MINISTRY OF EDUCATION AND TRAINING
NAM CAN THO UNIVERSITY

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom - Happiness

UNDERGRADUATE PROGRAM

(Issued pursuant to Decision No. /QĐ-ĐHNCT, dated / /2025 by The Rector of Nam Can Tho University)

Program: **Engineering in Computer Science, Specialization in Semiconductor Circuit Design**

Level: Undergraduate

Major: Computer Science

Code: 7480101

Typeof education: Regular

1. Program description

1.1. Introduction

1.2. General information

Program title in Vietnamese	Khoa học máy tính, chuyên ngành thiết kế vi mạch bán dẫn
Program title in English	Engineering in Computer Science, Specialization in Semiconductor Circuit Design
Program code	7480101
Degree-granting institution	Nam Can Tho University
Degree	Engineering in Computer Science
Level	Undergraduate
The number of required credits	**150**
Type of education	Regular
Program duration	4 years
Eligible candidates for admission	High school graduates
Grading scale	10
Graduation requirements	- Accumulate sufficient courses and complete the program requirements with 150 credits; - A cumulative GPA of at least 5.0 or higher for all courses

	- Meet the output standards of English proficiency according to the general regulations of the School - Meet output standards of Soft Skills and Professional Skills - Obtain certificates in National Defense Security Education and Physical Education
Career opportunities	- Semiconductor chip engineers participate in and contribute to the work in various stages of semiconductor chip manufacturing, including design, production, packaging, or testing of semiconductor chips at domestic and international semiconductor manufacturing companies such as Intel and Samsung. - Engineers research, develop, and manufacture software, hardware, and equipment for semiconductor chip fabrication at domestic and international semiconductor equipment suppliers such as Synopsys and Cadence. - Researchers and application specialists in semiconductor technology work at research institutes, centers, universities, and colleges. Lecturers teach subjects related to semiconductor technology at universities and colleges. - Computer Science application specialists in enterprises, organizations, agencies, and departments
Postgraduate study options	Can continue to study for master's and doctorate degrees in VietNam and internationally
Reference program	Overseas training program; Training program of Can Tho University
Update time	04/2025

1.3. Program goals

1.3.1. General goals

PO: Training engineers with specialized knowledge and skills in information technology, soft skills, self-study ability, foreign language ability, thinking ability, autonomy and responsibility, teamwork ability and the ability to start a business and be creative in work, meeting social requirements for information technology globally.

1.3.2. Specific goals

- **PO1:** Apply basic knowledge of political science, law and defense education to cultivate political ethics, professional ethics, practice the sense of national defense and civic responsibility.
- **PO2:** Learners meet the requirements of professional skills, soft skills, working and research environments, organize and perform professional works in

Semiconductor Engineering and Technology, thereby developing creativity and entrepreneurial ability, developing management capacity, environmental management, and working personnel

- **PO3:** Forming the ability to self-study and research in specialized fields, thus developing related life skills and guiding others, contributing to the improvement of society.

1.4. Learning outcomes

a. Knowledge

- **SO1:** Apply basic knowledge of political science, law and defense education to cultivate political ethics, professional ethics, practice the sense of national defense and civic responsibility.
- **SO2:** Apply mathematical knowledge, industry basis and specialization to solve practical problems in Semiconductor Engineering and Technology.
- **SO3:** Apply teamwork knowledge and evaluate work efficiency in Semiconductor Engineering and Technology, develop a diverse working environment and develop leadership thinking.

b. Skills

- **SO4:** Use English in communication and Semiconductor Engineering and Technology expertise according to the output standards of the Ministry of Education and Training.
- **SO5:** Apply analytical, design, and operational methods in Semiconductor Engineering and Technology.
- **SO6:** Apply new technologies, especially artificial intelligence and digital transformation to improve work performance.
- **SO7:** Analyze problems using critical and creative thinking, demonstrating independence, teamwork in Semiconductor Engineering and Technology projects, and entrepreneurial skills.

c. Capacity for autonomy and responsibility

- **SO8:** Adhere to professional ethics and fulfill social responsibilities in Semiconductor Engineering and Technology.
- **SO9:** Engage in lifelong learning, stay up to date with new technological trends, and share knowledge.

1.5. Teaching and learning methods/strategies and assessment methods

1.5.1. Teaching and learning methods/strategies and assessment methods

The teaching methods are presented in the table below

Methods and form of teaching organization	Purpose
Presentation	- Provide information and new concepts in a systematic and focused manner.

Methods and form of teaching organization	Purpose
	- Help learners grasp core content quickly. - Guide learners through clear presentation logic. - Emphasize the focus and connection between issues. - Convey a large amount of information to many people. - Serve as the basis for subsequent discussion and practice.
Discussion	- Create a positive learning environment, enabling learners to actively exchange ideas. - Develop critical thinking, practice logical reasoning skills. - Practice soft skills: Teamwork, communication, listening and responding, confidently presenting ideas in front of a crowd. - Assess the level of understanding.
Assignment	- Help students apply theory to practice, develop problem-solving skills and develop analytical and computational skills. - Teachers detect gaps in students' knowledge to promptly adjust and supplement. - Train self-awareness and discipline, prepare for independent learning and lifelong learning.
Self-study, reading of reference materials	- Expand and deepen knowledge, helping learners access multi-dimensional information, beyond the scope of basic curriculum. - Develop ability for independent learning, develop proactive skills in searching, selecting, and processing information, forming lifelong learning ability - Enhance critical thinking, as a basis for group discussion, report writing or problem solving.

1.5.2. Grading scale, form, assessment criteria, and weight of scores

No.	Form	%	Assessment criteria	Maximum score
1	Attendance	10	Proactivity, level of active preparation for lessons and participation in activities during class. Number of required class attendance.	10

No.	Form	%	Assessment criteria	Maximum score
2	Individual assignment	15	Percentage of homework completed and correct.	10
3	Progress assessment	15	According to the answers and grading scale of the test, apply the test forms according to the characteristics of each subject Essay, multiple choice, oral, thematic report,....	10
4	Final exam	60	According to the answers and grading scale of the exam, apply the exam forms according to the characteristics of each subject Essay, multiple choice, oral, thematic report,....	10

2. Program duration: 4 years

3. Required credits

Required credits: 150 credits (excluding the Physical Education and Defense and Security education courses), distributed as follows:

Credits	Obligatory	Elective	Total
General knowledge	**40**	**2**	**42**
Professional knowledge	**98**	**10**	**108**
Fundamental knowledge	37	0	37
Specialized knowledge	57	4	61
Graduation internship	4	0	4
Graduation thesis/Alternative courses	0	6	6
Total	**136**	**14**	**150**

4. Eligible candidates for admission

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. Curriculum, graduation requirements

5.1. Curriculum

Implement the regulations for regular university and college training according to the credit system and current training regulations of Nam Can Tho University

5.2. Graduation requirements

- Students who complete the training program will be considered for graduation and recognized as graduating according to Article 27 of the training regulations according to the credit system.

- Achieve English proficiency according to the general regulations of the School

- Obtained certificates in National Defense-Security Education; Physical Education; Soft Skills and Vocational Skills.

- Evaluation of component scores and course scores is carried out according to Articles 22 and 23 of the training regulations according to the credit system

- Academic year ranking and graduation ranking are carried out according to Articles 14 and 28 of the training regulations according to the credit system.

6. Program structure

6.1. General knowledge

No.	Course code	Course name	Number of credits	Theory	Practice	Category
A	**Political theory**					
1.		Marxist-Leninist philosophy	3	3		Required
2.		Marxist-Leninist political economy	2	2		Required
3.		Scientific socialism	2	2		Required
4.		Ho Chi Minh Thought	2	2		Required
5.		History of the Communist Party of Vietnam	2	2		Required
B	**Social Sciences and Humanities**					
6.		General law	2	2		Required
7.		Digital Transformation	2	2		Required
	Elective course		2	2		Elective
8.		Management information system **	2	2		Elective
9.		General Sociology	2	2		Elective
10.		Generative Artificial Intelligence Application **	2	2		Elective

No.	Course code	Course name	Number of credits	Theory	Practice	Category
11.		Vietnamese cultural foundation	2	2		Elective
12.		Principles of Accounting	3	3		Elective
C	**Foreign languages**					
13.		Basic English 1	3	3		
14.		Basic English 2	3	3		
15.		Basic English 3	3	3		
16.		Basic English 4	3	3		
17.		English for Computer Science	3	3		
D	**Mathematics - Information Technology - Natural Sciences**					
18.		Advanced Math 1	3	3		Required
19.		BasicComputer Science	3	2	1	Required
20.		Probability and Statistics	3	3		Required
21.		Introduction to Computers and Information Technology	1	1		Required
E	Physical education					
22.		Physical Education 1	1		1	Elective
23.		Physical Education 2	1		1	Elective
24.		Physical Education 3	1		1	Elective
F	National Defense Education					
25.		National defense and security education	8		8	

(*) Prerequisite courses, not included in the cumulative GPA calculation

6.2. P**rofessional knowledge**

No.	Code	Course name	Number of credits	Theory	Practice	Category
Fundamental knowledge						
26.		Basic programming	2	2	0	Required

No.	Code	Course name	Number of credits	Theory	Practice	Category
27.		Basic Programming – Practice	2	0	2	Required
28.		Discrete Mathematics 1	3	3	0	Required
29.		Discrete Mathematics 2	3	3	0	Required
30.		Data structures	3	3	0	Required
31.		Data Structures -Practice	1	0	1	Required
32.		Algorithm analysis and design	2	2	0	Required
33.		Algorithm Analysis and Design – Practice	1	0	1	Required
34.		Database	2	2	0	Required
35.		Databases -Practice	1	0	1	Required
36.		Computer network	2	2	0	Required
37.		Computer network – Practice	1	0	1	Required
38.		Computer architecture	3	3	0	Required
39.		Object Oriented Programming	2	2	0	Required
40.		Object Oriented Programming – Practice	2	0	2	Required
41.		Artificial Intelligence	3	3	0	Required
42.		Research methods and writing scientific reports	2	2	0	Required
43.		Law on IT	2	2	0	Required
Specialized knowledge						
44.		Electronic components	2	2	0	Required
45.		Electronic components - Practice	1	0	1	Required
46.		Electronic Circuitry	2	2	0	Required
47.		Electronic Circuitry - Practice	1	0	1	Required
48.		Microelectronic circuits	2	2	0	Required
49.		Microelectronic circuits - Practice	1	0	1	Required

No.	Code	Course name	Number of credits	Theory	Practice	Category
50.		Digital signal processing	3	3	0	Required
51.		Very Large Scale Integration VLSI	3	3	0	Required
52.		Signals and Systems	2	2	0	Required
53.		Signals and Systems - Practice	1	0	1	Required
54.		Communication Electronic Circuitry	3	3		Required
55.		Hệ điều hành Linux Linux operating system	2	2	0	Required
56.		Linux operating system - Practice	1	0	1	Required
57.		Wireless communication systems	3	3	0	Required
58.		Embedded systems	2	2	0	Required
59.		Embedded systems -Practice	1	0	1	Required
60.		IoT technology	2	2	0	Required
61.		IoT technology - Practice	1	0	1	Required
62.		Semiconductor physics	3	3	0	Required
63.		Digital IC design	2	2	0	Required
64.		Digital IC design -Practice	1	0	1	Required
65.		Digital IC design verification	2	2	0	Required
66.		Digital IC design verification - Practice	1	0	1	Required
67.		Analog IC design	2	2	0	Required
68.		Analog IC design -Practice	1	0	1	Required
69.		Physical design	2	2	0	Required
70.		Physical design - Practice	1	0	1	Required
71.		System on a Chip – SoC design	3	3	0	Required
72.		Project 1	3	0	3	Required

No.	Code	Course name	Number of credits	Theory	Practice	Category
73.		Project 2	3	0	3	Required
Elective courses						
74.		IC fabrication	2	2	0	Elective
75.		IC Packaging	2	2	0	Elective
76.		IC testing	2	0	2	Elective
77.		Software specification analysis	2	2	0	Elective
78.		Software design	2	2	0	Elective
79.		Software testing	2	2	0	Elective
80.		Software testing Practice	1	0	1	Elective
81.		Computer Vision	2	2	0	Elective
82.		Computer Vision - Practice	1	0	1	Elective
Graduation internship						
83.		IT Internship	4	0	4	Required
Graduation thesis/Alternative courses						
84.		IT Graduation thesis	6	0	6	Elective
Alternative courses						
85.		IC fabrication	2	2	0	Elective
86.		IC Packaging	2	2	0	Elective
87.		IC testing	2	0	2	Elective
88.		Computer Vision	2	2	0	Required
89.		Computer Vision - Practice	1	0	1	Required
90.		Cloud computing	2	2	0	Required
91.		Cloud Computing – Practice	1	0	1	Required

7. Tentative course plan

7.1. Semester 1

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
1	Basic English 1	3	45	45	0	Required
2	Physical Education 1	1	30	0	30	Required
3	Marxist-Leninist philosophy	3	45	45	0	Required
4	BasicComputer Science	3	45	30	30	Required
5	Advanced Math 1	3	45	45	0	Required
6	Discrete Mathematics 1	3	45	45	0	Required
7	Introduction to Computers and Information Technology	1	15	15	0	Required
8	General law	2	30	30	0	Required
Total		**18**	300	255	60	

Note: Courses marked with ** are currently selected for the current course

7.2. Semester 2

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	**Practice**	
Required Courses						
1	Marxist-Leninist political economy					Required
2	Scientific socialism					Required
3	Physical Education 2	1				Elective
4	National defense and security education	8	165	0	165	Required
5	Basic English 2	3	45	45	0	Required
6	Discrete Mathematics 2					Required
7	Basic programming					Required
8	Basic programming - Practice	2	60	0	60	Required
9	Linux operating system	2	30	30	0	Required

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
10	Thực hành Linux operating system - Practice	1	30	0	30	Required
Elective courses		**2**				
11	(Generative Artificial Intelligence Application	2	45	15	30	Elective
12	(General Sociology	2	30	30	0	Elective
13	(Management information system **)	2	30	30	0	Elective
14	(Principles of Accounting	3	45	45	0	Elective
15	(Vietnamese cultural foundation	2	30	30	0	Elective
Total's Semester 2		**19**				

7.3. Semester 3

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
1	History of the Communist Party of Vietnam	2	30	30	0	Required
2	Basic English 3	3	45	45	0	Required
3	Physical Education 3	1	30	0	30	Elective
4	Probability and Statistics	3	45	45	0	Required
5	Data structures	3	45	45	0	Required
6	Data Structures - Practice	1	30	0	30	Required
7	Electronic components	2	30	30	0	Required
8	Electronic components - Practice	1	30	0	30	Required
9	Object Oriented Programming	2	30	30	0	Required
10	Object Oriented Programming – Practice	2	60	0	60	Required
Total		**19**				

7.4. Semester 4

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
	Required Courses					
1	Ho Chi Minh Thought	2	30	30	0	Required
2	Electronic Circuitry	2	30	30	0	Required
2	Electronic Circuitry	1	30		30	Required
3	Algorithm analysis and design	2	30	30	0	Required
4	Algorithm Analysis and Design – Practice	1	30	0	30	Required
5	Database	2	30	30	0	Required
6	Databases – Practice	1	0	30	1	Required
7	Digital Transformation	2	30	30	0	Required
8	Microelectronic circuits	2	30	30	0	Required
9	Microelectronic circuits - Practice	1	30	0	30	Required
10	Basic English 4	3	45	45	0	Required
Total		**19**				

7.5. Semester 5

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
1	Computer network	2	30	30	0	Required
2	Computer network – Practice	1	30	0	30	Required
3	Artificial Intelligence	3	45	45	0	Required
4	Digital signal processing	3	45	45	0	Required
5	Signals and Systems	2	30	30	0	Required
6	Signals and Systems - Practice	1	30	0	30	Required
7	Wireless communication systems	3	45	0	45	Required
8	Linux operating system	2	30	45	0	Required

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
9	Operating system - Practice	1	30	0	30	Required
Total		**18**	**315**	**195**	**135**	

7.6. Semester 6

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
1	Very Large Scale Integration - VLSI	3	45	0	45	Required
2	Embedded systems	2	30	30	0	Required
3	Embedded systems - Practice	1	30	0	30	Required
4	Semiconductor physics	3	45	45	0	Required
5	English for Computer Science	3	45	45	0	Required
6	Communication Electronic Circuitry	3	45	0	45	Required
7	Project 1 (Communication Electronic Circuitry)	3	90	0	90	Required
Elective courses		**2**				
8	IC fabrication	2	30	30	0	Elective
9	Software specification analysis	2	30	0	30	Elective
10	Software design	2	30	30	0	Elective
11	Software testing	2	30	0	30	Elective
12	Software testing Practice	2	60	0	60	Elective
13	Computer Vision	2	30	30	0	Elective
14	Computer Vision - Practice	1	30	0	30	Elective
Total		**20**	**240**	**90**	**150**	

7.7. Semester 7

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
1	IoT Technology	2	30	30	0	Required
2	IoT Technology – Practice	1	30	0	30	Required
4	Digital IC design	2	30	30	0	Required
5	Digital IC design - Practice	1	30	0	30	Required
6	Law on IT	2	30	30	0	Required
7	Analog IC design	2	30	30	0	Required
8	Analog IC design - Practice	1	30	0	30	Required
9	Physical design	2	30	30	0	Required
10	Physical design - Practice	1	30	0	30	Required
11	Project 2	3	90	0	90	Required
Elective courses		**2**				
12	IC Packaging	2	30	0	30	Elective
13	IC testing	2	30	30	0	Elective
14	Software specification analysis	2	30	30	0	Elective
15	Software design	2	30	30	0	Elective
16	Software testing	2	30	0	30	Elective
17	Software testing Practice	2	60	0	60	Elective
18	Cloud computing	2	30	30	0	Elective
19	Cloud Computing – Practice	1	30	0	30	Elective
Total		**19**	**132**			

7.8. Semester 8

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
1	Research methods and writing scientific reports	2	45	15	30	Required

No.	Course name	Number of credits	Total periods	Class periods		Category
				Theory	Practice	
2	Digital IC design verification	2	30	30	0	Required
3	Digital IC design verification - Practice	1	30	0	30	Required
4	chip System on a Chip – SoC design	3	45	45	0	Required
5	Final Internship	4	120	0	120	Required
Elective courses		**6**				
6	Graduation Thesis Computer Science	6	180	0	180	Elective
Study alternative course for graduation thesis		**6**				
7	IC fabrication	2	30	30	0	Elective
8	IC Packaging	2	30	30	0	Elective
9	IC testing	2	30	30	0	Elective
10	Cloud computing	2	30	30	0	Elective
11	Cloud Computing – Practice	2	30	30	0	Elective
12	Principles of Machine Learning	2	30	30	0	Elective
13	Principles of Machine Learning – Practice	2	30	30	0	Elective
14	Computer Vision	2	30	30	0	Elective
15	Computer Vision - Practice	2	30	30	0	Elective
Total		**18**				

(*) If students do not meet the requirements to complete their graduation thesis, they will take alternative courses

8. Guidelines for Program Implementation

8.1 Faculties and departments

- The Faculty of Professional Management is responsible for reviewing and developing detailed course outlines for fundamental, core, and specialized knowledge areas, ensuring the correct credit allocation according to this program. Providing a list of textbooks, lectures and reference materials of all subjects to the School Library and

storing them in the Faculty Office. At the beginning of each semester, coordinate with the units of the School to implement the training plan on schedule.

- Assign lecturers with a master's degree or higher (in the same or related field to teach theoretical courses, provide detailed course outlines to lecturers to ensure compliance with the School's general teaching plan.)The academic advisor team must thoroughly understand the entire credit-based training program to guide students in registering for courses.

8.2 Lecturers

- When a lecturer is assigned to teach one or more courses, he/she must carefully study the detailed course outline to prepare lectures and appropriate teaching aids and tools Lecturers must fully prepare lectures, textbooks, learning materials and provide them to students to prepare before classOrganizing seminars, focusing on organizing group study and guiding students to write essays and projects. Lecturers determine teaching methods; give presentations in class, guide discussions, solve problems in class, in the practice room, in the laboratory and guide students to write reportsPay attention to developing students' self-study and research abilities throughout the teaching and internship and practice processIt is necessary to pay attention to the logic of conveying and acquiring knowledge blocks, specifying prerequisite courses of Required courses and preparing lecturers to meet the requirements of teaching elective courses.

8.3 Students

Must consult with academic advisor to choose courses that are suitable for progress. Must study the lesson before class to easily absorb the lecture. Must ensure enough class time to listen to the lecturer's lecture instructions. Be proactive in self-study and self-research, and actively participate in group study, attend all seminars. Proactively and actively exploit resources on the Internet and in the school library to serve self-study, self-research and graduation project. Strictly implement regulations on examination, testing and evaluation.

Regularly participate in group activities, literature, sports and arts to practice communication skills, understanding of society and people.

8.4 Facilities and equipment for teaching, practice, and internships

Theoretical classroom system with traditional equipment, equipped with additional teaching aids projector.

The computer lab is installed with software for basic computer training, computer graphics applications, computer design applications, and computer simulation applications.

RECTOR	DEPARTMENT OF ACADEMIC AFFAIRS	FACULTY