

PROJECT REPORT

Hospital Appointment Management System

1. Introduction

During my internship, I developed a **Hospital Appointment Management System** using Flask and SQLite. The project aims to simplify the process of booking, managing, and monitoring hospital appointments through a web-based platform.

The system allows patients to book appointments and enables administrators to manage doctors, approve appointments, and monitor revenue.

2. Problem Statement

Many small clinics and hospitals still rely on manual appointment systems, which can lead to:

- Scheduling conflicts
- Lack of proper record management
- Poor communication between patients and hospital staff
- Difficulty in tracking revenue and appointments

The objective was to build a simple, efficient, and user-friendly web application to automate this process.

3. Objectives

- To develop an online appointment booking system
 - To implement role-based authentication (Admin & Patient)
 - To prevent double booking of time slots
 - To provide appointment status tracking (Pending / Approved / Rejected)
 - To generate appointment receipts
 - To calculate hospital revenue automatically
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4. Technology Stack

Frontend:

- HTML
- CSS
- JavaScript

Backend:

- Python (Flask Framework)

Database:

- SQLite

ORM:

- SQLAlchemy

Other Libraries:

- Werkzeug (Password Hashing)
-

5. System Architecture

The system follows a three-layer architecture:

1. **Presentation Layer** – HTML templates and UI
2. **Application Layer** – Flask routes handling logic
3. **Database Layer** – SQLite database managed via SQLAlchemy

The application runs locally on Flask development server.

6. Modules Description

1. Authentication Module

- User Registration
- Secure Login
- Password hashing

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- Role-based access (Admin / Patient)

2. Patient Module

- Book appointment
- Auto-assign doctor based on symptoms
- Manual doctor selection
- Cancel appointment
- View appointment history
- Download receipt

3. Admin Module

- Add/Delete doctors
- Approve/Reject appointments
- View total patients
- View total appointments
- Revenue calculation
- Export appointment data (CSV)

4. Contact Module

- Patient can send message
- Message stored in database

7. Database Design

Main Tables:

1. User

- id
- name
- email
- password

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- role
- phone

2. Doctor

- id
- name
- specialization
- experience

3. Appointment

- id
- patient_id
- doctor_id
- date
- time
- symptoms
- mode (Online / Offline)
- meet_link
- status

4. ContactMessage

- id
- name
- email
- message

8. Key Features

- Role-based login system
- Appointment status tracking

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- Prevention of double booking
 - Automatic doctor assignment based on symptoms
 - Online consultation with generated Meet link
 - Revenue calculation dashboard
 - CSV export for admin
 - Flash notifications for user actions
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9. Security Implementation

- Passwords are hashed using Werkzeug
 - Session-based authentication
 - Role-based route protection
 - Input validation for booking
 - Prevention of unauthorized receipt access
-

10. Testing

The system was tested for:

- Registration and login functionality
- Booking validation (past date restriction)
- Double booking prevention
- Admin approval workflow
- Revenue calculation accuracy
- Contact form submission

All core functionalities worked as expected.

11. Limitations

- No real payment gateway integration

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- No email notifications
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12. Future Enhancements

- Integration with online payment gateway
 - Email/SMS appointment confirmation
 - Doctor availability scheduling
 - Advanced analytics dashboard
 - Real-time notification system
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13. Conclusion

The Hospital Appointment Management System successfully automates the process of booking and managing hospital appointments.

The project demonstrates practical implementation of:

- Full-stack web development
- Database integration
- Role-based authentication
- Backend logic handling
- Data validation and security practices

This internship project enhanced my understanding of Flask, database management, and real-world application development.

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The screenshot shows the homepage of the CityHospital website. At the top left is the logo "CityHospital" with a heart icon. The top right features a navigation bar with links: Home, About, Departments, Contact, Login, and Register. The main banner has a blue-toned image of a hospital building at night. Overlaid on the banner is the text "Your Health Is Our Priority" in large white letters, followed by "Expert medical treatment with state-of-the-art facilities." Below this are two buttons: "Book Appointment" and "Learn More". At the bottom of the banner is a copyright notice: "© 2026 City Hospital Management System. All Rights Reserved." Below the banner, a section titled "Meet Our Specialists" displays seven doctor profiles in cards:

- Dr. Sarah Jenkins**
Cardiology
15 Years Exp.
[Book Now](#)
- Dr. Mike Ross**
Neurology
10 Years Exp.
[Book Now](#)
- Dr. Emily Blunt**
Pediatrics
8 Years Exp.
[Book Now](#)
- Dr. John Doe**
Orthopedics
12 Years Exp.
[Book Now](#)
- Dr. Lisa Kudrow**
Dermatology
20 Years Exp.
[Book Now](#)
- Dr. Raj Malhotra**
General Physician
18 Years Exp.
[Book Now](#)

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Home About Departments Contact Login Register

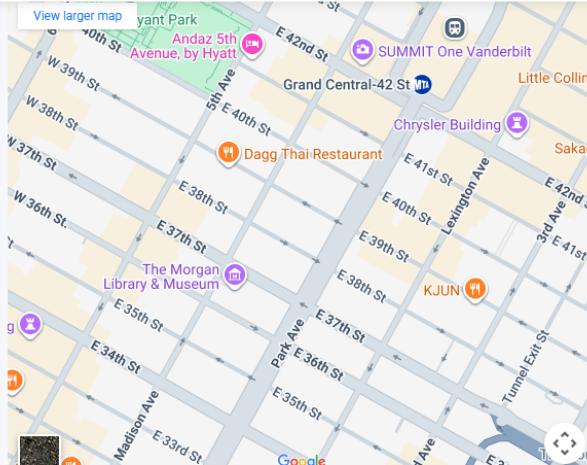
Send us a Message

Name

Email

Message

Send Message



City Hospital
Providing world-class healthcare with a focus on patient safety and comfort.

Quick Links
Patient Portal
Find a Doctor
Emergency Contact

Contact Us
📍 No. 45, MG Road, Indiranagar, Bangalore, Karnataka 560038, India
📞 +91 98765 43210
✉️ info@cityhospital.in

CityHospital

Home About Departments Contact Login Register

Patient Portal
Please login to manage your appointments

Email Address

Password

Secure Login

New patient? [Create an account](#)

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Home About Departments Contact Dashboard Logout

Welcome, Khurram Rashid

+ New Appointment

0
Total Appointments

0
Pending Approval

0
Confirmed

Appointment History

Doctor	Date & Time	Status	Actions
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Home About Departments Contact Dashboard Logout

Book an Appointment

Date

18-02-2026



Time

02:00 PM



Describe Your Symptoms

Fever

We will automatically assign the best specialist for you.

OR Select Manually

Select Doctor (Optional)

-- Let System Assign --



Consultation Fee: ₹500.00

🔒 Secure Payment Simulation

Confirm & Pay

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[Home](#) [About](#) [Departments](#) [Contact](#) [Dashboard](#) [Logout](#)

Appointment Confirmed!

INVOICE

City Hospital Appointment

Date: 2026-02-15

Patient Name: Khurram Rashid
Doctor: Dr. Raj Malhotra (General Physician)
Appointment Date: 2026-02-18 at 02:00 PM
Symptoms: Fever
Payment Status: PAID

Total: ₹500.00

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[Back to Dashboard](#)



[Home](#) [About](#) [Departments](#) [Contact](#) [Dashboard](#) [Logout](#)

Welcome, Khurram Rashid

[+ New Appointment](#)

1

Total Appointments

1

Pending Approval

0

Confirmed

Appointment History

Doctor

Date & Time

Status

Actions

Dr. Raj Malhotra
General Physician

2026-02-18
02:00 PM

Pending

[Receipt](#) [Cancel](#)

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Admin Dashboard

 Export CSV

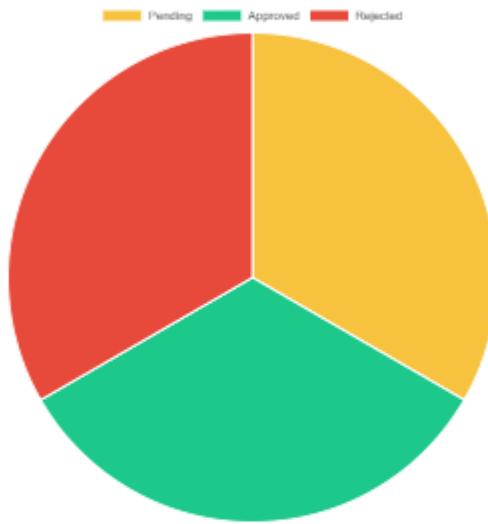
1
Patients

6
Doctors

3
Appointments

₹500
Revenue

Appointment Status



Add New Doctor

Name

Specialization

Experience

[Add Doctor](#)

Recent Appointments



[Filter](#)

Patient	Doctor	Date	Status	Actions
	Dr. Raj Malhotra	2026-02-28 11:00 AM	Approved	
	Dr. Sarah Jenkins	2026-02-19 11:00 AM	Rejected	
Khurram Rashid	Dr. Raj Malhotra	2026-02-18 02:00 PM	Pending	 