THAI NGUYEN UNIVERSITY	SOCIALIST REPUBLIC OF VIET NAM
UNIVERSITY OF INFORMATION AND COMMUNICATION TECHNOLOGY	**Independence - Freedom – Happiness**

COURSE SYLLABUS
(Training Level: Undergraduate)

Course Title:

Vietnamese Subject Title: Kỹ thuật vi xử lý và ứng dụng.

English Subject Title: Microprocessor technology and applications.

Course Code: MPT331

Major: Electronics – Telecommunications Engineering Technology

Version: 2017

1. General Information

- Number of credits: 3 (Theory: 3; Practice: 0)

- Types of Knowledge:

General Education		Base core courses		Major core courses		Concentration courses		Others
Required ☐	Optional ☐	Required ☐	Optional ☐	Required ☐	Optional ☐	Required X	Optional ☐	Alternative subject of Graduation Thesis ☐

- Required course(s): Analog electronics engineering, Digital electronics engineering, C Programming in electronics.

- Pre-requisite: None

- Co-requisite: None

- Facility Requirements: Classrooms with projectors

- Departments in Charge: Faculty of Electronic and Communication Technology

2. Time Allocated

	Theory: 33 periods
Total: 54 Periods	Discussion/ Group Presentation: 18 periods
	Assignment/ Essay/ Practice: 0.
	Tests: 3 periods *+ Theory: Number of Tests:03 Periods: 03* *+Practice: Number of Tests:0 Periods: 0*
Self-study: 90 periods. Other activities: 0 period	

3. Lecturers' Information

No	Lecturer name	Phone number	Email	Note
1	MSc.Thanh Tung Nguyen	0985700190	nttung@ictu.edu.vn	Leader
2	MSc.Mai Thi Kim Anh	0987765323	mtkanh@ictu.edu.vn	Member
3	MSc.Ho Mau Viet	0986765312	hmviet@ictu.edu.vn	Member

4. Objectives

The course Microprocessors and Applications provides students with knowledge about: Microprocessors and microprocessor systems, Data input and output organization in microprocessors, Interrupts and interrupt handling, Some families of microprocessors. Advanced controller, Application programming technique with 8051 family of microcontrollers, PIC16F877A Microcontroller. From the above knowledge, students have the skills to build practical electronic products.

The subject contributes to meeting the L6, L7, L8 learning outcomes of the training program.

5. Description of content and course learning outcome:

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

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

Notation CLOs	Contents	Level	
		Knoweldge	Skills
C1	Knowledge of microprocessors and microprocessors	1	
C2	Know the Intel 80x86 . Microprocessor	2	
C3	Understanding the organization of data input and output in microprocessors	2	
C4	Understand Interrupts and Interrupt Handling in Microprocessors	2	2
C5	Knowledge of the 8051 . family of microcontrollers	2	
C6	Get to know the software tools that support the 8051 . family of microcontrollers	2	3
C7	Skilled in C Programming for the 8051 . Microcontroller Family	3	3
C8	Skilled in Application Programming with the 8051 . Microcontroller Family	3	3
C9	Knowledge of the PIC family of microcontrollers	2	
C10	Get to know the Supported Software Tools for the PIC Microcontroller Family	2	3

C11	Skilled in C Programming for the PIC Microcontroller family	2	3
C12	Knowledge of Application Programming with the PIC family of microcontrollers	3	3
C13	Knowledge of the AVR family of microcontrollers	2	
C14	Know the ARM Processor Core	3	
C15	Grasp Some Common Circuit Boards	3	

6. Reading List

- Main syllabus:

[1]. Vu Chien Thang, Nguyen Thanh Tung (2018), Microprocessor and microcontroller engineering textbook, Thai Nguyen University Publishing House.

- References:

[2]. Ngo Dien Tap (2010), Textbook of microprocessors and computer structure, Education Publishing House.

[3]. Nguyen Manh Giang, (2007), Structure, programming, pairing and application of microcontrollers (Volume 1 and Volume 2), Education Publishing House.

[4]. Nguyen Dinh Phu (2014), PIC16F887 Microprocessor Textbook, University of Technical Education Publishing House.

[5]. Ngo Dien Tap (2006), Microcontroller Engineering with AVR, Science and Technology Publishing House.

7. Score Assessment

- Score Scale: 10.

- Components Assessment:

Evaluation Time	Components Assessment	CLOs	Factor	Score	Weight
During the duration of the course	Attendance: (score b_0)		1	$d=(b_0+b_1+b_2+b_3)/4$	30%
According to the teaching plan in section 9	Test No.1: (b_1)	C_5, C_6	1		
	Test No.2: (b_2)	C9, C10	1		
	Test No.3: (b_3)	C_7, C_8	1		
The end of the term.	Final exam	C3; C6; C10; C11, C12, C13, C14, C15		Final examination: e	70%
Final Score: (f)				f = d ×30% + e ×70%	

- End-term Examination: Essay

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	CHAPTER 1. PROCESSORS AND PROCESSOR SYSTEMS 1.1. General introduction to Microprocessors and microprocessors 1.2. Intel 80x86 microprocessor	Present; Raise and solve problems;	C_1 C_2	[1]. 1-10 page
2	3	CHAPTER 1. PROCESSORS AND PROCESSOR SYSTEM (continued) 1.3. Organize data input and output 1.4. Interrupts and interrupt handling in microprocessors	Present; Raise and solve problems;	C_3 C_4	[1]. 11-20 page [2]. 1-90 page [3]. 1 -16 page [5]. 10-25 page
3	3	Discussion 1 - Assembly language programming for INTEL 80x86 microprocessor. - Pairing between microprocessors and some peripherals.	Student groups present and discuss according to the plan	C_1 C_2 C_3 C_4	[1]. 1-20 page [2]. 1-90 page [3]. 1-32 page [4]. 18–71 page [5]. 10-25 page
4	3	CHAPTER 2. APPLICATION PROGRAMMING WITH 8051 . MICROCONTROL SERIES 2.1. General introduction to 8051 . microcontroller family 2.2. Support software tools for	Present; Raise and solve problems;	C_1 C_2 C_3 C_4 C_5	[1]. 1-20 page [2]. 1-90 page [3]. 1-32 page [4]. 18–71 page [5]. 10-25 page

No	Period	Contents	Teaching Methodology	CLOs	References
		the 8051 . family of microcontrollers		C_6	
		Test No. 1	Written	$C_1, C_2,$ $C_3, C_4,$ C_5, C_6	
5	3	CHAPTER 2. APPLICATION PROGRAMMING WITH 8051 MICROCONTROLLERS (continued) 2.3. C programming for the 8051 . family of microcontrollers 2.4. Programming applications with the 8051 . family of microcontrollers 2.4.1. GPIO control for 8051 . family of microcontrollers	Present; Raise and solve problems;	C_7 C_8	[1]. 21-30 page [2]. 111–166 page [3]. 33–44 page [4]. 104-119 page [5]. 124–147 page
6	3	CHAPTER 2. APPLICATION PROGRAMMING WITH 8051 MICROCONTROLLERS (continued) 2.4.2. Programming with Timer/Counter for 8051 . family of microcontrollers	Student groups present and discuss according to the plan under the supervision of the lecturer	C_8	[1]. 31-40 page [2]. 111–166 page [3]. 33–44 page [4]. 104–119 page [5]. 124-147 page
7	3	Discussion 2: Application programming for the 8051 family of microcontrollers: - GPIO control. - Timer/Counter.	Student groups present and discuss according to the plan groups, and mark the results	C_8	[1]. 21-40 page [3]. 33–44 page [4]. 104–119 page [5]. 124-147 page
8	3	CHAPTER 2. APPLICATION PROGRAMMING WITH 8051 MICROCONTROLLERS (continued) 2.4.3. Serial communication programming for the 8051 . family of microcontrollers	Present; Raise and solve problems;	C_8	[1]. 41-50 page [3]. 33–44 page [4]. 104–119 page [5]. 124-147 page

No	Period	Contents	Teaching Methodology	CLOs	References
9	3	Discussion 3: Application programming for the 8051 family of microcontrollers: - UART . serial communication - SPI . communication - I2C communication - Convert ADC.	Student groups present and discuss according to the plan	C_8	[1]. 51-60 page [3]. 33–44 page [4]. 104–119 page [5]. 124-147 page
10	3	CHAPTER 2. APPLICATION PROGRAMMING WITH 8051 MICROCONTROLLERS (continued) 2.4.4. Interrupt programming for the 8051 . family of microcontrollers	Present; Raise and solve problems;	C_5 C_6 C_7 C_8	[1]. 41-60 page [3]. 33–44 page [4].136-144 page [4]. 104–119 page [5]. 124-147 page
		Test No. 2	Written	$C_5, C_6,$ C_7, C_8	
11	3	Discussion 4: Application programming with interrupts of the 8051 . microcontroller family Chapter 3. APPLICATION PROGRAMMING WITH PIC . MICROCONTROLLERS 3.1. General introduction to the PIC . family of microcontrollers 3.2. Support software tools for the PIC . family of microcontrollers	Student groups present and discuss according to the plan	C_8	[1]. 61-70 page [3]. 233-254 page [4]. 122– 123 page
12	3	Chapter 3. APPLICATION PROGRAMMING WITH PIC . MICROCONTROLLERS 3.1. General introduction to the PIC . family of microcontrollers 3.2. Support software tools for the PIC . family of	Present; Raise and solve problems;	C_9 C_{10}	[1]. 71-80 page [3]. 83-110 page [4]. 120 –137 page

No	Period	Contents	Teaching Methodology	CLOs	References
		microcontrollers			
13	3	Chapter 3. APPLICATION PROGRAMMING WITH PIC Microcontrollers (continued) 3.3. C programming for the PIC . family of microcontrollers 3.4. Programming applications with the PIC . family of microcontrollers 3.4.1. GPIO control for the PIC . family of microcontrollers	Present; Raise and solve problems;	C_{11} C_{12}	[1]. 71-80 page [3]. 83-110 page [4]. 120 –137 page
14	3	Chapter 3. APPLICATION PROGRAMMING WITH PIC Microcontrollers (continued) 3.4.2. Programming the ADC for the PIC . family of microcontrollers 3.4.3. Serial Communication Programming for the PIC . family of microcontrollers	Student groups present and discuss according to the plan under the supervision of the lecturer	C_{12}	[1]. 81-90 page [4]. 86–92 page
15	3	Discussion 5: Application programming for PIC16F877A: - GPIO control. - ADC. - Serial communication - Communication I2C, SPI, Parallel.	Student groups present and discuss according to the plan	C_{12}	[1]. 91-100 page [3]. 153-158 page
16	3	Chapter 3. APPLICATION PROGRAMMING WITH PIC Microcontrollers (continued) 3.4.4. Programmable Timer/Counter/PWM, capture and compare for the PIC family of microcontrollers 3.4.5. Interrupt programming for the PIC . family of microcontrollers	Present; Raise and solve problems;	C_{12}	[1]. 81-100 page [3]. 153 –158 page [4]. 86-92 page
17	3	Chapter 4. INTRODUCTION TO SOME ADVANCED MICROCONTROLLER	Present; Raise and solve problems;	C_9 C_{10}	[1]. 81-110 page [3].111–142 page

No	Period	Contents	Teaching Methodology	CLOs	References
		FAMILY 4.1. AVR . family of microcontrollers 4.2. ARM processor core 4.3. Some popular circuit boards		C_{11} C_{12} C_{13} C_{14} C_{15}	
		Test No. 3	Written	$C_9, C_{10},$ C_{11} $C_{12},$ $C_{13},$ C_{14}, C_{15}	[1]. 81-110 page [3].111–142 page
18	3	Discussion 6: - Programmable Timer/Counter/PWM, capture and compare for PIC microcontroller family Interrupt programming for the PIC family of microcontrollers. - Some popular circuit boards	Student groups present and discuss according to the plan under the supervision of the lecturer	C_{12} C_{13} C_{14} C_{15}	[1]. 101-110 page [3]. 111–142 page

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

August 27th, 2017

Vice Rector	Vice Dean	Head of Department	Composer Team
			Nguyen Thanh Tung
PhD. Do Dinh Cuong	**Dr. Vu Chien Thang**	**MSc. Ho Mau Viet**	Mai Thi Kim Anh
			Ho Mau Viet

11. Updated Procedure

1st update: **Updater**