MINISTRY OF EDUCATION AND TRAINING
NAM CAN THO UNIVERSITY

SOCIALIST REPUBLIC OF VIET NAM
Independence-Freedom-Happiness

UNDERGRADUATE TRAINING PROGRAM

BIOMEDICAL ENGINEERING

(Issued under Decision No. /QD-DHNCT dated 2024 by the President of Nam Can Tho University.)

Program title : Biomedical Engineering Training Program
Education level : Full-time
Field of study : Biomedical Engineering
Program code : 7520212

1. PROGRAM DESCRIPTION

1.1. About the Program

The Biomedical Engineering program is designed to train engineers with strong professional ethics, foundational knowledge, and essential skills in biomedical engineering. Graduates will be capable of designing, developing, and applying technological solutions in the medical field to support diagnosis, treatment, and healthcare. The program equips students with scientific research capabilities and self-learning skills to enhance their qualifications and meet the demands of protecting and improving public health in the context of continuous technological advancement.

Students will begin by studying general education and foundational courses in science and engineering at the university, building a solid base of knowledge, practical skills, and professional work attitudes. This foundation enables them to successfully advance to applied and specialized phases of the program.

In the specialized phase, students apply their acquired knowledge and skills to real-world problems such as designing and maintaining medical devices, analyzing biological data, and developing medical support systems. These applications are guided by evidence-based medicine and aligned with economic, social, and environmental contexts.

The program also focuses on developing soft skills, including teamwork, effective communication, problem-solving, project management, and leadership. These competencies prepare students to adapt to and thrive in real-world working environments.

Students have the opportunity to engage in scientific research from the early years of their studies. In their final year, they can select specialized elective courses aligned with their career goals. Additionally, the program encourages participation in seminars and scientific conferences both domestically and internationally, fostering an environment for academic exchange, global exposure, and experiential learning.

1.2. General information about program

Program Name (Vietnamese)	Kỹ thuật Y Sinh
Program Name (English)	Biomedical Engineering
Training code	7520212
Degree-Awarding Institution	Nam Can Tho University
Degree Title	Biomedical Engineering Engineer
Education level	Undergraduate
Total Credits Required	161 credits
Mode of Study	Full-time
Program Duration	4.5 years
Admission Requirements	High school graduate or equivalent
Grading scale	4.0 GPA scale
Graduation Requirements	- Successfully complete all courses and credits in the curriculum; - Cumulative GPA must be 2.0 or higher (on a 4.0 scale); - Complete all prerequisite courses; - Achieve a minimum GPA of 2.0 for National Defense and Security Education courses; - Not subject to criminal prosecution or suspension from school in the final year.
Career Opportunities	- Work as a clinical engineer in hospitals and medical centers; manage and operate medical equipment; collaborate with doctors on research and technical consulting; - Work as an engineer in domestic and international medical equipment manufacturing and trading companies; - Conduct research, improvement, and production of medical devices suitable for Vietnam's needs; - Work in biomedical research and development centers and institutes; - Serve as lecturer, researcher, or technician at universities and colleges; - Work as a specialist in healthcare management agencies, governmental and non-governmental organizations.
Further Study	Eligible for master's and doctoral programs both in Vietnam and abroad
Reference program	Biomedical Engineering programs from domestic and international institutions, including: Ho Chi Minh City University of Technical Education, Ho Chi Minh City University of Technology, Can Tho University, Can Tho University of Medicine and Pharmacy, Kyung Hee University (Korea), University of Auckland (New Zealand), Mahidol University (Thailand).

Last Updated	December 2024

1.3. Objectives

1.3.1. General Objective

The Biomedical Engineering program aims to train individuals with professional competence, scientific research capabilities, and creativity. Graduates are expected to continuously improve their qualifications while developing political awareness, ethical integrity, and good health. They will master foundational knowledge and practical skills in biomedical engineering, enabling them to support medical personnel in identifying, proposing, and addressing issues related to personal and public health.

1.3.2. Specific Objectives

M1. Acquire knowledge in philosophy, law, national defense and security, and health education to contribute to national development, protection, and progress.

M2. Possess foundational knowledge of natural and social sciences to support problem-solving in fields related to biomedicine, health protection, diagnosis, and treatment.

M3. Be capable of applying specialized knowledge to scientific research, testing, management, operation, manufacturing, and development of biomedical equipment.

M4. Develop self-learning abilities, enhance professional qualifications, conduct scientific research, and demonstrate teamwork skills along with a professional, dedicated, honest, and objective work ethic.

M5. Demonstrate autonomy, problem-solving capabilities, and the ability to assist doctors and specialists in scientific research, clinical practice, and the development of applied medical products.

M6. Show social responsibility, uphold professional ethics, and consistently prioritize the goal of improving community health.

1.4. Training Program Outcomes

Graduates of the Biomedical Engineering program are expected to demonstrate the following competencies in terms of knowledge, skills, autonomy, and responsibility:

Knowledge

PO1. Understand and uphold the viewpoints of the Party and the State; fulfill their responsibilities as citizens to the State and society.

PO2. Possess foundational knowledge in natural sciences (mathematics, physics, chemistry, biology), foreign languages (English), information technology, and social sciences to effectively apply in both academic and real-life contexts.

PO3. Apply fundamental and specialized knowledge to identify, analyze, present, and solve problems related to the field of Biomedical Engineering.

Skills

PO4. Perform biomedical testing techniques; collect, process, and analyze biomedical data.

PO5. Implement safety protocols in laboratories and ensure the safe operation of medical equipment.

PO6. Possess the skills to design, propose, and implement ideas; operate medical equipment; and address emerging issues in the field of Biomedical Engineering.

Autonomy and Responsibility

PO7. Build cooperative, friendly, and trustworthy relationships with colleagues and partners.

PO8. Demonstrate the ability to work independently and in teams; engage in self-study and continuous professional development.

PO9. Be aware of the roles and responsibilities of a biomedical engineering professional; demonstrate ethical behavior, professional discipline, industrial work style, and a commitment to maintaining good health in service of their career.

2. Training Duration: 4.5 years

3. Total Program Credits: 161 credits, distributed as follows:

KNOWLEDGE BLOCK	Compulsory Credits	Elective credits	Total
General education			**64**
General knowledge	*36*	*0*	*36*
Basic Discipline Knowledge	*26*	*2*	*28*
Professional education			**97**
Core Discipline Knowledge	34	0	34
Specialized Knowledge	38	12	50
Graduation Thesis (or equivalent coursework)	13	0	13
Total			**161**

4. Admission objects

Admission is based on the results of the national high school graduation exam or the transcript of high school studies according to the combination of subjects by major and nationwide admission.

5. Training process, graduation conditions

5.1. Training process

Implement the training regulations for university level of the Ministry of Education and Training; current training regulations of Nam Can Tho University.

5.2. Graduation conditions

Students who complete the training program are considered for graduation and recognized as graduating according to Article 14 of the Regulations on university level training, issued together with Circular No. 08/2021/TT-BGDDT dated March 18, 2021 of the Minister of Education and Training.

Achieve foreign language and IT proficiency according to the general regulations of the School.

Achieving a certificate of National Defense and Security Education; Physical Education.

6. Teaching and learning methods

Teaching and learning methods are educational approaches based on output standards, from expected output standards of the training program, designing student output standards, designing subject output standards. Based on this output standard, develop a teaching plan, conduct teaching, course outline, teaching methods, learning methods and assessment tools. After completing the course, conduct a subject assessment and proceed to evaluate the program to improve the program output standards.

The list of teaching strategies and teaching methods used in the training program is described as follows:

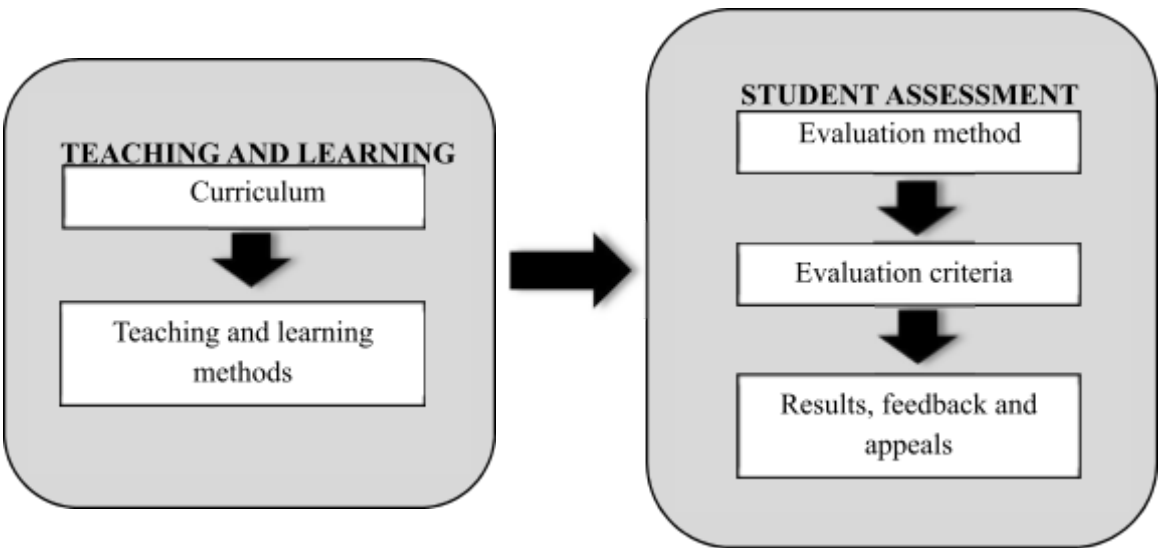
Method	Purpose
Lecture	To provide students with a systematic and logical understanding of the subject's core content.
Discuss	Through questions and answers between teachers and students to clarify the knowledge content in the subject.
Exercises/Practice	Help students understand and apply course content to practical problems.
Self-study and Reading	To enhance students' self-learning abilities and research skills through independent study and reference materials.

Teaching and learning methods are based on the subject output standards and are consistent with the objectives and output standards of the Biomedical Engineering training program. In order to improve and enhance the quality of teaching, the School has a number of plans and regulations as follows:

- The training program is reviewed periodically every 2 years with the direction of adjustment to meet the requirements of stakeholders (students, alumni, employers, experts, etc.) on the quality of the training program.
- Every year, the faculty develops a plan for observing lecturers, especially young lecturers, to exchange and share knowledge and teaching methods to improve lecturers' capacity.
- Regularly collect feedback from students on the qualities, talents, and responsibilities of lecturers.

7. Testing and evaluation methods

The assessment process is built on the requirements of the subject output standards and the subject output standards reflect the level of achievement of the program output standards. The teaching program clearly states the teaching and learning methods, from which there are appropriate assessment methods and assessment criteria for each subject. The assessment results will be announced to students and there will be a waiting period for feedback and review before being stored.



Teaching, learning and student assessment process

Scoring scale, format, evaluation criteria and score weighting

No.	Component	Weight (%)	Assessment Criteria	Maximum Score
1	Attendance	10	- Proactivity, level of preparation, and participation in class activities. - Required attendance. - Quizzes to assess understanding and application after each lesson.	10
2	Continuous Assessment	30	- Quality of submitted assignments/projects. - Based on the lecturer's answer key and grading rubric.	10
3	End-of-Term Exam	60	- Based on the lecturer's answer key and grading rubric.	10

8. PROGRAM CONTENT

8.1. General education knowledge: 61 credits

8.1.1. General knowledge: 36 credits

No.	Course Name	Number of Credits			Note
		Total	Theory	Practice	
1	Philosophy of Marxism – Leninism	3	3		Compulsory
2	Political Economy of Marxism – Leninism	2	2		Compulsory
3	Scientific Socialism	2	2		Compulsory
4	Ho Chi Minh's Ideology	2	2		Compulsory
5	History of the Communist Party of Vietnam	2	2		Compulsory
6	General Law	2	2		Compulsory
7	Physical Education 1*	1		1	Compulsory
8	Physical Education 2*	1		1	Compulsory
9	Physical Education 3*	1		1	Compulsory
10	National Defense and Security Education *	8	5	3	Compulsory
11	Basic English 1	3	3		Compulsory
12	Basic English 2	3	3		Compulsory
13	Basic English 3	3	3		Compulsory
14	Basic English 4	3	3		Compulsory

8.1.2. Basic knowledge of the industry: 28 credits

No.	Course Name	Number of Credits			Note
		Total	Theory	Practice	
1	English for Specific Purposes 1	3	3		Compulsory
2	English for Specific Purposes 2	3	3		Compulsory
3	English for Specific Purposes 3	3	3		Compulsory
4	Medical Statistics and Probability	2	2		Compulsory
5	General Biology – Biomedical Engineering	3	2	1	Compulsory
6	Molecular Biology – Biomedical Engineering	3	2	1	Compulsory
7	Basic Chemistry – Biomedical Engineering	3	2	1	Compulsory
8	Biophysics – Biomedical Engineering	2	2		Compulsory
9	Scientific Research Methodology – Biomedical Engineering	2	2	0	Compulsory
10	Psychology and Medical Ethics	2	2		Compulsory
11	Health Economics	2	2		2 Elective credits
12	Working Skills in Technical Environments	2	2		
13	Nuclear Medicine	2	2		
14	Computer Networks	2	2		
15	Intellectual Property	2	2		
16	Health Management	2	2		
17	Innovation and Entrepreneurship	2	2		
18	Experimental Design and Analysis	2	2		

8.2. Professional education knowledge

8.2.1. Basic industry knowledge: 34 credits

No.	Course Name	Number of Credits			Note
		Total	Theory	Practice	
1	Introduction to Biomedical Engineering	2	2		Compulsory
2	Biochemistry – Biomedical Engineering	3	2	1	Compulsory
3	Analytical Chemistry Techniques in Biomedical Engineering	2	2		Compulsory
4	Digital Pulse Circuits	2	2		Compulsory
5	Electrical Principles in Biomedical Engineering	3	2	1	Compulsory
6	Basic Programming – Electronics	2	1	1	Compulsory
7	Database Management in Biomedical Engineering	2	1	1	Compulsory
8	Artificial Intelligence – Biomedical Engineering	2	2		Compulsory
9	Health Information Systems	2	2		Compulsory
10	Human Anatomy	3	2	1	Compulsory
11	Physiology – Biomedical Engineering	3	2	1	Compulsory
12	Histology and Embryology – Biomedical Engineering	2	1	1	Compulsory
13	Medical Imaging in Biomedical Engineering	2	1	1	Compulsory
14	Principles of Pharmacokinetics	2	2		Compulsory
15	Safety and Health in Biomedical Engineering	2	2		Compulsory

8.2.2. Specialized knowledge: 50 credits

No.	Course Name	Number of Credits			Note
		Total	Theory	Practice	
1	Biomaterials Engineering	3	2	1	Compulsory
2	Biomedical Testing Techniques	3	2	1	Compulsory
3	Biomedical Signal Processing	3	2	1	Compulsory
4	Biomedical Sensor Technology	3	2	1	Compulsory
5	Bidding in Biomedical Engineering	2	2		Compulsory
6	Biomedical Optics	3	2	1	Compulsory
7	Mechanical Design and Manufacturing – Biomedical Engineering	3	2	1	Compulsory
8	Modeling and Simulation in Biomedical Engineering	2	2		Compulsory
9	Biomedical Equipment Engineering	3	2	1	Compulsory
10	Computer-Based Measurement and Control	2	2		Compulsory
11	Advanced Drug Delivery Materials	2	2		Compulsory
12	Biomedical Equipment Maintenance	2	1	1	Compulsory
13	Immunology – Biomedical Engineering	2	2		Compulsory
14	Basic Project – Biomedical Engineering	2		2	Compulsory
15	Specialized Project in Biomedical Engineering	3		3	Compulsory
Elective courses (choose 1 of 3 groups of courses)					
16	Applications of Biotechnology in Medicine	3	3		Group 1
17	Applications of Nanotechnology in Biomedical Engineering	3	2	1	
18	Applications of Ultrasound and Magnetic Technologies in Biomedical Engineering	3	2	1	
19	Biomedical Testing Techniques	3	2	1	
20	Machine Learning	3	3		Group 2
21	Information Technology in Healthcare	2	2		
22	Microorganism Analysis Techniques	3	2	1	

23	Computational Modeling in Biomedical Engineering	4	3	1	
24	Stem Cell Technology	3	3		Group 3
25	Materials in Regenerative Medicine	2	2		
26	Issues in Drug Research and Development	3	3		
27	Pharmaceutical Engineering	3	2	1	

8.2.3. Graduation credits: 13 credits

No.	Course Name	Number of Credits			Note
		Total	Theory	Practice	
1	Graduation Internship	5		5	Compulsory
2	Graduation Thesis	8		8	Compulsory

Rector **Faculty of Medicine**