KIẾN TRÚC MÁY TÍNH VÀ HỆ ĐIỀU HÀNH
(COMPUTER ARCHITECTURE AND OPERATING SYSTEMS)
Đề cương chi tiết (Course Syllabus)

1. General Information

Course name: Kiến trúc máy tính và Hệ điều hành (Computer Architecture and Operating Systems)

Course code: INT1325_CLC

Course type: Compulsory

Number of credits: 3

2. Objectives

Knowledge: The aim of this course is to provide students with basic knowledge of computer architecture and operating systems.

Skills: On successful completion of this course a student will be able to:

- Analyze and select computers with suitable configuration for specific tasks;
- Analyze and select suitable operating systems for specific computers and tasks.

Attitude: Students are required to attend the classes and complete assignments/projects.

3. Abstracts

This course provides students with basic knowledge of computer architecture and operating systems, including introduction to computer architecture; CPU and instruction sets; computer memory system; bus systems and peripheral devices; advanced computer architectures; introduction to operating systems; and basic services of operating systems.

4. Teaching and learning methods

Lectures: 30h
Exercises: 5h
Projects: 10h
Labs: 0h
Individual reading: 0h

5. Prerequisites: Introduction to informatics and information security - SEC1101_CLC

6. Learning outcomes

After completing this course, the student is able to:
[CLO1]: Explain basic concepts and knowledge of computer architecture and operating systems;
[CLO2]: Analyze and select computers with suitable configuration for specific tasks;
[CLO3]: Analyze and select suitable operating systems for specific computers and tasks.

7. Assignment criteria

Learning outcomes	Assignment criteria

[CLO1]: Explain basic concepts and knowledge of computer architecture and operating systems	Chapter 1, Chapter 2, Chapter 3, Chapter 4, Chapter 5, Chapter 6, Chapter 7
[CLO2]: Analyze and select computers with suitable configuration for specific tasks	Chapter 1, Chapter 2, Chapter 3, Chapter 4, Chapter 5
[CLO3]: Analyze and select suitable operating systems for specific computers and tasks	Chapter 6, Chapter 7

8. Outlines

Part I Computer Architecture

Chapter 1 Introduction to Computer Architecture

1.1. The concepts of computer organization and architecture
1.2. Brief history of computer development
1.3. Von-Neumann and Harvard architectures
1.4. Numbering systems and computer data organization

Chapter 2 The CPU and Instruction Sets

2.1. CPU diagram and instruction processing cycle
2.2. CPU components
2.3. Overview of CPU instruction sets, instruction format and elements
2.4. Typical CPU instructions
2.5. The CPU pipelines

Chapter 3 Computer Memory System

3.1. Introduction to computer memory system
3.2. ROM and RAM memory
3.3. Cache memory
3.4. External memory

Chapter 4 Bus Systems and Peripheral Devices

4.1. Overview of bus systems
4.2. Common computer buses
4.3. Overview of peripheral devices
4.4. Common computer peripheral devices

Chapter 5 Advanced Computer Architectures

5.1. Advanced computer architectures
5.2. Advanced CPU architectures
5.3. Advanced GPU architectures

Part II Operating Systems

Chapter 6 Introduction to Operating Systems

6.1. Overview of operating systems
6.2. Services of operating systems
6.3. Development process of operating systems
6.4. Structure of operating systems

6.5. Common operating systems

Chapter 7 Basic Services of Operating Systems

7.1. File system management
7.2. Memory management
7.3. Process management

9. Required Textbooks

[1] William Stallings, *Computer Organization and Architecture: Designing for Performance*, 10th Edition, Pearson, 2015.
[2] Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, Wiley; 10th edition, 2021.

10. Suggested Textbooks

[3] Hoàng Xuân Dậu, Bài giảng Kiến trúc máy tính, Học viện Công nghệ Bưu chính Viễn thông, 2012.
[4] Từ Minh Phương, Giáo trình Hệ điều hành, Học viện Công nghệ Bưu chính Viễn thông, 2015.

11. Schedule

Main contents	Duration	Specific contents
Chapter 1 Introduction to Computer Architecture	3h lecture	1.1. The concepts of computer organization and architecture 1.2. Brief history of computer development 1.3. Von-Neumann and Harvard architectures 1.4. Numbering systems and computer data organization
Chapter 2 The CPU and Instruction Sets	5h lecture 1h exercise 2h project	2.1. CPU diagram and instruction processing cycle 2.2. CPU components 2.3. Overview of CPU instruction sets, instruction format and elements 2.4. Typical CPU instructions 2.5. The CPU pipelines
Chapter 3 Computer Memory System	5h lecture 1h exercise 2h project	3.1. Introduction to computer memory system 3.2. ROM and RAM memory 3.3. Cache memory 3.4. External memory
Chapter 4 Bus Systems and Peripheral Devices	5h lecture 1h exercise 2h project	4.1. Overview of bus systems 4.2. Common computer buses 4.3. Overview of peripheral devices 4.4. Common computer peripheral devices
Chapter 5 Advanced Computer Architectures	3h lecture 1h exercise	5.1. Advanced computer architectures 5.2. Advanced CPU architectures 5.3. Advanced GPU architectures

Chapter 6 Introduction to Operating Systems	3h lecture 1h exercise 2h project	6.1. Overview of operating systems 6.2. Services of operating systems 6.3. Development process of operating systems 6.4. Structure of operating systems 6.5. Common operating systems
Chapter 7 Basic Services of Operating Systems	6h lecture 1h exercise 2h project	7.1. File system management 7.2. Memory management 7.3. Process management

12. Grading Policy

Attendance: 10%
Mid-term exam/exercises: 10%
Course projects: 30%
Final examination: 50%