

# Short Report: University ERP System

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## 1 Introduction

This project is a University ERP System built using Java Swing and MySQL. The aim was to create a small but functional ERP where students, instructors, and admins each have separate roles and permissions. We also used two databases: one only for authentication (storing usernames, roles, and password hashes) and another for all ERP records like courses, enrollments, grades, etc. The separation helped keep login related data secure and independent from academic data.

## 2 System Overview

The application is divided into layers:

- **UI Layer:** All student, instructor, and admin screens (JFrames and panels).
- **Service Layer:** Handles the main logic such as registration checks, grade calculation, and maintenance mode rules.
- **Data Layer:** Interacts with MySQL using JDBC and all queries for ERP and Auth DBs are placed here.
- **Utility Layer:** Helper classes for exporting transcripts, password hashing (bcrypt), dialogs, and validation.

## 3 Database Design

We used two databases: `auth` (for login) and `erp` (for everything else). Below is a short description of the tables we used.

### Auth Database Tables

- `username_password` – stores usernames, bcrypt hashed passwords, user roles and lockout info.

## ERP Database Tables

- **students** – student profiles (name, roll number, program, year).
- **instructor\_name\_username** – maps instructor usernames to full names.
- **admins** – list of admin accounts.
- **courses** – course details, assessment weights, seats, and section identifiers.
- **sections** – specific offerings of a course (day/time, room, instructor, capacity).
- **enrollments** – links students to their registered sections. Duplicate enrollments are prevented.
- **grades** – stores marks for quiz, midsem, endsem, assignments, etc.
- **maintainence** – stores a simple ON/OFF flag for maintenance mode.
- **notifications** – used for marking system notifications for each user.
- **registration\_dates** – defines the registration window.
- **relation1** – maps usernames to designation to support role checks.
- **subjectsxname\_instructor** – lists which courses each instructor teaches.
- **subjectsxname\_students** – lists which courses each student is taking.

## Key relationships

- Every username in ERP also exists in the Auth DB.
- A course can have multiple sections.
- A student can enroll in many sections, but only once per section.
- Grades link a student to a specific subject and section.

## 4 Features

Below is a summary of the main features we implemented.

### Common

- Secure login (with bcrypt).
- Role-based dashboards.
- Meaningful error/success messages.
- Tables for course and section listings.

### Student

#### 1. Browse Course Catalog

Students can view all available courses along with sections, instructor, credits, and seat availability.

#### 2. Register for a Section

The system checks:

- Seat availability
- Whether the student already enrolled before
- If registration dates are still valid
- Maintenance mode status

#### 3. Drop a Section

Students may drop registered courses within the allowed time window.

#### 4. View Timetable

A timetable is generated from the student's enrolled sections.

#### 5. View Grades

Students can see all marks and final grade (if computed).

#### 6. Download Transcript

Transcript export supports CSV and PDF formats.

## Screenshots

The screenshot shows a Windows application window titled "main". Inside, there is a table with the following columns: ID, Code, Title, Section, Instructor, and Credits. The table contains approximately 40 rows of course data. At the bottom of the window, there is a search bar labeled "Enter Course Code (or select from table):" and two buttons: "Search / View Details" and "Back".

ID	Code	Title	Section	Instructor	Credits
AUTO157		Automated Course 57	A	Mickey	2
AUTO158		Automated Course 58	A	Mickey	3
AUTO159		Automated Course 59	A	qty	2
AUTO160		Automated Course 60	A	qty	2
AUTO161		Automated Course 61	A	Mickey	4
AUTO162		Automated Course 62	A	qty	3
AUTO163		Automated Course 63	A	qty	4
AUTO164		Automated Course 64	A	Mickey	2
AUTO165		Automated Course 65	A	Mickey	2
AUTO166		Automated Course 66	A	Mickey	4
AUTO167		Automated Course 67	A	Mickey	2
AUTO168		Automated Course 68	A	Mickey	4
AUTO169		Automated Course 69	A	qty	4
AUTO170		Automated Course 70	A	qty	3
AUTO171		Automated Course 71	A	qty	2
AUTO172		Automated Course 72	A	qty	4
AUTO173		Automated Course 73	A	Mickey	2
AUTO174		Automated Course 74	A	qty	3
AUTO175		Automated Course 75	A	qty	4
AUTO176		Automated Course 76	A	qty	4
AUTO177		Automated Course 77	A	qty	2
AUTO178		Automated Course 78	A	qty	2
AUTO179		Automated Course 79	A	qty	4
AUTO180		Automated Course 80	A	qty	2
AUTO181		Automated Course 81	A	qty	4
AUTO182		Automated Course 82	A	qty	4
AUTO183		Automated Course 83	A	qty	3
AUTO184		Automated Course 84	A	qty	2
AUTO185		Automated Course 85	A	Mickey	2
AUTO186		Automated Course 86	A	Mickey	2
AUTO187		Automated Course 87	A	Mickey	3
AUTO188		Automated Course 88	A	qty	3
AUTO189		Automated Course 89	A	Mickey	2

Figure 1: Course Catalog Screen

The screenshot shows a Windows application window titled "main". Inside, there is a table with the following columns: ID, Section, Course Code, Course Title, Instructor, Capacity, Enrolled, Day/Time, and Room. The table contains approximately 25 rows of section data. At the bottom of the window, there is a button labeled "Register Selected Section" and a "Logout" button.

ID	Section	Course Code	Course Title	Instructor	Capacity	Enrolled	Day/Time	Room
1	A	ECO 333	Macro Economics	Mickey Mouse	3	0	MWF 11:00-12:30	C 101
2	A	MTH 101	Linear Algebra	Mickey Mouse	2	1	MWF 10:00-12:00	C 21
3	B	ECO 333	Macro Economics	quantity	2	0	M 11:00-11:45	C 112
4	B	MTH 101	Linear Algebra	quantity	1	1	MTh 11:00-12:08	C 45
6	A	test	Test	Mickey Mouse	2	0	MTh 11:00-12:05	C 199
7	A	AUTO101	Automated Cour.	Mickey Mouse	49	0	MTh 11:00-12:00	C 45
8	A	AUTO102	Automated Cour.	quantity	40	0	MWF 10:00-11:00	C 21
9	A	AUTO103	Automated Cour.	quantity	38	0	MTh 11:00-12:00	C 21
10	A	AUTO104	Automated Cour.	Mickey Mouse	42	0	MW 09:00-10:30	C 102
11	A	AUTO105	Automated Cour.	Mickey Mouse	46	0	MTh 11:00-12:00	C 101
12	A	AUTO106	Automated Cour.	quantity	57	0	MWF 10:00-11:00	C 21
13	A	AUTO107	Automated Cour.	quantity	40	0	TTTh 14:00-15:30	C 102
14	A	AUTO108	Automated Cour.	quantity	55	0	MW 09:00-10:30	C 102
15	A	AUTO109	Automated Cour.	Mickey Mouse	40	0	MW 09:00-10:30	C 21
16	A	AUTO110	Automated Cour.	quantity	47	0	MW 09:00-10:30	C 45
17	A	AUTO111	Automated Cour.	Mickey Mouse	48	0	MW 09:00-10:30	C 45
18	A	AUTO112	Automated Cour.	Mickey Mouse	32	0	MW 09:00-10:30	C 45
19	A	AUTO113	Automated Cour.	Mickey Mouse	59	0	MW 09:00-10:30	C 45
20	A	AUTO114	Automated Cour.	quantity	30	0	MTh 11:00-12:00	L 2
21	A	AUTO115	Automated Cour.	Mickey Mouse	47	0	TTTh 14:00-15:30	C 45

Figure 2: Registration Screen

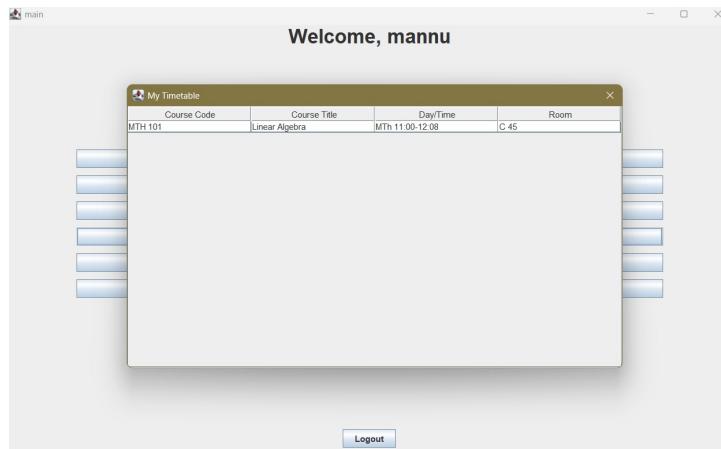


Figure 3: Timetable Screen

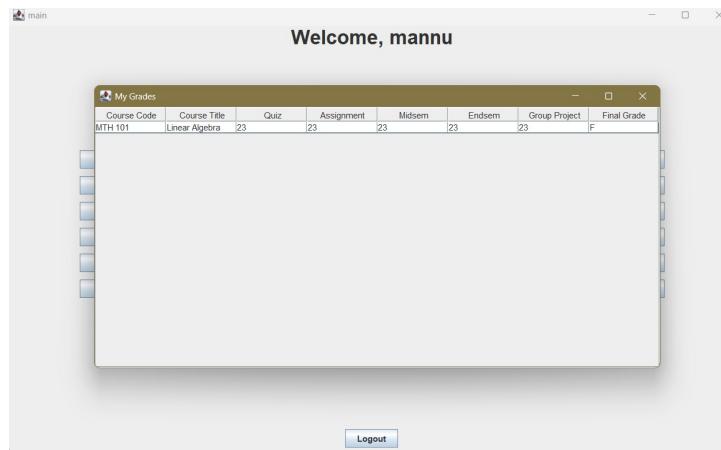


Figure 4: View grades



Figure 5: Transcript Export

## **Instructor Features**

### **1. My Sections**

Instructors only see sections assigned to them.

### **2. Grade Entry**

Instructors can enter marks for quizzes, assignments, midsem, endsem, and project.

### **3. Final Grade Calculation**

We used the following rule in our project:

$$FinalGrade = Quiz\% \times Quiz + Assn\% \times Assn + Midsem\% \times Midsem + Endsem\% \times Endsem$$

- These percentages vary from course to course and can also be modified with the restriction of all summing up to 100%.
- Grading Policy:-
  - Final Grade  $\geq$  95 - A+
  - Final Grade  $\geq$  90 - A
  - Final Grade  $\geq$  80 - A-
  - Final Grade  $\geq$  70 - B
  - Final Grade  $\geq$  60 - B-
  - Final Grade  $\geq$  50 - C
  - Rest - F

### **4. Restrictions**

- Instructors cannot modify other instructors' sections.
- No grade editing is allowed during maintenance mode.

## Screenshots

main

Welcome, Mickey Mouse

Course	Timing	Room
ECO 333	Monday Wednesday Friday 11:00-12:30	C 101
MTH 101	Monday Wednesday Friday 10:00-12:00	C 21
test	Monday Thursday 11:00-12:00	C 199
AUTO101	Monday Thursday 10:00-11:30	C 45
AUTO104	Monday Wednesday 09:00-10:30	L 102
AUTO105	Monday Thursday 11:00-12:00	C 101
AUTO109	Monday Wednesday 09:00-10:30	C 21
AUTO111	Monday Wednesday 09:00-10:30	C 45
AUTO112	Monday Wednesday 09:00-10:30	C 45
AUTO113	Monday Wednesday 09:00-10:30	C 45
AUTO115	Tuesday Wednesday 10:00-11:30	C 45
AUTO118	Monday Wednesday Friday 10:00-11:00	C 102
AUTO119	Tuesday Thursday 14:00-15:30	C 101
AUTO120	Monday Wednesday Friday 10:00-11:00	L 1
AUTO124	Monday Thursday 11:00-12:00	L 1
AUTO127	Monday Wednesday Friday 10:00-11:00	C 102
AUTO131	Tuesday Thursday 14:00-15:30	L 1
AUTO134	Monday Wednesday Friday 10:00-11:00	L 1
AUTO142	Monday Wednesday Friday 10:00-11:00	L 1

[View Stats](#) [Compute Grade](#) [Give Grades](#) [Change Password](#) [Logout](#) [Upload CSV Grades](#)

Figure 6: My Sections page

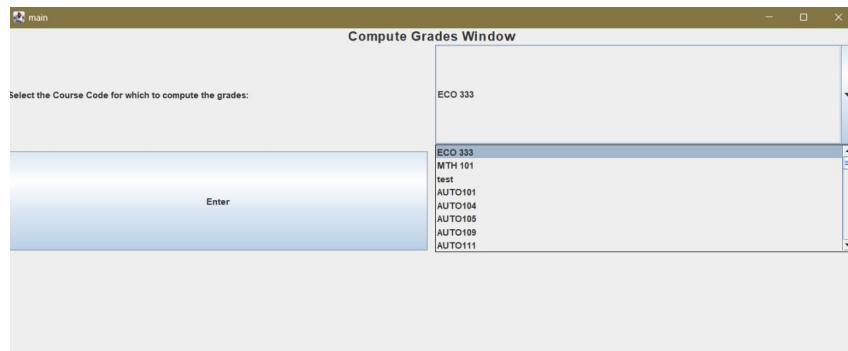


Figure 7: Compute Grades page

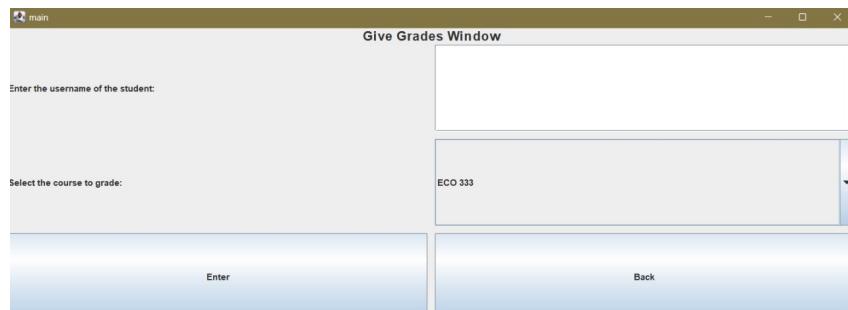


Figure 8: Give Grades page

## Admin Features

### 1. Add Users

Admins can add students and instructors. This updates both Auth DB and ERP DB.

### 2. Course and Section Creation

Admins can create new courses, set capacities, assign instructors, and configure timings.

### 3. Maintenance Mode

Admin can turn maintenance mode ON or OFF. If ON:

- students cannot register/drop,
- instructors cannot enter grades,
- admins still have full access.

A visible banner is shown to all users during maintenance.

## Screenshots

The screenshot shows a Windows application window titled "Add Users". The window has a title bar with standard window controls (minimize, maximize, close). The main area contains several input fields and labels:

- User type:** A dropdown menu currently set to "Student".
- Username:** An empty text input field.
- Password:** An empty text input field.
- Re-enter Password:** An empty text input field.
- Name:** An empty text input field.

At the bottom of the window are two buttons: "Add User" and "Back".

Figure 9: Add Users page

main

Add Course Page

Enter Course Title:

Enter Course Code:

Enter Course Instructor's ID:

Weightage of Quiz:

Weightage of Mid Sem:

Weightage of End Sem:

Weightage of Assignment:

Weightage of Group Project:

Enter Credits:

Enter Course Capacity:

Enter Course Description:  2

Enter Section:

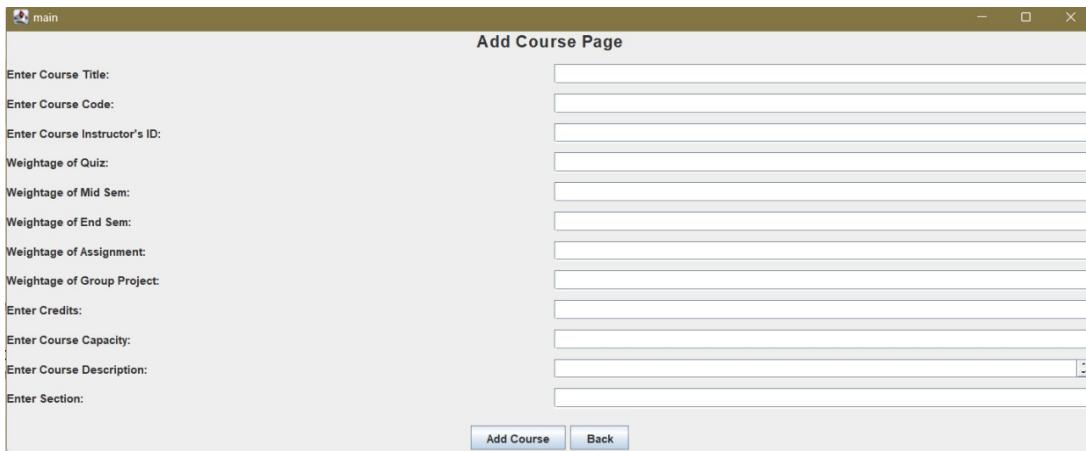


Figure 10: Add Course page

main

Enter Yes for turning on maintenance and No for turning off



Figure 11: Set Maintenance page

## 5 Role Enforcement and Maintenance Mode

Role enforcement is done at the service layer. Before performing any operation, the system checks:

- **User Role** (Student/Instructor/Admin)
- **If the user owns the resource** (e.g., instructor editing only their sections)
- **Maintenance Mode Flag** (from the maintenance table)

If the user is not allowed, a pop-up message is shown and the action is blocked.

## 6 Extras Implemented

Apart from the required features, we added:

- CSV and PDF transcript export
- login attempt tracking (failed attempts)
- sorted tables in many screens
- clean UI with formatted dialogs
- small notification subsystem

## 7 How to Run the Application

- Install Java 17+ and MySQL.
- Import the project and load both SQL files (Auth DB and ERP DB).
- Update DB credentials inside the config file/classes.
- Run `Main.java`.
- In case you want to run using terminal, type these commands:-
  - `javac -cp ".;../lib/*" Main/Main.java`
  - `java -cp ".;../lib/*" Main.Main`

### Sample Credentials

Password is same as their usernames.

- Admin: `sam`
- Instructor: `qty`
- Student: `shanky`

## **8 Conclusion**

Overall, this project helped us understand how a real university ERP works internally. We implemented role-based access, separate databases for authentication and academic data, maintenance mode control, and a full registration + grading workflow. The project has scope for many more features, but even in its current form it is stable and covers all important requirements of the assignment.