# Hospital Appointment System - Project Specification & Marking Guide

Audience: Epita Course

## 1. Project Overview

The Hospital Appointment System is a web-based application built using either .NET Core MVC / Razor Pages or Blazor and a SQL Database. It allows patients to book appointments with doctors while hospital administrators manage doctors and schedules.

## 2. Functional Requirements

### 2.1 User Roles & Authentication

- Patients: Can register, log in, book, view, and cancel appointments.

- Doctors: Can log in, view their schedules, approve or reject appointments.

- Admins: Manage doctors, patients, and appointments.

### 2.2 User Management

- Secure patient registration and profile management.

- Admin-controlled doctor registration and schedule setup.

- Role-based authentication using Microsoft Identity.

### 2.3 Appointment Booking & Management

- Patients can book, view, and cancel appointments.

- Doctors can approve, reject, and complete appointments.

- Admins can view and manage all appointments.

- System prevents double booking and scheduling conflicts.

### 2.5 Search & Filtering

- Patients can search for doctors by specialization or name.

- Appointments can be filtered by date, doctor, or status.

## 3. Database Design & Security

The database should include tables for Users, Doctors, Appointments, and Notifications. Ensure proper relationships, foreign keys, and data integrity constraints.

Security measures should include role-based access control, parameterized queries to prevent SQL injection (Use EF Core) , and password hashing for authentication (already handled).

## 4. Marking Guide (100 Marks)

### 4.1 Functionality (40 Marks)

User Authentication & Role Management: 10 Marks

Appointment Booking & Management: 15 Marks

Doctor Scheduling System: 5 Marks

Notifications & Reminders: 5 Marks

Search & Filtering: 10 Marks

### 4.2 Database Design & Implementation (20 Marks)

Schema & Relationships: 10 Marks [must include drawing]

SQL Queries & Performance: 5 Marks [using EF Core]

Data Integrity & Validation: 5 Marks [mostly validation]

### 4.3 Code Quality & Security (20 Marks)

Code Structure & Maintainability: 10 Marks

Security & Validation: 10 Marks

### 4.5 Documentation & Presentation (10 Marks)

Code Documentation: 5 Marks

Presentation & Testing: 5 Marks

Useful References

User Stories

### 1. ****Book an Appointment****

**User Story:**  
As a patient, I want to book an appointment with a doctor so that I can receive medical care at my preferred date and time.

**Acceptance Criteria:**

* The patient should be able to select a doctor, date, and time for the appointment.
* The system should prevent double booking for the same doctor and time slot.
* The system should confirm the booking and provide a reference number.
* The system should notify the patient via email/SMS after successful booking.

### 2. ****View Available Appointments****

**User Story:**  
As a patient, I want to see available time slots for my preferred doctor so that I can choose a convenient appointment time.

**Acceptance Criteria:**

* The system should display available appointment slots based on the selected doctor and date.
* The system should prevent displaying fully booked slots.
* The patient should be able to filter by date and doctor.

### 3. ****View My Appointments****

**User Story:**  
As a patient, I want to view a list of my upcoming and past appointments so that I can keep track of my medical visits.

**Acceptance Criteria:**

* The system should display upcoming and past appointments.
* Each appointment entry should include the doctor’s name, date, time, and status.
* Patients should be able to filter appointments by upcoming, past, and canceled.

### 4. ****Receive Appointment Confirmation****

**User Story:**  
As a patient, I want to receive a confirmation notification when I successfully book an appointment so that I am sure my booking is completed.

**Acceptance Criteria:**

* The system should generate a confirmation message after booking.
* The confirmation should include the doctor’s name, date, time, and location.
* The system should send an email and/or SMS notification with appointment details.

### 5. ****Reschedule an Appointment****

**User Story:**  
As a patient, I want to reschedule an appointment so that I can change my booking to a more suitable time if needed.

**Acceptance Criteria:**

* The patient should be able to select a new date and time for an existing appointment.
* The system should only allow rescheduling if done at least 48 hours in advance.
* The system should update the appointment and notify the patient.

### 6. ****Cancel an Appointment****

**User Story:**  
As a patient, I want to cancel an appointment at least 48 hours in advance so that I can free up the slot if I am unable to attend.

**Acceptance Criteria:**

* The system should allow cancellation only if the appointment is more than 48 hours away.
* The patient should receive a cancellation confirmation.
* The canceled slot should become available for other patients.

### 7. ****Receive Cancellation Restrictions Warning****

**User Story:**  
As a patient, I want to be informed if I try to cancel an appointment less than 48 hours before the scheduled time so that I understand the policy restrictions.

**Acceptance Criteria:**

* If a patient attempts to cancel an appointment within 48 hours, they should receive an error message explaining the restriction.
* The system should suggest contacting the clinic for emergencies.

### 8. ****Receive Appointment Reminders****

**User Story:**  
As a patient, I want to receive reminders before my appointment so that I don’t forget to attend.

**Acceptance Criteria:**

* The system should send a reminder email/SMS 24 hours before the appointment.
* The reminder should include appointment details and instructions.

### 9. ****Search for a Doctor****

**User Story:**  
As a patient, I want to search for doctors by specialty, name, or location so that I can find the right doctor for my needs.

**Acceptance Criteria:**

* The patient should be able to search doctors by name, specialty, and location.
* The system should display matching doctors with availability.

### 10. ****Filter Appointments by Status****

**User Story:**  
As a patient, I want to filter my appointments by upcoming, past, and canceled so that I can quickly find relevant information.

**Acceptance Criteria:**

* Patients should be able to apply filters for upcoming, past, and canceled appointments.
* The system should display relevant appointments based on the selected filter.

### 11. ****Receive Notifications for Changes****

**User Story:**  
As a patient, I want to receive a notification if my appointment is changed or canceled by the doctor so that I can adjust my plans accordingly.

**Acceptance Criteria:**

* If an appointment is modified by the doctor, the patient should receive an email/SMS notification.
* If an appointment is canceled, the system should allow the patient to rebook.

### 12. ****Provide Feedback on an Appointment****

**User Story:**  
As a patient, I want to provide feedback after an appointment so that I can share my experience with the doctor and the service.

**Acceptance Criteria:**

* Patients should be able to rate and provide comments after an appointment.
* The system should allow feedback only for completed appointments.

### 13. ****Access Telehealth Appointments (if applicable)****

**User Story:**  
As a patient, I want to join a virtual consultation if I have booked a telehealth appointment so that I can consult with my doctor remotely.

**Acceptance Criteria:**

* The system should provide a secure link to join the telehealth session.
* The link should only be accessible at the appointment time.

### 14. ****Manage My Profile and Medical Information****

**User Story:**  
As a patient, I want to update my personal details and relevant medical history so that my doctor has accurate information about me.

**Acceptance Criteria:**

* The system should allow patients to edit their name, contact details, and medical history.
* The system should restrict changes to sensitive medical data that require approval.

### 15. ****View Appointment Policies****

**User Story:**  
As a patient, I want to easily access the cancellation and rescheduling policies so that I understand the rules before making changes.

**Acceptance Criteria:**

* The system should have a dedicated section explaining policies.
* The policy page should be accessible from the appointment booking and cancellation screens.

Here are user stories from the patient's perspective regarding prescriptions:

### 1. ****Receive a Prescription from My Doctor****

**User Story:**  
As a patient, I want to receive a prescription from my doctor so that I can get the necessary medication for my treatment.

**Acceptance Criteria:**

* The system should notify me when a doctor issues a prescription.
* I should be able to view the prescription details, including medication name, dosage, and instructions.
* I should be able to download or print the prescription if needed.

### 2. ****View My Prescriptions****

**User Story:**  
As a patient, I want to see a list of all my prescriptions so that I can track my medications and their status.

**Acceptance Criteria:**

* The system should display all my prescriptions, categorized as active, expired, or completed.
* Each prescription should include the medication name, dosage, instructions, and issue date.
* I should be able to filter prescriptions by status (e.g., active, expired).

### 3. ****Receive Notifications for New Prescriptions****

**User Story:**  
As a patient, I want to receive a notification when a doctor issues a new prescription so that I am aware of my treatment plan.

**Acceptance Criteria:**

* The system should send an email and/or SMS when a new prescription is issued.
* The notification should include a link to view the prescription details.

### 4. ****Request a Prescription Renewal****

**User Story:**  
As a patient, I want to request a renewal for my prescription so that I can continue my treatment if needed.

**Acceptance Criteria:**

* I should be able to request a renewal for eligible prescriptions.
* The system should notify me when the doctor approves or rejects my renewal request.
* If rejected, the system should provide the reason and suggest a consultation if needed.

### 5. ****Know When My Prescription is About to Expire****

**User Story:**  
As a patient, I want to be notified when my prescription is about to expire so that I can request a renewal if needed.

**Acceptance Criteria:**

* The system should notify me via email/SMS when my prescription is nearing its expiration date.
* The notification should be sent at least a few days before expiry.

### 6. ****Access My Prescription for Pharmacy Use****

**User Story:**  
As a patient, I want to share my prescription details with a pharmacy so that I can collect my medication easily.

**Acceptance Criteria:**

* I should be able to download or print my prescription.
* If digital verification is enabled, I should receive a secure code to share with the pharmacy.

### 7. ****Receive Updates If My Prescription is Changed or Canceled****

**User Story:**  
As a patient, I want to receive a notification if my doctor updates or cancels my prescription so that I can take appropriate action.

**Acceptance Criteria:**

* The system should send a notification if my doctor updates my prescription.
* If the prescription is canceled, I should see a reason and be advised on next steps.

Doctor User Stories

Here’s your updated list of **user stories** with **acceptance criteria** for the **doctor's perspective** in your health appointment app:

### ****Appointment Management****

#### 1. ****View Appointments****

**User Story:**  
As a doctor, I want to view my upcoming appointments so that I can prepare for patient consultations.

**Acceptance Criteria:**

* ✅ The doctor can log in and access the appointment dashboard.
* ✅ The system displays a list of upcoming appointments sorted by date and time.
* ✅ The appointment list includes patient name, date, time, and status.
* ✅ Past appointments are either archived or marked as completed.

#### 2. ****Filter Appointments****

**User Story:**  
As a doctor, I want to filter my appointments by date, patient name, or status so that I can quickly find relevant bookings.

**Acceptance Criteria:**

* ✅ The doctor can apply filters for date, patient name, or status (e.g., upcoming, completed, canceled).
* ✅ The system updates the list dynamically based on the selected filters.
* ✅ The doctor can reset filters to see the full appointment list.

#### 3. ****View Patient Details****

**User Story:**  
As a doctor, I want to see the patient’s details and medical history so that I can provide informed care during the consultation.

**Acceptance Criteria:**

* ✅ The doctor can click on an appointment to view patient details.
* ✅ The patient’s contact information, age, and reason for the visit are displayed.
* ✅ If authorized, the doctor can view past medical history.

#### 4. ****Receive Notifications****

**User Story:**  
As a doctor, I want to receive notifications when a new appointment is booked or canceled so that I can manage my schedule effectively.

**Acceptance Criteria:**

* ✅ The doctor receives a real-time notification for new bookings and cancellations.
* ✅ Notifications can be viewed in the app and optionally via email or SMS.
* ✅ Cancellations are only allowed at least 48 hours before the appointment.

#### 5. ****Mark Appointment as Completed****

**User Story:**  
As a doctor, I want to mark an appointment as completed so that I can keep track of which patients I have already seen.

**Acceptance Criteria:**

* ✅ The doctor can select an appointment and mark it as completed.
* ✅ The system updates the appointment status and removes it from the upcoming list.
* ✅ Completed appointments are stored for record-keeping.

#### 6. ****Reschedule Appointments****

**User Story:**  
As a doctor, I want to request a rescheduling of an appointment if I have an emergency so that I can ensure patient care continues smoothly.

**Acceptance Criteria:**

* ✅ The doctor can request a reschedule by selecting a new available time slot.
* ✅ The patient receives a notification about the reschedule request.
* ✅ The patient must confirm the new time for the appointment to be updated.

#### 7. ****Block Unavailable Slots****

**User Story:**  
As a doctor, I want to block specific time slots on my schedule so that patients cannot book during my unavailable hours.

**Acceptance Criteria:**

* ✅ The doctor can set unavailable time slots via the settings panel.
* ✅ Patients cannot book appointments in blocked slots.
* ✅ The system automatically updates availability based on blocked slots.

### ****Patient Interaction****

#### 8. ****Send Messages to Patients****

**User Story:**  
As a doctor, I want to send messages to patients regarding their appointments so that I can communicate important details.

**Acceptance Criteria:**

* ✅ The doctor can send messages to patients via the app.
* ✅ The system notifies the patient of new messages.
* ✅ Messages are stored for future reference.

#### 9. ****Request Additional Information****

**User Story:**  
As a doctor, I want to request additional medical information from a patient before their appointment so that I can prepare adequately.

**Acceptance Criteria:**

* ✅ The doctor can send a request for additional medical details.
* ✅ The patient receives a notification and can provide the requested details.
* ✅ The updated information is stored in the patient’s profile for reference.

#### 10. ****View Patient Medical History (if enabled)****

**User Story:**  
As a doctor, I want to access a patient’s medical history (if they have granted permission) so that I can provide better care.

**Acceptance Criteria:**

* ✅ The system allows doctors to request access to a patient’s medical history.
* ✅ Patients must approve the request before the doctor can view past records.
* ✅ Medical history data is displayed securely.

### ****Administrative & Reporting****

#### 11. ****Generate Daily Schedule Reports****

**User Story:**  
As a doctor, I want to generate a report of my daily or weekly appointments so that I can plan my workload efficiently.

**Acceptance Criteria:**

* ✅ The doctor can generate a report for a selected date range.
* ✅ The report includes patient names, appointment times, and statuses.
* ✅ Reports can be exported as PDFs or CSV files.

#### 12. ****Export Appointment Data****

**User Story:**  
As a doctor, I want to export my appointment data to a CSV or PDF format so that I can maintain personal records if needed.

**Acceptance Criteria:**

* ✅ The doctor can select a date range for data export.
* ✅ The exported file contains patient names, appointment dates, and statuses.
* ✅ The export function is available via the settings panel.

#### 13. ****Track No-Shows & Cancellations****

**User Story:**  
As a doctor, I want to track the number of no-show patients or last-minute cancellations so that I can analyze trends in patient attendance.

**Acceptance Criteria:**

* ✅ The system logs and categorizes canceled and missed appointments.
* ✅ The doctor can view statistics on no-shows and cancellations.
* ✅ The doctor can filter reports to analyze trends over time.

#### 14. ****Set Up Custom Appointment Durations****

**User Story:**  
As a doctor, I want to define the duration of each appointment so that I can allocate sufficient time per patient.

**Acceptance Criteria:**

* ✅ The doctor can set appointment durations (e.g., 15, 30, or 60 minutes).
* ✅ The system automatically adjusts available slots based on the chosen duration.
* ✅ Patients can only book based on the predefined time slots.

Here are some **user stories** related to doctors issuing **prescriptions** for patients, along with **acceptance criteria**:

### ****Prescription Management****

#### 15. ****Issue a Prescription****

**User Story:**  
As a doctor, I want to issue a prescription for a patient so that they can obtain the necessary medication.

**Acceptance Criteria:**

* ✅ The doctor can access a patient’s appointment details and issue a prescription.
* ✅ The system allows the doctor to enter the medication name, dosage, frequency, and duration.
* ✅ The prescription is saved to the patient’s record.
* ✅ The patient receives a notification about the new prescription.

#### 16. ****View and Manage Prescriptions****

**User Story:**  
As a doctor, I want to view and manage past prescriptions so that I can track a patient’s medication history.

**Acceptance Criteria:**

* ✅ The doctor can view a list of past prescriptions for a selected patient.
* ✅ The prescription history includes medication names, dosages, and issue dates.
* ✅ The doctor can update or discontinue a prescription if necessary.

#### 17. ****Send Prescriptions to Pharmacies****

**User Story:**  
As a doctor, I want to send prescriptions directly to pharmacies so that patients can conveniently collect their medication.

**Acceptance Criteria:**

* ✅ The doctor can select a preferred pharmacy from a list.
* ✅ The prescription is securely transmitted to the chosen pharmacy.
* ✅ The patient is notified when the prescription is ready for pickup.

#### 18. ****Print or Download Prescription****

**User Story:**  
As a doctor, I want to print or download a prescription so that I can provide a physical copy to the patient.

**Acceptance Criteria:**

* ✅ The doctor can generate a printable version of the prescription.
* ✅ The document includes the doctor’s details, patient name, medication, dosage, and instructions.
* ✅ The prescription can be downloaded as a PDF.

#### 19. ****Verify Medication Interactions****

**User Story:**  
As a doctor, I want to be alerted about potential drug interactions when issuing a prescription so that I can ensure patient safety.

**Acceptance Criteria:**

* ✅ The system checks for potential interactions with the patient’s existing medications.
* ✅ If an interaction is detected, the doctor receives a warning message.
* ✅ The doctor can override the warning with a justification if necessary.

#### 20. ****Set Prescription Renewal Rules****

**User Story:**  
As a doctor, I want to set prescription renewal conditions so that patients can request refills when appropriate.

**Acceptance Criteria:**

* ✅ The doctor can specify whether a prescription is renewable and how many refills are allowed.
* ✅ Patients can request a renewal if refills are available.
* ✅ The doctor receives a notification to approve or reject the renewal request.

#### 21. ****Attach Notes to Prescriptions****

**User Story:**  
As a doctor, I want to attach special instructions or notes to a prescription so that patients understand how to take their medication properly.

**Acceptance Criteria:**

* ✅ The doctor can add additional notes when issuing a prescription.
* ✅ The notes are displayed alongside the prescription in the patient’s portal.
* ✅ The patient receives a notification about any special instructions.

This should cover key prescription-related features for your health appointment app. Let me know if you'd like any modifications! 🚀

Administrator User Stories

Here’s a set of user stories for the **Administrator** role in your health appointment app, along with acceptance criteria:

### ****1. Manage Users****

**As an administrator, I want to create, update, and deactivate user accounts so that I can manage access to the system.**

#### ****Acceptance Criteria:****

✅ The administrator can create new user accounts for doctors and patients.  
✅ The administrator can update user details (e.g., name, email, role).  
✅ The administrator can deactivate/reactivate accounts.  
✅ The system prevents duplicate email addresses for users.  
✅ The administrator receives a confirmation message after successful changes.

### ****2. View All Appointments****

**As an administrator, I want to view all scheduled appointments so that I can monitor the system’s usage and assist users if needed.**

#### ****Acceptance Criteria:****

✅ The administrator can see a list of all upcoming and past appointments.  
✅ The system displays appointment details, including date, time, patient, doctor, and status (scheduled/cancelled/completed).  
✅ The administrator can filter appointments by date, doctor, or patient.

### ****3. Cancel Appointments on Behalf of Users****

**As an administrator, I want to cancel appointments on behalf of doctors or patients so that I can assist them when needed.**

#### ****Acceptance Criteria:****

✅ The administrator can search for a patient or doctor and cancel an appointment.  
✅ The system prevents cancellations within 48 hours of the appointment time.  
✅ A cancellation confirmation is shown before finalizing the action.  
✅ The affected patient and doctor receive a cancellation notification.

### ****4. Override Cancellation Restrictions****

**As an administrator, I want the ability to override the 48-hour cancellation restriction in special cases so that I can handle urgent situations.**

#### ****Acceptance Criteria:****

✅ The administrator can cancel an appointment within 48 hours with a justification note.  
✅ The system logs the override action and the justification.  
✅ The affected patient and doctor receive a notification about the cancellation.

### ****5. Manage Doctor Schedules****

**As an administrator, I want to set and update doctors’ availability so that the system reflects their working hours and availability.**

#### ****Acceptance Criteria:****

✅ The administrator can set working hours for doctors (e.g., 9 AM - 5 PM, Monday to Friday).  
✅ The administrator can update or block off certain dates (e.g., vacation, sick leave).  
✅ The system prevents appointment bookings outside a doctor’s available hours.  
✅ Patients are notified if their appointment needs to be rescheduled due to schedule changes.

### ****6. Generate Reports****

**As an administrator, I want to generate reports on appointment statistics so that I can analyze system usage and trends.**

#### ****Acceptance Criteria:****

✅ The administrator can generate reports showing total appointments booked, cancelled, and completed.  
✅ Reports can be filtered by date range, doctor, and patient.  
✅ The system provides an export option for reports (CSV or PDF).

### ****7. View and Manage System Logs****

**As an administrator, I want to view system activity logs so that I can monitor actions taken by users.**

#### ****Acceptance Criteria:****

✅ The administrator can view logs of key actions (e.g., appointment bookings, cancellations, user account changes).  
✅ Logs include timestamps, user IDs, and action details.  
✅ Logs are searchable by date, user, and action type.

### ****8. Send System-Wide Notifications****

**As an administrator, I want to send announcements and updates to all users so that they are informed about important changes.**

#### ****Acceptance Criteria:****

✅ The administrator can send notifications to all users or specific roles (doctors, patients).  
✅ Notifications appear in the app and can be sent via email if configured.  
✅ Users can view past notifications in their dashboard.