

TEST PLAN

1. Objective

The purpose of this Test Plan is to verify the functionality, data integrity, and access control of the University ERP desktop application, developed using Java Swing and MySQL. It ensures each user role, Admin, Instructor, and Student, performs actions allowed by their privileges while maintaining data security and stability.

2. Scope

The testing includes: - User authentication via Auth DB (with bcrypt password hashes). - Role-based dashboards and restricted permissions. - Course registration, grades, and transcript management. - Instructor grade management and reporting. - Admin-level configuration, user management, and maintenance control. - Bonus tests: account lockout, CSV/PDF export/import, and UI feedback dialogs.

3. Test Environment

Component	Configuration
Operating System	Windows 11
Java Version	JDK 24
IDE	IntelliJ IDEA 2025.1.4
Database	MySQL 8.0
Libraries	JDBC, FlatLaf, BCrypt, OpenCSV, OpenPDF
Databases	auth_db , erp_db (linked via user_id)
Connection	JDBC connections from ERPDatabase.java & AuthDatabase.java

4. Test Data and Accounts

Username	Role	User ID	Description
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admin1 (password - pass123)	ADMIN	1	Manages all users and settings
inst1 (password - pass123)	INSTRUCTOR	2	Computer Science faculty
stu1 (password - pass123)	STUDENT	3	B.Tech 2nd-year student
stu2 (password - pass123)	STUDENT	4	B.Tech 2nd-year student

Courses and Sections

Code	Title	Credits	Section	Instructor	Time
DS101	Data Structures	4	A1	inst1	Mon 10–12
IP102	Introduction to Programming	3	B2	inst1	Wed 9–11
DM103	Discrete Mathematics	4	C3	inst1	Fri 2–4

Initial

- Data stu1 is enrolled in DS101.
- stu2 is free for registration and drop tests.

5. Functional Test Cases

A. Login & Authentication

- Valid login - Logs into correct dashboard per role.
- Invalid password (5 attempts) - Locks account and displays warning.
- Admin unblocks user - User restored to active status.
- Password hash check - No plaintext passwords, only bcrypt hashes.

B. Student Role

- View catalog - Lists all courses with capacity and instructor.
- Register for section - Works only if seat available; no duplicates.

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- Drop section - Permitted before deadline; blocked after.
- View timetable - Displays all registered courses.
- View grades - Shows components and final grade.
- Export transcript - Exports successfully to CSV/PDF.

C. Instructor Role

- My Sections view - Displays only instructor's own sections.
- Add component scores - Inserts quiz/midterm/endsem marks.
- Compute final grades - Uses 20/30/50 weighted rule correctly.
- View stats - Displays average, min, max, grade distribution.
- Import grades (CSV) - Imports valid rows; skips invalid ones.
- Export grades (CSV) - Saves grade data correctly.

D. Admin Role

- Add user - Creates linked records in Auth and ERP DBs.
- Add course/section - Instantly reflected in the catalog.
- Assign instructor - Successfully links via user_id.
- Delete course/section - Performs safe cascade deletions.
- Toggle maintenance mode - Blocks non-admin edits.
- Unblock user - Restores access for blocked accounts.

6. Edge and Negative Tests

- Duplicate enrollment - Blocked with clear message.
- Register full section - Denied with "Section full" alert.
- Instructor editing others' section - Access blocked.
- Student accessing another's record - Denied securely.
- Maintenance mode active - Write actions blocked; view only.
- Invalid capacity or score - DB validation error triggered.

7. Non-Functional Tests

Type	Description	Result
Performance	Catalog (100+ entries) loads under 2s	Passed
Security	All passwords hashed; role checks enforced	Passed
UI/UX	Tables sortable; clear messages & icons	Passed
Error Handling	Friendly and consistent dialogs	Passed

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Maintenance	Toggle works instantly across UI	Passed
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8. Bonus / Additional Tests

Feature	Description	Status
Account Lockout	Locks after 5 failed logins	Implemented
CSV Import/Export	For Instructor grade management	Implemented
"Please wait" dialogs	Added for long-running tasks	Implemented
Sorting & Filtering	Enabled via setAutoCreateRowSorter(true)	Implemented

9. Conclusion

All acceptance criteria and bonus features passed testing successfully. The system demonstrates: - Stable performance across roles - Secure authentication and password handling - Accurate grade computation and reporting - Clear UI with consistent access control.
