

AP Test Summary: University ERP

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1 Test Plan

1.1 Overview

This Test Plan outlines the functional, negative, UI, and security tests carried out for the University ERP System. The purpose is to validate that all major workflows (Admin, Instructor, and Student) function correctly and satisfy the requirements defined in the project specification.

All tests were performed using a local MySQL instance populated with the provided seed data. The system was executed via the project's `LoginView` entry point.

1.2 Test Environment

- **Operating System:** macOS / Windows 11
- **JDK Version:** Java JDK 24
- **Database:** MySQL 8.0 (auth_db and erp_db)
- **Dependencies:** Java Swing, MySQL Connector/J, JBCrypt, OpenCSV
- **Seed Data:**
 - `short_seed_data.sql` (Used for primary functional testing)
 - `long_seed_data.sql` (Used for load/scroll testing)

2 Acceptance Tests

2.1 A. Login and Authentication

Test Case	Expected Outcome
Login with Admin (admin1 / a1)	Admin Dashboard opens successfully.
Login with Instructor (inst1 / i1)	Instructor Dashboard opens successfully.
Login with Student (stu1 / s1)	Student Dashboard opens successfully.
Login with Student 2 (stu2 / pass123)	Student Dashboard opens successfully.
Login with incorrect password	Error: "Incorrect username or password."
Login with non-existent user	Error: "Incorrect username or password."

2.2 B. Student Module Tests

Test Case	Expected Outcome
1. Course Catalog	
Browse Course Catalog	Table loads with Code, Title, Credits, and Instructor Name.
2. Registrations	

Register for available section	Success message; "Enrolled / Cap" count increases.
Register for full section	Error: "Registration Failed: Section is full."
Register for same section twice	Error: "Already registered."
Drop a registered course	Success; removed from "My Enrolled Sections".
Attempt to Register/Drop after deadline	Error: "Deadline passed."
Attempt to Register during Maintenance	Error: "System is in Maintenance Mode."
3. Grades & Transcript	
View My Grades	Shows grouped list: Course Header → Components → Final Grade.
Download Transcript	CSV file generated; contains formatted grade report.

2.3 C. Instructor Module Tests

Test Case	Expected Outcome
1. Sections List	
View Assigned Sections	Only sections assigned to <code>inst1</code> appear in the table.
2. Grade Entry	
Load Students for Section	List of enrolled students appears with pre-filled rows (Quiz, Midsem, Endsem).
Enter/Save Valid Grade	Success message; "Saved X grade entries".
Enter Score > Max (e.g., 25 for Quiz 20)	Error: "Score exceeds max limit".
Compute Final Grades	Grades calculated (Total = Quiz+Mid+End); Letter grade assigned (A/B/C/D/F).
Attempt to Save during Maintenance	Error: "System is in Maintenance Mode."

2.4 D. Admin Module Tests

Test Case	Expected Outcome
1. User Management	
Create new Student User	Entry created in <code>auth_db</code> ; Profile created in <code>erp_db</code> .
Create new Admin User	Entry created in <code>auth_db</code> .
View All Users	Table displays Username and Role for all system users.
2. Course/System Management	
Create new Course	Appears in Course Catalog.
Set Deadlines	Registration and Drop deadlines updated in database.
Toggle Maintenance ON	Global alert "SYSTEM UNDER MAINTENANCE" appears on all dashboards.
Toggle Maintenance OFF	Global alert resets; operations resume.

3 Negative / Edge Case Tests

Test Case	Observation
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Instructor inputs negative score	Error: "Invalid score number."
Student drops course with existing grades	System handles Foreign Key constraint (deletes grades first), then drops enrollment.
Admin creates duplicate username	Error: "Username might already exist."
Access Dashboard without Login	Not possible; application starts at LoginView.

4 Security Tests

- **Password Storage:** Verified in MySQL Workbench that `users_auth` table contains only BCrypt hashes (starting with `$2a$...`), not plain text.
- **SQL Injection:** Verified that inputs (e.g., usernames like `' OR '1'='1`) are handled safely via `PreparedStatement`.
- **Account Lockout:** After 3 failed login attempts, the account status changes to 'locked' in the database.

5 UI/UX Tests

- **Layout:** Dashboards resize correctly; GridBagLayout keeps forms centered.
- **Visuals:** IIIT-Delhi logo loads correctly from `src/`; Buttons have consistent styling.
- **Feedback:** All major actions (Save, Delete, Register) provide `JOptionPane` feedback (Success/Error).

6 Test Summary

This section presents a concise summary of all major functional areas tested in the University ERP System. All tests were executed on the final integrated build.

Test Category	Status	Remarks
Login & Authentication	PASS	Role-based routing and BCrypt verification working perfectly.
Student Course Catalog	PASS	Cross-database join works; Instructor names display correctly.
Student Registration	PASS	Capacity checks, duplicate checks, and deadline enforcement verified.
Student Grades	PASS	View grouped by course; Transcript CSV export verified.
Instructor Gradebook	PASS	Validation logic (Max Score) and Auto-calculation working.
Instructor Stats	PASS	Duplicate entry filtering works; Stats calculated correctly.
Admin User Management	PASS	Admin/Instructor/Student creation successful.
Maintenance Mode	PASS	Effectively blocks write operations for non-admins.
Database Constraints	PASS	Foreign Keys and Unique Constraints enforced.
Security	PASS	Passwords hashed; Account lockout active.

Table 6: Final Test Summary