

University ERP System Testing Pack Assessment

We have thoroughly reviewed the provided Testing Pack, which includes the Test Plan, Test Dataset, and Test Summary. Our goal is to present this documentation in a cleaner, first-person perspective for our two-person group, ensuring no loss of original data or structure.

Part 1: Test Plan Review

1.1 Introduction

This Test Plan is designed to verify the complete functionality, security, and data integrity of the University ERP System against the project requirements. We developed this plan to cover acceptance tests, negative testing scenarios, security checks, and performance benchmarks across the three distinct user roles: Student, Instructor, and Administrator.

1.2 Test Environment

We will execute all tests using the following configuration, ensuring a stable and reproducible environment:

Component	Specification
Operating System	Windows 10/11
Java Version	JDK 11 or higher
Database	MySQL 8.0
Build Tool	Maven 3.6+
Test Accounts	admin1, inst1, stu1, stu2 (password: password123)

1.3 Key Test Cases and Verification Areas

We structured the acceptance tests into seven key areas to systematically cover all system functionalities. The following tables outline the scope and expected outcomes for each area.

A. Login & Role Tests (AUTH)

These tests confirm that the authentication layer correctly handles user input and routes users to the appropriate role-based dashboard.

Test ID	Test Case	Expected Result
AUTH-01	Wrong password rejected	Error message: "Incorrect username or password"
AUTH-03	Student dashboard on login	Student Dashboard opens with four correct tabs (Timetable, Catalog, Grades, Notifications)
AUTH-04	Instructor dashboard on login	Instructor Dashboard opens with Gradebook panel

B. Student Tests (STU)

We focused on validating the transactional features (registration and dropping) and data retrieval.

Test ID	Test Case	Expected Result
STU-02	Register for available section	Success message; course appears in Timetable
STU-04	Full section registration blocked	Error: "This section is full (X/X)"
STU-06	Drop course after deadline blocked	Error: "The drop deadline (YYYY-MM-DD) has passed"
STU-08	Download transcript	CSV file saved with complete course grades

C. Instructor Tests (INS)

Our tests confirm access control and the critical grade management workflow.

Test ID	Test Case	Expected Result
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INS-01	View own sections only	Only sections assigned to the logged-in instructor are shown
INS-02	Define grade components	Success: "Components saved" with weights totaling 100%
INS-04	Invalid score rejected	Error: "Score must be between 0 and 100"
INS-05	Compute final grades	Final grades (A+, A, B+, etc.) are correctly calculated and displayed

D. Admin Tests (ADM)

We ensured the administrator can perform all CRUD (Create, Read, Update, Delete) operations and manage system settings.

Test ID	Test Case	Expected Result
ADM-01	Create student user	Success: User created in both Auth DB and Students table
ADM-05	Delete course with sections blocked	Error: "Cannot delete course. It is in use by X section(s)"
ADM-06	Delete section with enrollments blocked	Error: "Cannot delete section. It has X student(s) enrolled"

E. Maintenance Mode Tests (MNT)

This critical set of tests verifies that the read-only flag is properly enforced across the system.

Test ID	Test Case	Expected Result
MNT-01	Student blocked during maintenance	Error: "System is in maintenance mode. Registration is temporarily disabled"

MNT-03	Instructor blocked during maintenance	Error: "Cannot save scores. System is in Maintenance Mode"
MNT-04	View still works during maintenance	All view operations (catalog, grades) work normally
MNT-05	Maintenance banner visible	Warning banner shown at top of Student/Instructor dashboards

F. Password & Auth Separation Tests (SEC)

We specifically focused on security compliance and the two-database architecture.

Test ID	Test Case	Expected Result
SEC-01	Password hash in Auth DB	Only BCrypt hashes (starting with \$2a\$) are stored
SEC-02	No passwords in ERP DB	No password or hash columns exist in any ERP DB table
SEC-05	Account lockout after 5 attempts	Error: "Too many failed attempts. Account locked for 1 minute"

G. Export Tests (EXP)

We verified the data export and import functionalities, including the CSV backup system.

Test ID	Test Case	Expected Result
EXP-01	Student transcript export	CSV file created with course codes, scores, final grades
EXP-03	Admin restore works	Data restored to previous backup state after modification

1.4 Edge & Data Integrity Testing

We included focused tests to push the system limits and confirm database constraints.

- Edge Cases: We tested scenarios like zero capacity sections (NEG-02), negative input for capacity (NEG-01), and duplicate unique keys (NEG-03, NEG-04).
- Integrity: We confirmed that database constraints prevent actions that would corrupt the data, such as duplicate enrollment (INT-01) and orphan record deletion (INT-02, INT-03).

Part 2: Test Dataset Review

Minimal Test Dataset Structure

We utilized the provided SQL script to establish a baseline state for testing. This dataset is concise yet sufficient to cover all acceptance criteria.

Entity	Count	Key Test Functionality Enabled
Users	4	All three roles + one extra student (stu2)
Sections	2	Section 1 (Normal enrollment, used for grading) / Section 2 (Capacity=2, used for "full section" test)
Enrollments	2	stu1 is enrolled (for dropping/grading tests); stu2 is enrolled (to nearly fill Section 2)
Grades	3	Sample scores exist for stu1 to verify grade viewing/transcript export

Part 3: Test Summary

University ERP System Test Execution Results

We are pleased to report that the testing phase concluded successfully with a 100% pass rate across all categories.

Test Execution Summary

Category	Total Tests	Passed	Failed	Pass Rate
Login & Roles	5	5	0	100%

Student Features	9	9	0	100%
Instructor Features	7	7	0	100%
Admin Features	8	8	0	100%
Maintenance Mode	5	5	0	100%
Security & Auth	5	5	0	100%
Exports	3	3	0	100%
Edge/Negative	8	8	0	100%
Data Integrity	4	4	0	100%
UI/UX	4	4	0	100%
Performance	2	2	0	100%
TOTAL	60	60	0	100%

Key Findings

Core Functionality Verification

The main flows for each user role were confirmed as fully operational:

- Registration and Grading: Students can register/drop courses and view grades. Instructors can define components, enter scores, and compute finals.
- System Management: Administrators successfully managed users, courses, sections, and the critical Maintenance Mode toggle.

- Data Handling: All CSV export and database restore functions worked as expected, proving the system's ability to handle data lifecycle events.

Security and Access Control Verification

The project's strongest features, security and access control, were validated:

- The separation between the Auth DB (containing only hashes) and the ERP DB (containing only profile data) was confirmed.
 - The Account Lockout feature functioned correctly, preventing further attempts after five failed logins.
 - Role-Based Access Control was consistently enforced; no user could view or modify data outside their authorized scope.

Conclusion

Based on the execution of all 60 test cases, the University ERP System has met all project requirements and acceptance criteria. We found no outstanding issues and recommend the system is ready for submission.