

MICROPROCESSORS

1. Thông tin về học phần (General Information)

Tên học phần (Course name): Microprocessors

Mã học phần (Course code): INT1330

Số tín chỉ (Number of credits): 3

Loại học phần (Course type): Compulsory

Học phần tiên quyết (Prerequisites):

- Computer Architecture (INT1323)

Học phần trước (Previous courses):

Học phần song hành (Parallel courses):

Các yêu cầu đối với học phần (Course requirements):

- Lecture room: Projector, black board
- Laboratory:

Giờ tín chỉ đối với các hoạt động (Teaching and Learning hours):

- Lý thuyết (Lectures): 36h
- Bài tập (Exercises): 8h
- Bài tập lớn (Projects): 0h
- Thực hành (Labs): 0h
- Tự học (Individual reading): 1h

Địa chỉ Khoa/Bộ môn phụ trách học phần (Address of the Faculty/Department in charge of the course):

- Address: Faculty of Information Technology 1 - Posts and Telecommunications Institute of Technology, Km10, Nguyen Trai Street, Ha Dong District, Hanoi.
- Phone number: (024) 33510432

2. Mục tiêu học phần (Objectives)

Về kiến thức (Knowledge):

The course provides an introduction to microprocessors, which focusses on the understanding of the 8086/8088 architecture and components, assembly language and system programming, I/O interface. In addition, the course also provides an understanding of recent microprocessors and applications such as multicore processors, GPU/TPU, wearable computers, and the Internet-of-Things. The students will:

- gain the background of microprocessors.
- become familiar with system programming and toward the development of I/O interface systems and embedded systems.

Kỹ năng (Skills):

Upon successful completion of this source, the students will be able to:

- understand the 8086/8088 architecture and components.
- have assembly language and system programming skills.
- implement simple I/O interfacing and embedded systems.

Thái độ, Chuyên cần (Attitude):

Students are required to attend the classes and complete exercises and assignments.

3. Tóm tắt nội dung học phần (Description)

This course starts with the introduction to microprocessors: concepts, history, applications; then 8086/8088 architecture and components. Next, the course will provide the background of instruction set, assembly language and system programming to students. In addition, memory and I/O interface are introduced to students for understanding the hardware operation and interface programming. Finally, students will also explore some recent trends of microprocessors such as multi-core processors, GPU/TPU, wearable computers and IoT.

4. Nội dung chi tiết học phần (Outlines)

Chapter 1: Introduction to Microprocessors

- 1.1. Basic concepts
- 1.2. Microprocessor systems
- 1.3. History

Chapter 2: Intel 8086/8088 microprocessors

- 2.1 8086 architecture and components
 - 2.1.1 Architecture
 - 2.1.2 Components: BIU, EU, registers and internal bus
- 2.2 8086/8088 instruction set
 - 2.2.1 Instruction concept and encoding
 - 2.2.2 Addressing modes
 - 2.2.3 Common instructions
- 2.3 Instruction execution
- 2.4 Interruption

Chapter 3: Assembly language programming

- 3.1. How to create and run an assembler code
- 3.2 Emu8086 simulator
- 3.3 Sub-routines and macro
- 3.4 Examples

Chapter 4: Memory and I/O interfacing

- 4.1 CPU pin signals
- 4.2 CPU-memory interfacing & address decoding
- 4.3 CPU-I/O interfacing & data exchange methods
- 4.4 Simple I/O interface programming
 - 4.4.1 Traffic light
 - 4.4.2 Thermal
 - 4.4.3 Keyboard
 - 4.4.4. Robotics
- 4.5. Exercise

Chapter 5: Advanced topics

- 5.1 Microcontrollers and System-on-Chip (SoC)
- 5.2. Multi-core microprocessors
- 5.3. GPU/TPU
- 5.4. Wearable computers
- 5.5. The Internet-of-Things devices

5. Học liệu (Textbooks)

5.1. Học liệu bắt buộc (Required Textbooks)

- [1]. M. Senthil Kumar, M. Saravanan, S. Reevanathan. *Microprocessors and Microcontrollers*. Oxford University Press, 2013.

5.2. Học liệu tham khảo (Optional Textbooks)

- [2]. Samir G. Pandya. *8085 Microprocessor Assembly Language Programming*, LAP Lambert Academic Publishing, 2017
- [3]. Walter A. Triebel, Avtar Singh. *8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware, and Applications - 4th edition*, Prentice Hall, Inc. 2003

6. Phương pháp, hình thức kiểm tra – đánh giá kết quả học tập học phần (Grading Policy)

Grading method	Percentage	Group/Individual
- Attendance	10%	Individual
- Exercises	10%	Individual
- Mid-term projects/exams	20%	Group or individual
- Final examination	60%	Individual

Trưởng Bộ môn
(Head of Department)

Giảng viên biên soạn
(Lecturer)

Ngô Xuân Bách

Phạm Văn Cường