

**CAPSTONE PROJECT REPORT**

**Report 5 – Software Test Documentation**

– Ho Chi Minh City, December 2025 –

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# I. Project Report

## 1. Status Report

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Work Item** | **Status** | **Notes (Work Item in Details)** |
| 1 | Test Planning | Completed | Defined testing scope, environment (Web & Sim), and tools. |
| 2 | Test Case Design | Completed | Designed 197 test cases covering 5 main modules. |
| 3 | Test Execution | Completed | Executed manual and integration tests on the Staging environment. |
| 4 | Defect Fixing | Completed | Critical bugs regarding Simulation handshake and JWT Auth resolved. |
| 5 | Final Reporting | Pending | Consolidating final metrics and creating this documentation. |

## 2. Team Involvements

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Task** | **Member** | **Notes (Task Details, etc.)** |
| 1 | Test Lead / Manager | Le Nhat Quang | Test planning, progress tracking, resource allocation. |
| 2 | Tester / QA | Le Nhat Quang | Test case design, manual execution, logging bugs. |
| 3 | Backend Developer | Dao Trong Duc | Unit testing for APIs, fixing BE logic (Final Exam, Auth). |
| 4 | Frontend Developer | Dao Trong Duc | UI/UX adjustments, integration testing with Simulation. |

## 3. Issues/Suggestions

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Issue** | **Status** | **Notes (Solution, Suggestion, etc.)** |
| 1 | Simulation Handshake Delay | Solved | Optimized the token passing mechanism between Web and Sim Client. |
| 2 | Dashboard Performance | Solved | Refactored API queries for "SystemStats" and "EnrollmentTrend" to reduce load time. |
| 3 | Final Exam Timer Sync | Solved | Fixed the issue where the timer on FE did not sync perfectly with BE timestamp. |

# II. Project Management Plan

## 1. Overall Description

### 1.1 Test Model

The project follows the Agile Testing Model. Testing is performed continuously alongside development sprints (Sprint 1 to Sprint 4).

* Requirement Analysis: Analyze SRS to identify test scenarios.
* Test Design: Create Test Cases (Excel).
* Test Execution: Execute Functional and Integration tests.
* Defect Tracking: Log issues on Github and re-test after fixing.

### 1.2 Testing Levels

* **Unit Testing:** Performed by Developers using xUnit (BE) and localized component testing (FE).
* **Integration Testing:** Verifying communication between React FE, .NET API, and the Simulation Client.
* **System Testing:** End-to-end testing of full workflows (e.g., Enrollment -> Learning -> Exam -> Certificate).
* **Acceptance Testing (UAT):** Validating the system against user requirements (Admin, Instructor, Trainee flows).

### 1.3 Testing Types

* **Functional Testing:** Verifying all features against SRS (CRUD, Workflows).
* **UI/UX Testing:** Ensuring responsiveness and usability (React components).
* **API Testing:** Validating data integrity using Postman.
* **Security Testing:** Verifying Role-based Access Control (RBAC) and JWT Authentication.

## 2. Test Plan

### 2.1 Test Stages

*[Clearly state the stage in which the test will be executed. Identified below are the stages in which common test are executed]*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of Test** | **Stage of Test** | | | |
| ***Unit*** | ***Integration*** | ***System*** | ***Acceptance*** |
| Function Test | X | X | X | X |
| User Interface Test |  |  | X | X |
| Performance Tests |  | X | X |  |
| Security Test |  | X | X |  |
| Data Integrity Test | X | X | X |  |

### 2.2 Resources

a. Human Resources(Refer to Team Involvements table in Section I.2)

b. Environment

|  |  |  |  |
| --- | --- | --- | --- |
| **Purpose** | **Tool** | **Provider** | **Version** |
| **Backend Server** | .NET 8 Web API | Microsoft | Hosted on Azure/Localhost |
| Frontend Client | ReactJS (Vite) | Open Source | Node.js v18+ |
| Database | SQL Server | Microsoft | Azure SQL / SQL Server 2019 |
| Simulation Client | Unity Build | Unity Tech | Windows Executable (.exe) |
| Browser | Google Chrome | Google | Latest Version |
| API Testing | Swagger / Swagger UI / Swagger Editor | OpenAPI Initiative | Latest Version |
| IDE | VS Code / Visual Studio | Microsoft | Code Editing |

### 2.3 Test Milestones

|  |  |  |  |
| --- | --- | --- | --- |
| **Milestone Task** | **Effort (md)** | **Start Date** | **End Date** |
| Test Planning | 2 | 10/11/2025 | 11/11/2025 |
| Test Case Design | 5 | 12/11/2025 | 18/11/2025 |
| Environment Setup | 1 | 19/11/2025 | 19/11/2025 |
| Test Execution (Round 1) | 5 | 20/11/2025 | 26/11/2025 |
| Bug Fixing & Retest | 3 | 27/11/2025 | 05/12/2025 |
| Final Report Generation | 1 | 06/12/2025 | 12/12/2025 |

### 2.4 Deliverables

|  |  |  |
| --- | --- | --- |
| **No** | **Deliverables** | **Due Date** |
| 1 | Report 5 - Test Documentation (This document) | 14/12/2025 |
| 2 | Report 5 - Test Cases (Excel File) | 14/12/2025 |
| 3 | Test Execution Reports (CSV/Excel) | 14/12/2025 |
| 4 | Bug Log / Defect List | 14/12/2025 |

## 3. Test Cases

Detailed test cases are provided in the attached file: Report5\_Test Report.xlsx. The test suite covers the following modules:

1. **Training Content & Curriculum Management:** Program, Course, Class, Section management.
2. **Trainee Enrollment & Learning Process:** Enrollment flow, "My Classes", learning materials.
3. **Simulation Integration:** Launching Sim client, syncing scores and results.
4. **Trainee Final Exam Module:** Theory and Simulation exams, grading logic.
5. **Dashboard Management:** Admin, Instructor, and Sim Manager analytics.

## 4. Test Reports

**Summary of Test Execution (Source: Test Statistics.csv):**

* **Total Test Cases:** 197
* **Passed:** 191
* **Failed:** 0
* **Pending/NA:** 6 (Skipped scenarios or future features)
* **Pass Rate:** ~96.95%

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***No*** | ***Module Name*** | ***Passed*** | ***Failed*** | ***Pending*** | ***N/A*** | ***Total TCs*** |
| *1* | *Training Content & Curriculum Management* | *50* | *0* | *0* | *0* | *56* |
| *2* | *Trainee Enrollment & Learning Process* | *73* | *0* | *0* | *0* | *73* |
| *3* | *Simulation Integration & Practice Session* | *9* | *0* | *0* | *0* | *9* |
| *4* | *Trainee Final Exam Module* | *36* | *0* | *0* | *0* | *36* |
| *5* | *Dashboard Management* | *23* | *0* | *0* | *0* | *23* |
| ***Total*** |  | ***191*** | ***0*** | ***0*** | ***0*** | ***197*** |