

COURSE SYLLABUS
(Training level: Undergraduate)

Vietnamese Course Title: Kỹ thuật lập trình
English Course Title: Programming techniques
Course Code: PTE231
Major: Information technology
Training program: Information technology
Version: 2021

1. General information

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

General Education		Base core courses		Major core courses		Concentration courses		Others
Required <input type="checkbox"/>	Optional <input type="checkbox"/>	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"/>	
								Alternative Course of Graduation Thesis <input type="checkbox"/>

- Required course: None
- Pre-requisite: General Informatics
- Co-requisite: None

2. Time Allocated

Total: 60 periods	Theory: 29 periods
	Group Discussion/Presentation: 0/0
	Assignments/Essays/Practices: 0/0/28 periods.
	Tests: 3 + <i>Theory: Number of Tests: 1 Periods: 1</i> + <i>Practice: Number of Tests: 2 Periods: 2</i>
	Self-study: 105 periods Other activities: 0

3. Departments in Charge: Faculty Information Technology

4. Lecturer's Information

No.	Lecturer name	Phone number	Email	Note
1	PhD. Nguyen Tuan Anh	0912 662 003	anhnt@ictu.edu.vn	Leader
2	PhD. Ngo Huu Huy	0981 320 896	nhhuy@ictu.edu.vn	Member
3	MSc. Duong Thi Quy	0947 015 947	dtquy@ictu.edu.vn	Member

5. Facility Requirements:

The classroom is equipped with a projector and a whiteboard.

6. Course Description:

The Programming Techniques course aims to provide students with fundamental knowledge of structured programming through the C programming language. The main contents include: Concepts of algorithms and algorithmic representation languages; Concepts of programming languages; Concepts of data types; Overview of the C programming language; Data types in C; Control structures; Design and use of functions in C; Some data structures in C. This course provides background knowledge, creating a prerequisite for students to absorb other courses in the training program.

7. Objectives

Objectives	Description	PLOs	Proficiency level
G1	Apply knowledge of the C programming language and algorithmic thinking to solve problems.	1.3.1	3
		1.3.3	3
G2	Apply communication skills, presentation skills, listening and respecting others' opinions.	3.2.1	3

8. Learning Outcomes

Objectives	CLOs	Description of CLOs	PLOs	Proficiency level
G1	G1.1	Apply components in C language in building application programs.	1.3.1	3
	G1.2	Apply control structures in the C programming language to programmatically solve problems.	1.3.1	3
	G1.3	Apply functional subroutines in top-down problem decomposition.	1.3.1	3
	G1.4	Apply structured data types to solve problems involving user-defined data types.	1.3.3	3
	G1.5	Apply pointer data type in C language to build programs related to dynamic memory allocation.	1.3.3	3
G2	G2.1	Apply communication skills, presentation skills, listening and respecting others' opinions.	3.2.1	3

9. Scientific ethics

Actively attend theoretical classes in class, do exercises assigned by the lecturer, fully participate in discussion hours in the spirit of improving self-discipline, self-control and completing regular tests. All acts of cheating in learning and assessment will be handled according to regulations.

10. Detailed Contents

Period	Contents	References	CLOs	Proficiency level	Teaching Methodology	Assessment Methodology
1-3	Chapter 1: Programming Overview					
	A/ Classroom learning content: 1.1. Concept of computer program <i>1.1.1. Algorithm (Algorithm)</i> <i>1.1.2. Program (Program)</i> <i>1.1.3. Programming language</i> <i>1.1.4. Steps to build a program</i> 1.2. Algorithm demonstration <i>1.2.1. Use natural language</i> <i>1.2.2. Using flowcharts - Block Diagrams</i> <i>1.2.3. Use pseudocode</i> 1.3. Counting systems 1.4. Structuring a C program	[1] [2] [3]	G1.1	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 2.	[1] [2] [3] [4] [5]	G1.1	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
4-6	Chapter 2: Elements in C language					
	A/ Classroom learning content: 2.1. The basic concepts <i>2.1.1. Key word</i> <i>2.1.2. Name</i> <i>2.1.3. Basic data types</i> <i>2.1.4. Structure of a program</i> 2.2. Expressions and operations <i>2.2.1. Expression</i> <i>2.2.2. Mathematical operations</i> <i>2.2.3. Condition expression</i> 2.3. Declare variable <i>2.3.1. Declare variable</i> <i>2.3.2. Scope of the variable</i> 2.4. Import/Export data <i>2.4.1. Data input function</i> <i>2.4.2. Data output function</i>	[1] [2] [3] [4] [5]	G1.1	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 3.	[1] [2] [3] [4] [5]	G1.1	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment

Period	Contents	References	CLOs	Proficiency level	Teaching Methodology	Assessment Methodology
7-9	Chapter 3: Control Structures					
	A/ Classroom learning content: 3.1. Branching structure	[1] [2] [3]	G1.2	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 3.	[1] [2] [3] [4] [5]	G1.2	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
10-12	Chapter 3: Control Structures					
	A/ Classroom learning content: 3.2. Repeating structure 3.3. Break and continue statements 3.4. Some examples	[1] [2] [4]	G1.2	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 4.	[1] [2] [3] [4] [5]	G1.2	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
13-15	Chapter 4: Functions and Recursion					
	A/ Classroom learning content: 4.1. Function definition in C 4.2. Pass parameters in C function 4.3. Recursive	[1] [2] [4]	G1.3	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 5.	[1] [2] [3] [4] [5]	G1.3	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
16-18	Chapter 5: Structured Data Types					
	A/ Classroom learning content: 5.1. Array data type 5.1.1. One-dimensional array	[1] [2] [4]	G1.4	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	Periodic Test No.1	[1] [2] [4]	G1.1 G1.2 G1.3	3 3 3	Theory test	Evaluation by the score
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 5.	[1] [2] [3] [4] [5]	G1.4	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment

Period	Contents	References	CLOs	Proficiency level	Teaching Methodology	Assessment Methodology
19-21	Chapter 5: Structured data types					
	A/ Classroom learning content: 5.1.2. Two-dimensional array	[1] [2] [4]	G1.4	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 5.	[1] [2] [3] [4] [5]	G1.4	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
22-24	Chapter 5: Structured data types					
	A/ Classroom learning content: 5.2. String	[1] [2] [5]	G1.4	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 5.	[1] [2] [3] [4] [5]	G1.4	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
25-27	Chapter 5: Structured data types					
	A/ Classroom learning content: 5.3. Structure type	[1] [2] [4]	G1.4	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 6.	[1] [2] [3] [4] [5]	G1.4	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
28-30	Chapter 6: Pointers and addresses					
	A/ Classroom learning content: 6.1. Computer memory 6.2. Variable and its address 6.3. Pointer variable 6.4. Arrays and pointers	[1] [2] [3] [5]	G1.5	3	Present; Give and solve problems; Operate directly on the projector	Evaluation by comments
	B/ Self-study: Re-read the learned content. Preview the next content in Chapter 6.	[1] [2] [3] [4] [5]	G1.5	3	Guided self-study	Motivational assessment/ Combined with Attendance assessment

Period	Contents	References	CLOs	Proficiency level	Teaching Methodology	Assessment Methodology
31-33	Practice lesson 1: Elements in C language					
	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [3] [4] [5] [6]	G1.1 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.1 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
34-36	Practice lesson 2: Branching structure					
	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [3] [6]	G1.2 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.2 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
37-39	Practice lesson 3: Repetition Structure - For Statement					
	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [4] [6]	G1.2 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.2 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
40-42	Practice lesson 4: Repetition Structure - While Statement					
	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [4] [6]	G1.2 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.2 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment

Period	Contents	References	CLOs	Proficiency level	Teaching Methodology	Assessment Methodology
43-45	Practice lesson 5: Function and Pass parameters in C function					
	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [4] [6]	G1.3 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process
	Periodic Test No.2	[1] [2] [4] [6]	G1.2 G1.3 G2.1	3 3 3	Practice test	Evaluation by the score
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.3 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
46-48	Practice lesson 6: Function and Pass parameters in C function (Continue)					
	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [4] [6]	G1.3 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.3 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
49-51	Practice lesson 7: Array					
	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [5] [6]	G1.4 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.4 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
52-54	Practice lesson 8: String					
	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [3] [4] [6]	G1.4 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process

Period	Contents	References	CLOs	Proficiency level	Teaching Methodology	Assessment Methodology
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.4 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
	Practice lesson 9: Structured Data Type					
55-57	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [3] [5] [6]	G1.4 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.4 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment
	Practice lesson 10: Pointers and Arrays					
	A/ Classroom learning content: - Complete the exercise content as required	[1] [2] [3] [5] [6]	G1.5 G2.1	3 3	Give and solve problems; Instructions to practice directly on the computer	Evaluation by comments; Evaluation of the practice process
58-60	Periodic Test No.3	[1] [2] [3] [5] [6]	G1.4 G1.5 G2.1	3 3 3	Practice test	Evaluation by the score
	B/ Self-study: Practice exercises as required	[1] [2] [6]	G1.5 G2.1	3 3	Guided self-study	Motivational assessment/ Combined with Attendance assessment

11. Student Assessment: 10 score Scale.

11.1. Test plan:

No.	Content	Time (Period)	CLOs	Proficiency level	Assessment methods	Assessment tools	Weight %
Attendance							10
Regular Test Score							30
1	Chapter 1-4	18	G1.1 G1.2 G1.3	3 3 3	Written Assessment	Test	10

No.	Content	Time (Period)	CLOs	Proficiency level	Assessment methods	Assessment tools	Weight %
2	Chapter 4	45	G1.2 G1.3 G2.1	3 3 3	Practice and Answer Question	Test	10
3	Chapter 5-6	60	G1.4 G1.5 G2.1	3 3 3	Practice and Answer Question	Test	10
Final exam							60
1	Chapter 1-6		G1.1 G1.2 G1.3 G1.4 G1.5 G2.1	3 3 3 3 3 3	Practice and Answer Question	Exam	60

CLOs	Contents							Test Method			
	Periods 1-6	Periods 7-12	Periods 13-15	Periods 16-27	Periods 28-30	Periods 31-48	Periods 49-60	Written Assessment I	Practice and Answer question II	Practice and Answer question III	Final exam
G1.1	x					x		x			x
G1.2		x				x		x	x		x
G1.3			x			x		x	x		x
G1.4				x			x			x	x
G1.5					x		x			x	x
G2.1						x	x		x	x	x

11.2 Assessment Rubrics

* Rubric 1: Attendance

Criteria assessment	Weight (%)	Very good (8.5-10)	Good (7.0-8.4)	Average (5.5-6.9)	Below average (4.0-5.4)	Poor (0-3.9)
Level of participation in classes.	70	Full attendance	Absence from 1-9% of periods	Absence from 10-15% of periods	Absence from 16-20% of periods	Absence 20% of periods (Exam ban)
Activeness in lessons, self-study	30	Very actively participate in exercises, ask questions, discuss, Complete assignments	Quite actively participate in asking questions, discussing, doing exercises	Less actively participating in asking questions, discussing, doing exercises.	It takes a teacher's influence to ask questions, discuss, and do exercises.	Only attend class but do not actively participate in asking questions, discussing, doing exercises

*** Rubric 2: Periodic Test No.1** (Allotted time: 1 period; Form: Written; Total of questions: 02; Score Scale: 10)

Evaluation criteria		Weight (%)	Quality Level Description				
Question	CLOs		Very Good	Good	Average	Below Average	Poor
			(8,5-10 point)	(7,0-8,4 point)	(5,5-6,9 point)	(4,0-5,4 point)	(0-3,9 point)
1	G1.1 G1.2	50	Beautiful, clear presentation. The content of good settlement 90-100% of the requirements set out	Clearly presented. Content of 70 to less than 90 % of the requirements set out	Presentation is relatively clear. The content is from 50 to less than 70% of the requirements set out	The presentation is not clear. The content is resolved from 40 to less than 50% of the requirements set out	The presentation is not clear. Content of handling less than 40% of the requirements set out
2	G1.3	50	Beautiful, clear presentation. The content of good settlement 90-100% of the requirements set out	Clearly presented. Content of 70 to less than 90 % of the requirements set out	Presentation is relatively clear. The content is from 50 to less than 70% of the requirements set out	The presentation is not clear. The content is resolved from 40 to less than 50% of the requirements set out	The presentation is not clear. Content of handling less than 40% of the requirements set out

*** Rubric 3: Periodic Test No.2** (Allotted time: 1 period; Form: Practice; Total of questions: 02; Score Scale: 10)

Evaluation criteria		Weight (%)	Quality Level Description				
Question	CLOs		Very Good	Good	Average	Below Average	Poor
			(8,5-10 point)	(7,0-8,4 point)	(5,5-6,9 point)	(4,0-5,4 point)	(0-3,9 point)
1	G1.2 G1.3	80	Good programming thinking, clear code presentation. The content of good settlement 85-100% of the requirements set out	Clear code presentation. Content of 70 to less than 85 % of the requirements set out	The code presentation is relatively clear. The content is from 55 to less than 70% of the requirements set out	The code presentation is not clear. The content is resolved from 40 to less than 55% of the requirements set out	The code presentation is not clear. Content of handling less than 40% of the requirements set out
2	G2.1	20	A good answer 85-100% of the requirements of the	Answer correctly from 70 to less than 85 % of the	Answer correctly from 55 to less than 70 % of the	Answer correctly from 40 to less than 55 % of the	Answer less than 40% according to the question of the teacher

Evaluation criteria		Weight (%)	Quality Level Description				
Question	CLOs		Very Good	Good	Average	Below Average	Poor
			(8,5-10 point)	(7,0-8,4 point)	(5,5-6,9 point)	(4,0-5,4 point)	(0-3,9 point)
			teacher's question	requirements on the question of the teacher	requirements on the question of the teacher	requirements on the question of the teacher	

*** Rubric 4: Periodic Test No.3** (Allotted time: 1 period; Form: Practice; Total of questions: 02; Score Scale: 10)

Evaluation criteria		Weight (%)	Quality Level Description				
Question	CLOs		Very Good	Good	Average	Below Average	Poor
			(8,5-10 point)	(7,0-8,4 point)	(5,5-6,9 point)	(4,0-5,4 point)	(0-3,9 point)
1	G1.4 G1.5	80	Good programming thinking, clear code presentation. The content of good settlement 85-100% of the requirements set out	Clear code presentation. Content of 70 to less than 85 % of the requirements set out	The code presentation is relatively clear. The content is from 55 to less than 70% of the requirements set out	The code presentation is not clear. The content is resolved from 40 to less than 55% of the requirements set out	The code presentation is not clear. Content of handling less than 40% of the requirements set out
2	G2.1	20	A good answer 85-100% of the requirements of the teacher's question	Answer correctly from 70 to less than 85 % of the requirements on the question of the teacher	Answer correctly from 55 to less than 70 % of the requirements on the question of the teacher	Answer correctly from 40 to less than 55 % of the requirements on the question of the teacher	Answer less than 40% according to the question of the teacher

Rubric 5: Final Examination (Allotted time: 1 period; Form: Practice; Total of questions: 03; Score Scale: 10)

Evaluation criteria		Weight (%)	Quality Level Description				
Question	CLOs		Very Good	Good	Average	Below Average	Poor
			(8,5-10 point)	(7,0-8,4 point)	(5,5-6,9 point)	(4,0-5,4 point)	(0-3,9 point)
1	G1.1 G1.2 G1.3	40	Good programming thinking, clear code presentation.	Clear code presentation. Content of 70 to less than 90% of	The code presentation is relatively clear. The content is	The code presentation is not clear. The content is resolved	The code presentation is not clear. Content of handling less

Evaluation criteria		Weight (%)	Quality Level Description				
Question	CLOs		Very Good	Good	Average	Below Average	Poor
			(8,5-10 point)	(7,0-8,4 point)	(5,5-6,9 point)	(4,0-5,4 point)	(0-3.9 point)
			The content of good settlement 90-100% of the requirements set out	the requirements set out	from 50 to less than 70% of the requirements set out	from 40 to less than 50% of the requirements set out	than 40% of the requirements set out
2	G1.3 G1.4 G1.5	40	Good programming thinking, clear code presentation. The content of good settlement 90-100% of the requirements set out	Clear code presentation. Content of 70 to less than 90% of the requirements set out	The code presentation is relatively clear. The content is from 50 to less than 70% of the requirements set out	The code presentation is not clear. The content is resolved from 40 to less than 50% of the requirements set out	The code presentation is not clear. Content of handling less than 40% of the requirements set out
3	G2.1	20	A good answer 90-100% of the requirements of the teacher's question	Answer correctly from 70 to less than 90 % of the requirements on the question of the teacher	Answer correctly from 50 to less than 70 % of the requirements on the question of the teacher	Answer correctly from 40 to less than 50 % of the requirements on the question of the teacher	Answer less than 40% according to the question of the teacher

12. Reading List

A. Main Syllabus

- [1]. Prof. Pham Van At, ThS. Do Van Tuan, MSc. Nguyen Hieu Cuong, Le Truong Thong (2018), *Basic and Advanced C Programming Techniques*, Bach Khoa Publishing House.
- [2]. Department of Computer Science and Technology (2021), *Lecture on "Programming Techniques"*, Faculty of Information Technology - Thai Nguyen University of Information and Communication Technology.

B. References

- [3]. Brian W. Kernighan and Dennis M. Ritchie (1988), *The C programming Language*, Second Edition, Prentice Hall.
- [4]. Paul Deitel and Harvey Deitel (2012), *C How to Program: with an introduction to C++*, 7th Edition, Prentice Hall.
- [5]. Paul Deitel and Harvey Deitel (2013), *C++ How to Program*, 9th Edition, Pearson.

C. Software

- [6]. Dev C++, <https://www.bloodshed.net/>

13. First approval date: August 30th, 2021

14. Competent Authority Approval: Thai Nguyen University of Information and Communication Technology

Vice Rector



PhD. Do Dinh Cuong

Dean



PhD. Nguyen Hai Minh

Head of Department



PhD. Nguyen Dinh Dung

Composer Team



**Nguyen Tuan Anh
Ngo Huu Huy
Duong Thi Quy**