Assessment Instruction

SEC-205: Distributed Ledger and Blockchain

Spring 2026

General Information

Competency Code:	SEC-205
Competency Title:	Distributed Ledger and Blockchain
Semester:	Spring 2026
Instructor Information:	Charnon Pattiyanon, Ph.D. (charnon@cmkl.ac.th)

Assessment Overview

The SEC-205 Distributed Ledger and Blockchain competency aims to introduce students to decentralized technologies, including blockchain, Ethereum, smart contract development, and Web 3.0 applications. These advanced technologies provide significant benefits across many real-world use cases, such as Decentralized Finance (DeFi), decentralized identity systems, and Non-Fungible Tokens (NFTs). In this competency, students will have the opportunity to develop smart contracts using the Solidity programming language on the Ethereum Virtual Machine (EVM).

In this assessment, students are required to apply their knowledge of distributed ledger and blockchain technologies to develop a Web 3.0 application using Solidity to address a real-world problem. Students must design and implement smart contracts to execute the business logic of their selected application within the Ethereum blockchain environment.

Assessing Skills

- **[SEC-205:00010]** – Successful students will be able to understand how blockchain technology operates in real-world use cases.
- **[SEC-205:00020]** – Successful students will be able to design and develop a Web 3.0 application that uses blockchain technology as its underlying mechanism.
- **[SEC-205:00030]** – Successful students will be able to critically analyze blockchain privacy and security issues in a comprehensive manner.

Pre-Cautions

- **Express your answers form your own ideas and perspective.** Plagiarism is unacceptable. You must cite referenced sources properly to acknowledge their originality and must not copy partial or entire ideas from your peers. If content or ideas are found to be remarkably similar between two or more

submissions, or if orginal material is copied from other works without proper citation, all students will receive a score deduction as a consequence of disciplinary action.

- **Demonstrate deep understanding through critical analysis and original insight**. Overreliance on AI-generated content without substantial original thought will negatively impact the assessment score.
- **Justifications** should explain a decision or finding in a "why" style, providing adequate technical and valid rationale. For example: "I believe that this security control is the best choice for ensuring endpoint seucirty because it is an enterprise-grade solution with relatively-low cost for installation." There will be no one-size-fit-all solution or criticism for writing a justification; your skill will be evaluated on the clarity of your justification.
- **Inquiries:** Students are encouraged to ask instructors any questions about the assessment or competency content via email or other agreed channels. However, students are not allowed to submit an assessment report and ask for feedback; such a submission will be treated as a report submission.
- **Optional questions** may be provided in this assessment with a clear indicator. Students may omit them from the report without affecting the final grade. However, optional questions may be considered in cases when a student receives a boderline score between two mastery levels or fails the competency. The optional question can contribute to the final score but will not exceed 10% of the overall score, at the instructor's discretion.

Sumission Policy

- You are allowed to submit your work only once per semester, unless specified otherwise. You may submit your work and then request feedback from the instructor. However, it is at the instructor's discretion whether to provide feedback.
- All submissions must be completed **through the Canvas system only**, as your scores need to be stored and transferred to the university's system. Submissions made via any other channel will not be recognized as official, and you will not receive a score for your work.
- At the end of each semester, **CMKL University** sets a deadline for students to submit their assessments for all enrolled competencies. If you fail to submit your work by the stated deadline, you will not receive any score. In such cases, you must retake the competency in future semesters. While you may submit a request for consideration of a late submission, approval is subject to the instructor's discretion and the university's operational constraints.

Assessment Instruction

The total score for this assessment is 300 points, with each skill contributing 100 points. Please carefully follow the instructions below:

1. Each student must individually select one Web 3.0 application from the following list: (1) e-commerce application, (2) asset/inventory management application, or (3) voting system. However, you are not limited to these options and may propose another application of your interest.

2. Each student must specify the system requirements and design the architecture, data structures, use case scenarios, and smart contract structure for the selected Web 3.0 application. All of this information must be compiled into **a design specification** following the first chapter of the provided template.
3. Each student must develop a Solidity project that implements all required smart contracts to handle transactions on the blockchain. The smart contracts must cover all use case scenarios specified in the design document.
4. Each student must write test cases demonstrating both the expected and actual outcomes. The test cases must at least cover all intended operations defined in the system design.
5. (Optional) Each student may develop a front-end application that connects to the blockchain smart contracts and deploy it on a local test network using Hardhat.
6. Each student must analyze the security and privacy aspects of the implemented Web 3.0 application. In addition, students should propose recommendations to enhance system security and protect users' personal information.
7. Each student must record a video (MP4 format, no longer than 5 minutes) explaining the Solidity source code and demonstrating the results of each smart contract function according to the defined use case scenarios. The video must be uploaded to a cloud storage service (e.g., Google Drive or Dropbox) or a streaming platform (e.g., YouTube). **The link to your video must be provided in the full report**.
8. Each student must prepare a full development report that includes all previously mentioned components. The report template, provided separately, outlines the minimum required structure; however, students are encouraged to include additional details that improve clarity and completeness. Additional relevant content may positively impact the final grade.
9. Each student must submit the full development report (as described in item 8) along with the link to the video (as described in item 7) via **Canvas** by **Friday, May 1, 2026, before 11:59 PM**. Late submissions will not be accepted, as the deadline is determined by the university. Students are strongly encouraged to submit their work as soon as it is completed.

Important Dates for the Assessment

- **Submission Deadline for Assessment Report and Video:** May 1, 2026, 11:59PM