

# NHẬP MÔN BLOCKCHAIN (INTRODUCTION TO BLOCKCHAIN)

## Đề cương chi tiết (Course Syllabus)

### 1. General Information

**Course name:** Nhập môn Blockchain (Introduction to Blockchain)

**Course code:** SEC1415\_CLC

**Course type:** Selective

**Number of credits:** 3

### 2. Objectives

#### *Knowledge:*

The aim of this course is to provide students with the basic knowledge Blockchain as well as how to build an application from Blockchain.

#### *Skills:*

After completing the course, students will:

- Have the skills to build and develop real-world applications from Blockchain.
- Know how to test and evaluate the weaknesses and vulnerabilities of Blockchain.

#### *Attitude:*

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

### 3. Abstracts

The course provides students with basic knowledge about Blockchain including: the role and importance of Blockchain; some basic mathematical issues applied in Blockchain; some architectures, operating principles, and protocols of Blockchain; information security issues for Blockchain, and some practical applications of Blockchain.

### 4. Teaching and learning methods

Lectures: 24h

Exercises: 5h

Projects : 8h

Labs: 8h

Individual reading: 0h

**5. Prerequisites:** SEC1403\_CLC - Introduction to Cryptography

### 6. Learning outcomes

After completing this course, the student is able to:

[CLO1]: Explain the basic knowledge of Blockchain

[CLO2]: Select and deploy Blockchain components and platforms to solve basic real-world problems.

## 7. Assignment criteria

Learning outcomes	Assignment criteria
[CLO1]: Explain the basic knowledge of Blockchain	Chapter 1, Chapter 2, Chapter 3, Chapter 4, Chapter 5.
[CLO2]: Select and deploy Blockchain components and platforms to solve basic real-world problems	Chapter 3, Chapter 4, Chapter 5.

## 8. Outlines

### CHAPTER 1: OVERVIEW OF BLOCKCHAIN

- 1.1. Basic terms and concepts
- 1.2. Characteristics of Blockchain technology
- 1.3. History
- 1.4. Classification
- 1.5. Role and importance
- 1.6. Basic applications

### CHAPTER 2: THEORETICAL BASICS OF BLOCKCHAIN

- 2.1. Encryption
- 2.2. Hash function
- 2.3. Digital signature
- 2.4. Other theoretical models

### CHAPTER 3. ARCHITECTURE AND OPERATING MECHANISM OF BLOCKCHAIN

- 3.1. Overview of architecture
- 3.2. Operating mechanism
- 3.3. Basic protocols

### CHAPTER 4. APPLICATIONS OF BLOCKCHAIN

- 4.1. Smart Contracts
- 4.2. Digital Currencies
- 4.3. Other applications

### CHAPTER 5. SECURITY AND DEVELOPMENT TRENDS OF BLOCKCHAIN

- 5.1. General overview of security issues in Blockchain
- 5.2. Common attack techniques on Blockchain
- 5.3. Blockchain development trends

## 9. Required Textbooks

- [1] Ahmed Imteaj, M. Hadi Amini, Panos M. Pardalos. Foundations of Blockchain: Theory and Applications. Springer International Publishing, 2021. ISBN: 3030750264, 9783030750268.

## 10. Suggested Textbooks

- [2] Arshdeep Bahga, Vijay Madisetti. Blockchain Applications: A Hands-On Approach. VPT. January 31, 2017.
- [3] Sonali Vyas, Vinod Kumar Shukla, Shaurya Gupta, Ajay Prasad. Blockchain Technology Exploring Opportunities, Challenges, and Applications. CRC Press. 2022. ISBN 9780367685584
- [4] Xiwei Xu, Ingo Weber, Mark Staples. Architecture for Blockchain Applications. Springer International Publishing. ISBN 978-3-030-03034-6. eBook: <https://doi.org/10.1007/978-3-030-03035-3>

## 11. Schedule

Main contents	Duration	Specific contents
CHAPTER 1: OVERVIEW OF BLOCKCHAIN	4h lecture	1.1. Basic terms and concepts 1.2. Characteristics of Blockchain technology 1.3. History 1.4. Classification 1.5. Role and importance 1.6. Basic applications
CHAPTER 2: THEORETICAL BASIS OF BLOCKCHAIN	4h lecture 1h exercise 2h lab 2h project	2.1. Encryption 2.2. Hash function 2.3. Digital signature 2.4. Other theoretical models
CHAPTER 3. ARCHITECTURE AND OPERATING MECHANISM OF BLOCKCHAIN	4h lecture 1h exercise 2h project 2h lab	3.1. Overview of architecture 3.2. Operating mechanism 3.3. Basic protocols
CHAPTER 4. APPLICATIONS OF BLOCKCHAIN	6h lecture 2h project 2h lab 1h exercise	4.1. Smart Contracts 4.2. Digital Currencies 4.3. Other applications

CHAPTER 5. SECURITY AND DEVELOPMENT TRENDS OF BLOCKCHAIN	6h lecture 2h exercise 2h project 2h lab	5.1. General overview of security issues in Blockchain 5.2. Common attack techniques on Blockchain 5.3. Blockchain development trends
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## 12. Grading Policy

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