# SE 2226 Test Completion Report – Udemy Web Application


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## 1. Summary of Testing Performed

Testing was conducted at the **system level** using **black-box techniques** over a 4-week period. The scope included end-to-end flows of the Udemy web application, covering:

- User authentication (login, register)
- Course discovery (search, filtering, navigation)
- Course interaction (details, progress, pagination)
- Favorites (add/remove/view)
- Purchase flow (normal, alternate, exception)
- Performance metrics

**Testing types applied:**

- Functional Testing
- Use Case Testing
- Form and UI Testing
- Performance Testing
- Decision Table Testing
- Equivalence Partitioning (EP)
- Boundary Value Analysis (BVA)

**Constraints:**

- No backend access, all UI-only testing
- CAPTCHA-protected pages were excluded
- Limited to browser-visible behaviors
- Real payments were not tested

## 2. Deviations from Planned Testing

Some minor deviations occurred:

- CAPTCHA-protected pages could not be automated as planned.
- A few Selenium scripts failed due to Cloudflare protection and were replaced with manual testing, and failed tests also tested in different websites.
- Purchase flows were simulated without real payment confirmation.

**Residual Risks:**
These deviations may leave edge-case defects undetected in the real backend (e.g., payment confirmation, instructor pages).

## 3. Test Completion Evaluation

The project **met all exit criteria except autamated tests pass rate**:

- A total of 47 test cases (e.g., TC-UC-01) were executed, comprising 298 individual tests, where each test case may include multiple test inputs such as E1, U1, U2 - each representing a separate equivalence class or input condition.(see TestCaseTables.pdf)
- 75% passed in automated tests, >90% pass rate **not achieved.**
- All techniques (EP, BVA, DT, Use Case,performance) applied
- All test artifacts, including reports, logs, screenshots, .side files, videos, and JUnit/automation bot source code, have been archived.
- Test completion report (this document) generated.

Some manual scenarios were used as fallback where automation was blocked.

## 4. Factors That Blocked Progress

- CAPTCHA and Cloudflare protections blocked automated tests .
- Minor delays occurred due to cross-browser inconsistencies (Safari vs. Chrome)
- Some test data (like expired courses or unavailable courses) had to be simulated manually.

**Solutions:**

- Replaced blocked automation with manual testing.
- Browser tests were limited to Chrome, Edge and Opera where compatibility was ensured.
- Test data was curated manually for edge cases.

As a solution of CAPTCHA, we use this testing envirioments to test similar use cases:

| Environment | Purpose |
|---|---|
| https://www.saucedemo.com | Simulated purchase flow automation. |
| https://www.trendyol.com | Real-world UI stability testing |
| https://www.discudemy.com | Search and course listing bot testing |
| **UdemyDemo** (internal clone)(made by us) | Full control for test coverage including error cases and bot automation |

## 5. Test Measures

| Measure Type | Value |
|---|---|
| Total Test Cases | 47 |
| Total Tests | 298 |
| Automation Coverage | ~40% (20 automated, 27 manual) |
| Pass Rate (Automated) | 75.38% |
| Failures or Incidents | 4 (retested and resolved manually) |
| Coverage by Technique | EP: 14, BVA: 8, DT: 7, Use Case: 15 , Performance: 3 |
| Performance Tests | 3 tests using Lighthouse, Selenium + Timer, Network |

## 6. Test Deliverables

| Deliverable | Location or Format |
|---|---|
| Test Plan | Se-2226 Test Plan.pdf |
| Test Case Table | Udemy-Test/TestCaseTables.pdf |
| JUnit & Selenium Scripts | Udemy-Test/udemyAutomationTests.zip |
| Execution Screenshots | Udemy-Test/Deliverables |
| Completion Report | This Document |
| Test Presentation | Udemy-Test/ Test_Presentation.pptx |

## 7. Lessons Learned

1. **CAPTCHAs = Nightmare for Bots**
   Automation hit a wall whenever CAPTCHA or Cloudflare protections were involved. We discussed this in retrospectives and solved it by switching to manual testing or using bot-friendly environments like Saucedemo,UdemyDisc and our custom UdemyDemo clone. In future projects, we'll plan dedicated testing environments from the beginning.

2. **Formal Test Techniques Actually Helped**
   At first, EP, BVA, Use Case, and Decision Table Testing felt like just theory, but they made our test cases way more organized and helped us cover a wider range of inputs. We realized during retrospectives that these techniques saved time and reduced confusion in later test design.

3. **Manual Testing Still Has Its Place**
   Not everything can be automated. For things like UI bugs, CAPTCHA pages, or weird edge cases, manual testing was quicker and more effective. We used it as a fallback whenever automation failed—and it often turned out to be the better option.

4. **Performance Testing Matters**
   Using tools like Lighthouse and Selenium timers showed us that performance is just as important as functionality. It helped us catch slow pages and gave us insights into how the user experience could be improved overall.

5. **Browser Bugs are Real**
   What worked perfectly on Chrome sometimes broke on Safari. This caused delays until we limited our testing to Chrome, Edge, and Opera. In future sprints, we'll clearly define which browsers are in-scope early on to avoid wasting time.

6. **Having a Custom Test Environment Was a Game-Changer**
   Building our own UdemyDemo clone gave us full freedom—no CAPTCHAs, no restrictions. We could simulate every scenario we wanted, including error cases. This decision was highlighted several times in retrospectives as something we'd definitely do again in future projects.