,0) | (a) Math A1, Physics |
| **15** | Engineering Materials | 2(2,0) | |
| **16** | Mechanical Measurement Practice | 1(0,1) | (c) Mechanical Drawing |
| **17** | Materials Technology | 3(3,0) | (a) Eng. Materials; (c) Materials Lab |
| **18** | Materials Laboratory | 1(0,1) | (a) Eng. Materials; (c) Materials Tech |
| **19** | **Elective:** Tolerance and Fit | 2(2,0) | |

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**III. SPECIALIZED KNOWLEDGE (52 Credits)**

| No. | Course Name | Credits | Condition |
|---|---|---|---|
| **1** | Metal Cutting Principles | 2(2,0) | (a) Materials, Tech Drawing |
| **3** | Mechatronics Programming & Control | 3(1,2) | |
| **4** | Machine Elements Project | 1(0,1) | (a) Machine Elements, Tolerance, Drawing |
| **5** | CNC Technology | 3(3,0) | |
| **6** | Manufacturing Engineering 1 | 3(3,0) | (a) Tolerance, Mech Drawing |
| **8** | Geometric Modeling and Simulation | 2(0,2) | (a) Drawing; (c) CAE Applications |
| **10** | Hydraulic and Pneumatic Drives | 3(3,0) | |
| **12** | CAD/CAM Practice | 2(0,2) | (a) Drawing; (c) CNC Practice |
| **14** | CNC Lathe Practice | 2(0,2) | (a) CNC Tech; (c) CAD/CAM Practice |
| **17** | Manufacturing Engineering Project | 1(0,1) | (a) Manufacturing Eng 1 & 2 |
| **19** | Graduation Internship | 4(0,4) | |
| **20** | Graduation Thesis | 6(0,6) | (a) All major projects |
| **Electives** | **Group A (Management), B (Thermal/Jigs), C (Agro-machinery)** | **7(7,0)** | |

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**IV. ADVANCED SPECIALIZED KNOWLEDGE (30 Credits)**

| No. | Course Name | Credits | Condition |
|---|---|---|---|
| **1** | Automated Production Systems | 2(1,1) | |
| **2** | Mold Design Technology | 3(3,0) | (a) Technical Drawing |
| **3** | 3D Printing Technology | 2(1,1) | (a) CAD/CAM Practice |
| **4** | CAE Applications in Mechanical Design | 3(1,2) | (a) Drawing; (c) Geometric Modeling |
| **5** | Engineering Internship | 8(0,8) | |
| **6** | Optimization in Mechanical Engineering | 3(2,1) | |
| **7** | Mechatronics System Dynamics | 3(3,0) | |
| **8** | Engineering Capstone Project | 3(0,3) | |
| **9** | **Elective:** Smart Manufacturing Systems | 3(3,0) | |

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**SUMMARY OF CREDITS**

- **Total Theory Credits: 99**
- **Total Practice/Internship/Thesis Credits: 52**
- **GRAND TOTAL: 151 Credits**