

**IMI62-332**

# **Medical Information Security**

## **Course Syllabus**

Semester 2 / Academic Year 2025

Instructor:

**Asst. Prof. Dr. Chananthorn Chandaeng**

School of Medical Information Innovation

Walailak University

# 1. Course Information

**Course Code:** IMI62-332

**Course Title:** Medical Information Security

**Credits:** 3(3-0-6)

**Class Schedule:**

 Friday, 15:00–18:00

 Computer and Digital Technology Laboratory 1

## 2. Course Description

This course introduces the principles of cybersecurity in the context of healthcare. Students will explore cyber threats, vulnerabilities, risk assessment, IoMT security, health data protection, incident response, and the legal/ethical frameworks governing health information such as PDPA, HIPAA, ISO/IEC 27001, and relevant international standards.

### 3. Prerequisites

Students must complete:

- IMI62-232 Computer Networks
- ITD62-231 Internet Technology

# **4. Course Learning Outcomes (CLOs)**

## **CLO1 – Knowledge (Understand)**

Explain the fundamental principles and components of medical information security.

## **CLO2 – Skills (Analyze)**

Analyze threats, vulnerabilities, and risks in healthcare environments.

## **CLO3 – Competency (Evaluate/Create)**

Evaluate and design security controls aligned with international standards.

## **CLO4 – Ethics (Apply)**

Apply legal, regulatory, and ethical principles related to health data protection.

## 5. Course Content (8 Modules)

1. Introduction to Medical Information Security
2. Health Information Systems (HIS/EHR/EMR/HIE)
3. Secure Health Data Communication (HL7, FHIR, DICOM)
4. Cyber Threats, Vulnerabilities, and Attacks
5. IoMT Security
6. Risk Assessment & Data Protection
7. Incident Response & Digital Forensics
8. Healthcare Laws, Standards, and Ethics

## 6. Weekly Teaching Plan (12 Weeks)

| <b>Week</b> | <b>Topics / Content</b>                      | <b>TLA</b>  | <b>*Assessment</b> | <b>CLOs</b>   |
|-------------|--|---|--------------------|---------------|
| 1           | Introduction to Medical Information Security | Lecture, Q&A, introductory discussion                           | Quiz 1             | CLO1          |
| 2           | Cyber Threats in Healthcare Systems          | Case analysis of real incidents, discussion of ransomware cases | Worksheet 1        | CLO1,<br>CLO2 |
| 3           | Health Information Systems (HIS/EHR/EMR/HIE) | Lecture, system architecture walkthrough                        | Quiz 2             | CLO1          |

## 6. Weekly Teaching Plan (12 Weeks)

| Week | Topics / Content   | TLA   | *Assessment        | CLOs          |
|------|--|---|--------------------|---------------|
| 4    | Security of Health Data Communication (HL7, FHIR, DICOM) | Demonstration of data exchange, communication threat analysis | Quiz 3             | CLO1,<br>CLO2 |
| 5    | Cyberattacks, Vulnerabilities, and Exploits              | Workshop:<br>Vulnerability scenario analysis                  | Participation      | CLO2          |
| 6    | <b>Midterm Examination<br/>(Covering Week 1-4)</b>       | -   | Midterm Exam (15%) | CLO1,<br>CLO2 |

## 6. Weekly Teaching Plan (12 Weeks)

| <b>Week</b> | <b>Topics / Content</b>                                | <b>TLA</b>   | <b>*Assessment</b>     | <b>CLOs</b>   |
|-------------|--|--|------------------------|---------------|
| 7           | IoMT Security<br>(Medical Devices & Connected Systems) | Case Study: Attacks on infusion pumps, pacemakers            | Worksheet 2            | CLO2          |
| 8           | Risk Assessment in Healthcare Environments             | Workshop: Risk identification, analysis, mitigation planning | Risk Analysis Exercise | CLO2,<br>CLO3 |
| 9           | Data Protection & Data Governance                      | Group activity:<br>Designing Data Protection Policy          | Group Report (10%)     | CLO3          |

## 6. Weekly Teaching Plan (12 Weeks)

| <b>Week</b> | <b>Topics / Content</b>  | <b>TLA</b>  | <b>*Assessment</b>                | <b>CLOs</b> |
|-------------|--|---|-----------------------------------|-------------|
| 10          | Incident Response & Data Breach Handling                               | Tabletop simulation of cyber incident             | Participation + Scenario Analysis | CLO3        |
| 11          | Healthcare Regulations, Standards, and Ethics (PDPA, HIPAA, ISO 27001) | Discussion: Case studies of patient data breaches | Analytical Report (10%)           | CLO4        |
| 12          | Course Review & Final Exam Preparation                                 | Q&A, exam preparation, content summary            | Participation                     | CLO1-4      |

## 7. Teaching Methods

- Lectures and demonstrations
- Case study discussions
- Workshop: Risk & threat analysis
- Tabletop simulation: Incident response
- Analytical report and group presentation

## 8. Assessment Overview

| <b>Assessment Item</b>           | <b>Weight</b> |
|----------------------------------|---------------|
| Weekly Quizzes                   | 30%           |
| Analytical Report                | 10%           |
| Class Participation & Activities | 25%           |
| <b>Midterm Exam</b>              | 15%           |
| <b>Final Exam</b>                | 20%           |

# 9. Study Materials

## Core Standards & Frameworks

- PDPA (Thailand)
- HIPAA Security Rule
- ISO/IEC 27001 & ISO 27799
- NIST Cybersecurity Framework
- HC3 & WHO Cybersecurity Reports

## Supplementary Materials

- Weekly lecture notes
- Research articles on IoMT & Healthcare Cybersecurity

## 10. Course Policies

- Minimum 80% attendance required
- Academic integrity is mandatory
- Assignments must be submitted on time
- Respect patient privacy and ethical responsibilities
- Follow PDPA and institutional data governance rules

## 11. Instructor Contact

**Asst. Prof. Dr. Chananthorn Chandaeng**

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Walailak University

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# Welcome to IMI62-332

## *Medical Information Security*

Let's explore and strengthen cybersecurity in the healthcare world together.