

**COURSE SYLLABUS**  
(Training level: Undergraduate)

**Course Title:**

Vietnamese Course Title: Lập trình C trong điện tử

English Course Title: C Programming in the electronic

Course Code: 1021

Major: Electronics and Telecommunications Engineering Technology.

Version: 2017

**1. General Information**

- Number of credits: 3 (Theory: 2; Practice: 1)

- Types of knowledge:

General Education		Base core courses		Major core courses		Concentration courses		Others
Required <input type="checkbox"/>	Optional <input type="checkbox"/>			Information Technology; Software Engineering				
		Required <input checked="" type="checkbox"/>	Optional <input type="checkbox"/>	Required <input type="checkbox"/>	Optional <input type="checkbox"/>	Required <input type="checkbox"/>	Optional <input type="checkbox"/>	

- Required courses : None.

- Pre-requisite: General Informatics.

- Co-requisite: None.

- Facility Requirements: Classrooms with projectors.

- Departments in Charge: Faculty of Electronics and Communications Technology.

**2. Time Allocated**

Total: 60 periods	Theory: 29 periods
	Discussion/ Group Presentation: 0 period.
	Assignment/ Essay/ Practice: 29 periods.
	Tests: 02 + Theory: Number of Tests:01    Periods:01 +Practice: Number of Tests:01    Periods:01
Self-Study: 90 periods. Other activities (visiting, surveying, outdoor activities, organizing events, clubs): 0 periods (or sessions)	

**3. Lecturer's Information**

No.	Lecturer name	Phone number	Email	Note
1	MSc. Doan Ngoc Phuong	0979479940	dnphuong@ictu.edu.vn	Leader
2	MSc. Nguyen Thi Thu Hang	0399831287	ntthang@ictu.edu.vn	Member

No.	Lecturer name	Phone number	Email	Note
3	MSc. Pham Xuan Kien	0398831285	<a href="mailto:pxkien@ictu.edu.vn">pxkien@ictu.edu.vn</a>	Member

#### 4. Objectives

- Knowledge: After studying this course, students will understand the basics knowledge of programming, the C programming language and the application of the C programming language in the fields of electronics and communication. Thereby, students are able to solve basic computer and electronic problems using C programming language, and students also have basic knowledge about programming in embedded systems; Programming with microcontrollers, microprocessors.

- Skills: Students are able to use the C programming language to solve basic computer problems, and can apply programming on data bits, programming communications with serial/parallel ports and programming with electronic circuits. From there, students will have knowledge to apply writing application programs in larger electronic and telecommunications systems.

- Attitude: The course creates confidence, professionalism in problem solving. Promote the students' sense of self-study and creativity. Consciously apply the knowledge learned to life in general and professional reality in particular.

Position of course: The course belongs to the base core courses, which is compulsory.

- The course contributes to meeting the L4, L5, L6, L7, L8, L10 learning outcomes of the training program.

#### 5. Description of content and output standards:

- **Knowledge Standards:** (1) Remember  $\Rightarrow$  (2) Understand  $\Rightarrow$  (3) Apply  $\Rightarrow$  (4) Analyze  $\Rightarrow$  (5) Create.

- **Attitude Standards:** (1) Copy  $\Rightarrow$  (2) Self-manipulation  $\Rightarrow$  (3) Masterfully repeating to the norm  $\Rightarrow$  (4) Combining multiple activities  $\Rightarrow$  (5) Completely proactive.

Notation CLOs	Contents	Level		PLOs
		Knowledge	Skills	
C1	Understand programming languages, how to solve problems in programming languages. Difference of a software program for computer and for microcontroller.	2		L4
C2	Understand the basic structure of a software program written in C language, know the meaning of how to use the components in a program.	2		L4
C3	Understand how to execute a program, meaning and usage of selection and loops statements. How to use loop statements when writing a program on a microcontroller.	3		L5
C4	Understand and know how to use functions and data types in C. Know the limits of working with the C language to build programs for microcontrollers.	3		L5

C5	Thinking skills	Solve a basic computer problem and typical problems of electronic communication using C programming language.		3	L6
C6		Analyze to make good use of control structures, data types in C.		3	L8
C7		Analyze to down the problem into component functions.		3	L8
C8	Application skills	Apply knowledge to write programs, debug simple C programs.		4	L7
C9		Apply knowledge to solve problems in electronics and telecommunications.		4	L10
C10		Apply knowledge to build basic I/O programs on microcontrollers and microprocessors.		3	L10

## 6. Reading List

### - Main Syllabus:

[1] Pham Van At (2003), " *Programming Techniques in C*", Thong ke publisher.

### - References:

[2] Ngo Thi Vinh (2014), "*C Programming in the electronic*", Faculty Electronic and Communication technology.

[3] Steve Oualline(1997), "*Practical C Programming*", O'Reilly.

[4]. Brian W. Kernighan and Dennis M. Ritchie (1988), "*The C programming Language*", Prentice-Hall.

[5]. Tran Quang Vinh (2003), "*Hardware Principles and Computer Connection Techniques*", Education publisher.

## 7. Score Assessment

- Score Scale: 10.

- Components Assessment:

Evaluation Time	Components Assessment	Course Learning Outcome	Factor	Score	Weight
During the duration of the course	Attendance: (score $b_0$ )		1	$d=(b_0 + b_1 + b_2)/3$	30%
According to the teaching plan in section 9	Test No.1: (score $b_1$ )	C1, C2, C3, C8	1		
	Test No.2: (score $b_2$ )	C4, C5, C6, C7, C9, C10	1		
The end of the term.	Final exam	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10		$e$	70%

Evaluation Time	Components Assessment	Course Learning Outcome	Factor	Score	Weight
During the duration of the course	Attendance: (score $b_0$ )		1	$d=(b_0+b_1+b_2)/3$	30%
According to the teaching plan in section 9	Test No.1: (score $b_1$ )	C1, C2, C3, C8	1		
	Test No.2: (score $b_2$ )	C4, C5, C6, C7, C9, C10	1		
Final Score: ( $f$ )				$f = d \times 30\% + e \times 70\%$	

- Final exam: *Practice*

## 8. Regulations for students

### 8.1. Student's duties

- Read the material and prepare for each lesson before attending class.
- Complete assigned assignments.
- Prepare discussion content for the course.

### 8.2. Regulations on Exams and Academic Studies

- Students must attend classes, ensuring at least 80% of classroom sessions.
- Complete the assigned tasks for the course.
- Participate in the full number of regular tests.

## 9. Teaching Plan

No.	Period	Contents	Teaching Methodology	CLOs	References
1.	3 (theory)	<p><b>Chapter 1: Overview of C programming in electronics and telecommunications</b></p> <p>1.1. Hardware, software, and firmware.</p> <p>1.2. History of C language</p> <p>1.3. Introduction to computer architecture.</p> <p>1.4. Compile, link, and write an executable.</p> <p>1.5. Applications of C language in the field of electronics and telecommunications</p>	<p>Presentation;</p> <p>Raise and solve problems</p>	<p>C1;</p> <p>C2;</p> <p>C3;</p>	<p>[1] Chapter 1</p> <p>[2] Chapter 1</p> <p>[3] Chapter 1</p> <p>[4] Chapter 1</p>

No.	Period	Contents	Teaching Methodology	CLOs	References
2.	3 (theory)	<b>Chapter 2: The basic concepts of the C language</b> 2.1. Character set in C 2.2. Keywords 2.3. Names 2.4. Data types, Basic data types 2.5. Some notes for declare constants and variables in programming microcontroller.	Presentation; Raise and solve problems; Direct operation on the projector	C4; C5;	[1] Chapter 1 [2] Chapter 2 [3] Chapter 3
3.	3 (theory)	<b>Chapter 3: I/O commands and the basic structure of the program</b> 3.1. Comments in C 3.2. Statements and Blocks 3.3. Structure of a C program 3.4. Some notes to write programs on microcontrollers. 3.5. Character Input 3.6. Character Output 3.7. Input and Output in microcontroller/microprocessors.	Presentation; Raise and solve problems; Direct operation on the projector.	C5; C7;	[1] Chapter 1, 4 [2] Chapter 3 [5] Chapter 6, 8, 11
4.	3 (theory)	<b>Chapter 4: Expressions</b> 4.1. Expressions. 4.2. Assignment operators. 4.3. Arithmetic operators. 4.4. Logical and Bitwise operators. 4.5. Increment and decrement operators, move operators. 4.6. Type Conversions. 4.7. Bitwise operators and applications in electronics and telecommunications. 4.8. Commonly used math operations in microprocessor programming	Presentation; Raise and solve the problem; Work directly on the projector	C7; C8;	[1] Chapter 3 [2] Chapter 4 [3] Chapter 4
5.	3 (theory)	<b>Chapter 5: Control Flow</b> 5.1. Selection statements 5.2. Looping statements 5.3. Examples (in electronics and telecommunications) 5.4. Notes on how to use loops	Presentation; Raise and solve the problem; Work directly on the projector	C9;	[1] Chapter 5 [2] Chapter 5 [4] Chapter 3 [5] Chapter 6, 8, 11

No.	Period	Contents	Teaching Methodology	CLOs	References
		and jumps in microcontroller and microprocessors programming.			
6.	3 (theory)	<b>Chapter 6: Functions</b> 6.1. The concept of functions 6.2. Passing arguments 6.3. Return value	Presentation; Raise and solve the problem; Work directly on the projector	C8; C9;	[1] Chapter 6 [2] Chapter 6 [4] Chapter 4
		Test No. 1 (Written)	Test the theory	C1, C2, C3, C8;	
7.	3 (theory)	<b>Chapter 6: Functions</b> 6.4. Types of functions 6.5. How to exploit functions in libraries (for advanced microcontrollers)	Presentation; Raise and solve the problem; Work directly on the projector	C8; C9; C10;	[1] Chapter 6 [2] Chapter 6 [5] Chapter 6, 8, 11
8.	3 (theory)	<b>Chapter 6: Functions</b> 6.6. Build some basic functions commonly used in electronics and telecommunications	Presentation; Raise and solve the problem; Work directly on the projector	C9; C10;	[1] Chapter 6 [2] Chapter 6 [4] Chapter 4
9.	3 (theory)	<b>Chapter 7: Arrays and strings</b> 7.1. The concept of array 7.2. Declaring and using arrays	Presentation; Raise and solve the problem; Work directly on the projector	C9; C10;	[1] Chapter 2 [2] Chapter 1, 2 [4] Chapter 2
10.	3 (theory),	<b>Chapter 7: Arrays and strings</b> 7.3. Declaring and using strings 7.4. Commonly used String functions in strings 7.5. Some problems when using arrays and strings on microcontrollers.	Presentation; Raise and solve the problem; Work directly on the projector	C4; C5; C6;	[1] Chapter 2 [2] Chapter 1, 2 [4] Chapter 2 [5] Chapter 6, 8, 11
11.	3 (practice)	<b>Practice #1: Building a simple C program</b> 1.1. Use support tools 1.2. Create a simple C application. 1.2.1. Practice declaring constants and data types 1.2.2. Use the components declared in the main method.	Raise and solve the problem; Direct practice instructions on the machine.	C4; C5;	[1] Chapter 1 [2] Chapter 2 [4] Chapter 4
12.	3 (practice)	<b>Practice #2: Building a simple C program</b> 1.3. Create a C application that allows data input/output 1.3.1. Write a program that checks for input exceptions	Raise and solve the problem; Direct practice instructions on the machine.	C4; C5;	[1] Chapter 3 [2] Chapter 4 [3] Chapter 4

No.	Period	Contents	Teaching Methodology	CLOs	References
		1.3.2. Write a program to check for output exceptions			
13.	3 (practice)	<b>Practice #3: Building a simple C program</b> 1.4. Using expressions in C 1.4.1. Using mathematical expressions and casting in C 1.4.2. Using logical expressions, bitwise operations 1.4.3. The order of operations 1.4.4. Applying mathematical operations in electronics and telecommunications problems	Raise and solve the problem; Direct practice instructions on the machine.	C4; C5; C7;	[1] Chapter 3 [2] Chapter 4 [3] Chapter 4
14.	3 (practice)	<b>Practice #4: Working with Control Flow</b> 2.1. Using the selection statements 2.2. Using the loops statements 2.3. Problems with loops statements	Raise and solve the problem; Direct practice instructions on the machine.	C4; C5; C7;	[1] Chapter 5 [2] Chapter 5 [4] Chapter 3 [5] Chapter 6, 8, 11
15.	3 (practice)	<b>Practice #5: Working with Control Flow</b> 2.4. Examples of electronics and telecommunications 2.4.1. Construct a truth table 2.4.2. Problems with expressions/logic circuits 2.4.3. Interactive push button management problem	Raise and solve the problem; Direct practice instructions on the machine.	C4; C5; C7; C8;	[1] Chapter 5 [2] Chapter 5 [4] Chapter 3 [5] Chapter 6, 8, 11
16.	3 (practice)	<b>Practice #6: Working with functions</b> 3.1. Practice creating user functions 3.2. Practice calling the user function 3.3. Building functions with parameters 3.3.1. Construct a function with a value parameter 3.3.2. Build function with variable parameter	Raise and solve the problem; Direct practice instructions on the machine.	C4; C5; C7; C8;	[1] Chapter 6 [2] Chapter 6 [4] Chapter 4
17.	3	<b>Practice #7: Working with</b>	Raise and solve the	C5;	[1] Chapter 6

No.	Period	Contents	Teaching Methodology	CLOs	References
	(practice)	<b>functions</b> 3.4. Practice with the return value of the function 3.4.1. Function with return value 3.4.2. Function has no return value	problem; Direct practice instructions on the machine.	C7; C8;	[2] Chapter 6 [4] Chapter 4
18.	3 (practice)	<b>Practice #8: Working with functions</b> 3.5. Problems related to electronics and telecommunications 3.5.1. Build a function that simulates bitwise operations 3.5.2. Build a function to calculate logical expressions 3.5.3. Build a function that prints the truth table	Raise and solve the problem; Direct practice instructions on the machine.	C9; C10;	[1] Chapter 6 [2] Chapter 6 [4] Chapter 4
19.	3 (practice)	<b>Practice #9: Working with programming on microcontrollers</b> 4.1. Programming tool for microcontrollers. 4.2. Write a simple program for a microcontroller.	Raise and solve the problem; Direct practice instructions on the machine.	C9; C10;	[1] Chapter 2 [2] Chapter 1, 2 [4] Chapter 2 [5] Chapter 6, 8, 11
		Test No. 2 (Question/Answer with Computer)	Practice test	C4, C5, C6, C7, C9, C10;	
20.	3 (practice)	<b>Practice #10: Working with programming on microcontrollers</b> 4.3. Work with developer library usage and community usage.	Raise and solve the problem; Direct practice instructions on the machine.	C6; C9; C10;	[1] Chapter 2 [2] Chapter 1, 2 [4] Chapter 2 [5] Chapter 6, 8, 11

**10. Competent Authority Approval:** University of Information and Communication Technology.

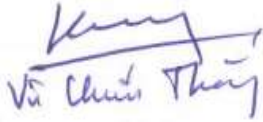
*August 27<sup>th</sup>, 2017*



**Vice Rector**



**Dean**




Vũ Xuân Thủy


**Vice of Department**



Doan Ngọc Phương

**Composer Team**

Nguyen Thi Thu Hang: 

Doan Ngoc Phuong: 

Pham Xuan Kien 

### 11. Updated Procedure

1st update: <i>Day/month/year</i>	<b>Updater</b>
2st update: <i>Day/month/year</i>	<b>Updater</b>