Topic: Hospital Management System

Subtopic: Requirements Engineering

Team Members:

- Shpëtim Shabanaj
- Artjol Zaimi
- Arjan Muka
- Eglis Braho
- Nikola Rigo
- Arlin Bashllari
- Marin Tartaraj

Executive Summary

Project Overview

This project aims to develop a **Hospital Management System (HMS)** designed to streamline hospital operations and enhance patient care. The intended audience includes hospital administrators, medical staff (doctors, nurses, lab technicians, pharmacists), and supporting personnel (receptionists, housekeeping, ambulance services). The HMS will optimize appointment scheduling, patient record management, bed allocation, billing, pharmacy inventory, and emergency handling. It will also improve communication and resource allocation across hospital departments.

Product/Service Description

The **Hospital Management System (HMS)** is a comprehensive, integrated software solution designed to optimize hospital operations, improve patient care, and enhance administrative efficiency. It serves as a centralized platform that connects various hospital departments, ensuring seamless coordination between medical staff, administrative personnel, and patients. The system facilitates patient registration, admission, discharge, and transfer, allowing real-time tracking of bed availability and efficient scheduling of medical services. Doctors and nurses can access electronic health records ,manage prescriptions, order diagnostic tests, and monitor patient progress, ensuring accurate and timely medical decisions.

The HMS streamlines billing and financial management by automating invoice generation, insurance claim processing, and payment tracking, reducing errors and improving financial transparency. Laboratories and radiology departments benefit from integrated test ordering and result management. Pharmacy and inventory control functions ensure proper medication tracking, stock level monitoring, and compliance with drug regulations, reducing shortages and waste. The system also includes emergency management, coordinating ambulance dispatch, prioritizing critical cases, and enabling rapid triage to provide timely medical attention.

Resource allocation features optimize staff scheduling, track equipment usage, and ensure the availability of necessary medical supplies. Security and compliance mechanisms safeguard patient data through role-based access controls, audit logs, and encrypted communication channels. Additionally, the system includes a library and literature search module, providing medical staff with access to research papers, case studies, and clinical guidelines to support evidence-based decision-making. By integrating all hospital functions into a single digital ecosystem, the HMS enhances operational efficiency, reduces manual errors, and ensures high-quality patient care while complying with healthcare regulations and standards.

Project Goals & Objectives

The Hospital Management System aims to:

- Optimize hospital workflows by automating patient registration, appointments, and medical record management.
- Enhance patient experience through faster service, reduced waiting times, and online access to records.
- Improve hospital efficiency by reducing manual errors, minimizing paperwork, and streamlining internal processes.
- Enable real-time reporting and analytics to support better decision-making and resource allocation.

Product Context

The HMS will **interface with multiple external and internal systems**, including:

- **Electronic Health Records (EHR)** for patient history and medical details.
- **Pharmacy Inventory Management** for medication tracking.
- **Billing & Payment Processing** for seamless financial transactions.
- **Laboratory Information System** for test order and result uploads.
- **Radiology and Imaging Systems** for managing scans and reports.
- **Ambulance & Emergency Response** coordination for critical cases.
- **Library and Literature Search** for medical reference and research.

The system will be **web-based with mobile accessibility**, ensuring **remote access for doctors, nurses, and administrators.**

Assumptions

The project assumes:

- **All medical staff and administrators have basic IT literacy** to operate the system.
- **The hospital has the necessary IT infrastructure**, including servers, internet access, and devices.
- **Government and industry regulations** will be followed for data security.
- **Medical records will be digitized and available** for integration into the system.
- **A stable internet connection** is available for cloud-based access and real-time updates.

Constraints and Dependencies

- **System Security & Access Control:**
  - Only authorized personnel will have access to sensitive patient records.
  - Multi-factor authentication may be required for critical modules.
- **Integration with Existing Systems:**
  - There might be an integration with GPS system and an external library API.
- **Parallel Operation with Old Systems:**
  - During the initial deployment phase, the HMS may operate alongside existing manual or semi-automated systems.
- **Audit & Logging:**
  - The system will maintain a comprehensive audit log for tracking changes to patient records, staff access, and medication administration.
- **Module Dependencies:**
  - The **Electronic Health Record module** must be functional before enabling appointment scheduling and medical profiling.
  - **Resource Allocation and Staff Scheduling modules** must be in place before emergency handling features go live.

    - **Billing & Payment Processing** must integrate with existing financial systems before being fully operational.
- **Training & Adoption** – Hospital staff must undergo training sessions to familiarize themselves with the system's workflows and functionalities.

Stakeholders

1. Primary Stakeholders (Directly Involved in System Use & Management)

These stakeholders actively interact with the system and rely on its functionalities.

Stakeholder	Role & Interaction with HMS
Patients	Register, book appointments, view medical records, make payments, receive notifications (via SMS or platform), and consult/contact doctors.
Doctors	Manage appointments, access patient records, prescribe medication, and interact with lab & pharmacy modules.
Nurses	Monitor patients, administer medications, update records, and track assigned tasks.
Receptionists	Register patients, schedule appointments, and manage inquiries/requests.
Pharmacists	Manage prescriptions, issue medicines and track stock.
Lab Technicians	Process lab tests, update test results, and communicate findings to doctors.
Radiologists	Review and upload diagnostic imaging to the system.
Hospital Administrators	Manage doctors, departments, finances, patient records, and system security.
IT Support Team	Maintain system infrastructure, troubleshoot issues, and ensure system security and backups.

2. Secondary Stakeholders (Indirectly Affected by HMS Usage)

These stakeholders benefit from HMS indirectly or use system-generated data for decision-making.

Stakeholder	Role & Interaction with HMS
Hospital Management/Board Members	Oversee system performance, generate reports, and track operational efficiency.
Government Health Departments	Ensure compliance with health regulations, collect patient statistics, and audit hospital activities.
Insurance Companies	Process claims, verify patient details, and ensure smooth transactions between hospital and citizens.
Medical Researchers	Use anonymized patient data for medical studies and trend analysis.
Healthcare Regulators	Ensure compliance with safety and medical standards, audit hospital records, and grant certifications.
Medical Equipment Suppliers	Manage procurement, track hospital inventory, and provide maintenance updates.

Users Of System

End users are individuals who access HMS functionalities daily for medical or operational purposes.

End User	Description
Patients	Use the HMS to book appointments, check records, view appointments, view scheduled treatment, pay bills, and receive medical care.
Doctors	Access patient records, manage schedules, issue prescriptions, request examination from lab or radiology sector, and coordinate treatments.
Nurses	Access patient records, view schedule/appointments, update patient medical data (ex: patient was provided a medication at a time, etc.)
Pharmacists	Access medical inventory management system, view issued prescriptions by doctors, handle medical request from different hospital sectors.
Receptionists	Access appointment schedule, view patient/doctor/nurse information, register patients.

Lab Technicians	Access requests from doctors for analysis of specific patients, post results on patients' online folder.
Radiologists	Access requests from doctors for radiology of specific patients, post images on patients online folder.
Housekeeping	Access requests from nurses or reception for specific room cleaning.
Manager	Access report generation and shift scheduling for staff.
Administrators	Maintain hospital operations, ensure system security, and manage role-based access control(permission granting) and register different end-users to system.

User Profile Details

1. Patients

- **Type:** General public, including students, faculty, staff, and other individuals seeking healthcare services.
- **Experience:** Varies widely
- **Technical Expertise:** Basic familiarity with smartphones and online booking; some may need assistance.
- **Other Characteristics:** Require a user-friendly interface with clear navigation, mobile accessibility, etc.

2. Doctors

- **Type:** Medical professionals, including specialists and general practitioners.
- **Experience:** High experience in medical field; varying familiarity with hospital IT systems.
- **Technical Expertise:** Moderate to high; comfortable using medical software but require intuitive design for efficiency.
- **Other Characteristics:** Need fast access to patient records, reliable prescription management, and seamless integration with other hospital modules.

3. Nurses

- **Type:** Healthcare professionals assisting doctors and monitoring patients.

- **Experience:** High experience in medical care, varying experience in digital record-keeping.
- **Technical Expertise:** Moderate; used to electronic health records but need efficient workflow management.
- **Other Characteristics:** Require a straightforward interface to update records quickly and track medication administration.

4. Pharmacists

- **Type:** Medical professionals managing prescriptions and drug inventory.
- **Experience:** High experience in pharmaceuticals, varying experience in HMS.
- **Technical Expertise:** Moderate to high; familiarity with inventory and prescription management software.
- **Other Characteristics:** Need reliable stock management, prescription tracking, and integration with doctors and billing modules.

5. Receptionists

- **Type:** Front-desk staff handling appointments and inquiries.
- **Experience:** Customer service experience, varying experience with medical software.
- **Technical Expertise:** Moderate; require training on appointment scheduling and patient registration features.
- **Other Characteristics:** Need an intuitive, error-proof interface to manage high patient volumes efficiently.

6. Lab Technicians & Radiologists

- **Type:** Medical professionals performing diagnostics.
- **Experience:** Highly skilled in their fields, with some familiarity with digital lab/radiology systems.
- **Technical Expertise:** Moderate; need seamless integration between doctor requests and test result uploads.
- **Other Characteristics:** Require precise workflow tracking and easy-to-use result upload functions.

7. Administrators & Managers

- **Type:** Hospital management and IT personnel.

- **Experience:** High experience in management, finance, or IT.
- **Technical Expertise:** Advanced; responsible for data security, role-based access, and system maintenance.
- **Other Characteristics:** Require robust control over user permissions, analytics tools, and system customization features.

8. Housekeeping

- **Type:** Cleaning staff
- **Experience:** -
- **Technical Expertise:** Basic familiarity with smartphones
- **Other Characteristics:** Require a user-friendly interface with clear navigation.

Requirements

ID	Module Name	Applicable End Users	Requirement Definition	Detailed System Functionality & Comments	Priority	Date Reviewed	Member Approved
REQ-01	**Login**	Patient, Doctor, Admin, Nurse, Receptionist, Pharmacist, Lab Technician, Radiologist	Users shall log in using unique credentials using government issued ID and a password for secure access.	The system verifies credentials entered by user and redirects users to their specific dashboard, where each dashboard is accommodated to user role. User role is automatically determined by the system.	1		
REQ-02	**Registration**	Admin, Receptionist	Users of this feature shall be able to register in the system other end-users.	**Admin:** Will be able to register all kind of users. **Receptionist:** Will be able to register patients. Users of this features will be required to fill a registration form of user data. They must select the new user role. Note that receptionist shall be able to only add patients to system. The system shall validate correctness and existence of this data before saving data to database. The system validates and checks for duplicate registrations before approval.	1		

				If registration is successful a message will be displayed on screen and a randomly generated password for the new user. Else a message will be displayed with errors encountered such as wrong or skipped fields.			
REQ-03	**Appointment Scheduling**	Patient, Receptionist	These users shall be able to book an appointment with a specific doctor via this feature. Patients can select a doctor, date, and time to request an appointment.	**Patient:** Patients will have the ability to book appointments directly by selecting a specific doctor from a list provided within the system. Once a doctor is chosen, patients can view their available dates and times, select a preferred slot, and confirm the appointment after providing essential details such as name, contact information, and the reason for the visit. In cases where the selected time is unavailable, the system will dynamically check the doctor's schedule and suggest the nearest possible alternatives. Booking confirmations and reminders will then be sent to the patient via email or SMS. **Receptionist:** Receptionists, on the other hand, will have the capability to create appointments on behalf of patients for requests made in person or over the phone. Using their interface, receptionists can search	1		

				for doctors, view their availability, and finalize bookings by entering patient details and confirming the selected slot. Additionally, they will be able to update or cancel appointments as needed. ---------- The system will ensure that doctor's schedules are kept accurate, accounting for holidays, vacations, and existing bookings, thereby avoiding conflicts or double bookings. In cases where a doctor is fully booked, the system will propose alternative doctors with similar specialties or the earliest possible available slots.			
REQ-04	**Appointment Cancellation**	Patient, Doctor	Patients can cancel an appointment; doctors can also cancel an appointment	**Patients** have the option to cancel their appointments directly through the system, while **doctors** can also make cancellations for their scheduled appointments if necessary. **In both cases**, the system ensures a prompts user for rescheduling before the cancellation is finalized. This feature allows patients or doctors to select a new date and time that works for them. Once a cancellation or rescheduling is confirmed, the system updates all relevant schedules and sends	1		

				notifications to the affected parties, ensuring clear communication and a streamlined experience.			
REQ-05	**Payment Processing (Billing System)**	Reception	Reception can initiate billing processing for each paid service offered by hospital.	The hospital billing system will allow receptionists to handle transactions efficiently and accurately. When a patient completes an appointment with a doctor or other hospital services, the receptionist can initiate the billing process through this feature. The receptionist will input or select service details which will be listed on screen (such as consultation fees, surgeries, lab tests, radiography, etc.). The system will then generate a detailed bill, itemizing each service and its associated cost. Patients can provide their payment details, whether through card or cash to complete the transaction. Before finalizing the payment, the system will verify its success, ensuring there are no issues. After a successful payment, a receipt will be issued to the patient, and the system will update the financial records automatically. Note that payment have to be full and no partial payments would be accepted. This feature shall be used by reception after the service is offered by hospital to patient.	2		

REQ-06	**Profile Management**	All users	This feature enables all users to view and update their personal information.	The system provides a feature that allows all users to view and update their personal information with ease. When a user accesses their profile, they can review existing details such as their name, contact information, and other displayed data. If user tends to update his data, the user can make the necessary changes, and the system will validate these modifications to ensure they meet predefined rules. Once the changes pass validation, the system securely updates the information in the database, ensuring data integrity constraints and predefined constraints.	2		
REQ-07	**Patient Medical Profile Management**	Doctor, Nurse	Doctors and Nurses shall be able to search patient names in order to view their medical history and test/radiology results.	Doctors and nurses will have the ability to search for patients by name through the system, giving them access to the patient's general information, comprehensive medical history, and results from lab tests or radiology analyses. This feature enables them to efficiently review and interpret critical medical data, ensuring they can deliver precise and effective care. →After users of this feature enter patient name, the patient's portfolio will be displayed. Some data that will be displayed are: personal	1		

				information, blood group, previous medical tracks, lab analysis(if any), radiology results(if any). Furthermore, in cases when patients are accommodated in hospital for medical care, data such as reason of hospitalization, date of arrival, medical approach that is being used and some other technical fields.			
REQ-08	**Medication Prescription**	Doctor	Doctors can prescribe medications	Doctors will have the ability to prescribe medications directly through the system, creating detailed prescriptions for their patients. He will fill patient id, full name and patient's medical condition in the system. Then he must be able to select all medicines he is prescribing to patient. When he submits the form, he will be required to confirm the prescribe. Once a prescription is issued, the system securely stores it and makes it accessible to both patients and pharmacists. Pharmacists are notified of new prescriptions in real time, allowing them to promptly review the details.	1		
REQ-09	**View Prescription**	Patient, Pharmacist	Patients can check their prescriptions; Pharmacists can check the issued	Patients and pharmacists will have access to view prescriptions through the system. Patients can review their prescriptions to stay informed about their treatment plans, while	2		

			prescriptions by doctors	pharmacists can access prescriptions issued by doctors to ensure accurate preparation and dispensing of medications. The system will display all relevant prescription details in an organized format similar to the one filled by doctor in **REQ-08**, offering search and filter options to make it easy to locate specific prescriptions based on criteria such as patient name, medication type, or date of issue. Pharmacists shall be able to view inventory and availability for prescribed/requested medications.			
REQ-10	**Electronic Health Records Update**	Doctor	Doctors can update patient medical history by adding new medical conditions or adding new treatment to patient's portfolio.	Doctors and nurses will have the ability to update a patient's medical history by adding new medical conditions or recording treatments administered during their care. When a patient enters the hospital for examination, their medical portfolio is made available to the attending doctor, who can review it and document any updates, such as diagnoses, ongoing treatments, or changes in the patient's condition. Doctor will be able to add new updates by filling fields like date, new medical condition, description of situation, necessary treatment, etc.	1		

				(Doctor should enter updates for both consultations and hospitalized patents)			
REQ-11	**Lab Test Ordering**	Doctor Nurse	Doctors and nurses can order lab tests for a specific patient and should provide test type.	Doctors and nurses will have the capability to order lab tests for specific patients directly through the system. When placing an order, they will specify the type of test required (like blood test), patient id, full name and desired time due, ensuring clarity for the laboratory. Once the request is submitted, the system securely transmits the details to the lab for processing.	1		
REQ-12	**Lab Test Result Upload**	Lab Technician	Lab staff can upload results for doctor review and patient access.	Lab technicians will have the ability to upload test results directly into the system, making them accessible for review by doctors and, when appropriate, by patients. Lab Technicians shall be able to search for patient id or full name and doctor id or name. Then he shall be able to upload test results document to the system. Once the results are successfully uploaded, the system will automatically notify the relevant parties, ensuring that doctors are promptly informed about results availability in patient's portfolio and patients, if permitted, can view their results without delay. The results	1		

				shall be accessed by doctors and patients in respective patient's medical portfolio.			
REQ-13	**Radiology & Imaging Ordering**	Doctor Nurse	Doctors and nurses can order radiology service by using this feature.	Doctors and nurses will have the capability to order radiology services for specific patients directly through the system. When placing an order, they will specify the type of service required (like arm image), patient id, full name and desired time due, ensuring clarity for the radiology laboratory. Once the request is submitted, the system securely transmits the details to the lab for processing.	1		
REQ-14	**Radiology Results Upload**	Radiology Technician	Radiology staff can upload results for doctor review and patient access.	Radiology technicians will have the ability to upload results directly into the system, making them accessible for review by doctors and, when appropriate, by patients. Lab Technicians shall be able to search for patient id or full name and doctor id or name. Then he shall be able to upload test results document to the system. Once the results are successfully uploaded, the system will automatically notify the relevant parties, ensuring that doctors are promptly informed about results availability in patient's portfolio and patients, if permitted, can view their	1		

				results without delay. The results shall be accessed by doctors and patients in respective patient's medical portfolio.			
REQ-15	**Inpatient & Bed Management**	Nurse	Assign, update, and track patient bed availability.	The system will enable nurses to efficiently assign, update, and track patient bed availability in real-time. During patient admission, staff can input patient details such as ID, condition, and assign an appropriate available bed which will be listed on the fields. As a result, the system will update its status to "Occupied." When the patient is released, the bed's status will change to "Needs Cleaning,". Once cleaning is complete, the status updates to "Available." In the case of patient transfers, the current bed will be marked as "Needs Cleaning," while a new bed matching the patient's requirements will be reserved. A real-time dashboard with user-friendly GUI and search filters provides nurses with an organized overview of bed statuses across the facility. This functionality improves workflow and reduces delays.	1		
REQ-16	**Nurse Task Assignment**	Doctor	Doctors shall be able to assign	Doctors shall have the capability to assign tasks to nurses related to a	2		

			tasks to nurses regarding a specific patients treatment.	specific patient's treatment through the system. When a doctor creates a task, they can include details such as the patient's information, the nature of the task, date & time, and its urgency. The system processes this information and sends real-time notifications to the assigned nurse, clearly indicating the task's priority level and automatically adding task to the nurse's task schedule. When selecting the nurse for a task at a time, system must notify doctor for nurse availability at that time. Nurses will receive these notifications on their platform. This functionality enhances coordination between doctors and nurses, ensuring timely and efficient patient care.			
REQ-17	**Medication Administration for patients**	Nurse, Doctor	When nurse completes a task assigned by the doctor for hospitalized or non-hospitalized patient, she shall be able to add this update on patient's portfolio	When a nurse completes a task assigned by a doctor for either a hospitalized or non-hospitalized patient, she will have the ability to document this update directly in the patient's portfolio. The nurse shall be able to fill fields such as date & time of update, type of medication, optional observations or comments, inflammations encountered (if any), etc.	1		

				These updates will be added to patients medical portfolio.			
REQ-18	**Pharmacy & Stock Management**	Pharmacist	Track medicine stock, update inventory, and manage restocking.	The system shall enable Pharmacists option for management of medicine stock by tracking inventory levels, updating records, and facilitating restocking processes. It continuously monitors the stock of medicines across various storage units and updates inventory in real time as medications are issued or replenished. When stock levels for any medicine fall below a predefined number(like 10 units), the system automatically generates low-stock alerts, notifying the pharmacist to initiate the restocking process. Additionally, the system keeps track of medicine expiry dates and sends timely alerts when medications are nearing expiration. This ensures that expired medicines are promptly removed from stock and replaced, maintaining the safety and reliability of the hospital's inventory. This feature must provide the user with functionality of adding new medicines that are not registered before in system, by entering data such as barcode, name, expiration date, type of medicament, purpose,	1		

				quantity, price, restock date, etc. When a unit of medication is sold, stock will automatically be decremented. In case of restock pharmacist shall be able to update fields such as quantity, restock date and new expiration date.			
REQ-19	**Medical Staff Timetable**	Doctor Nurse	Doctors and Nurses shall be able to view their work timetable and tasks assigned.	The system will provide doctors and nurses with access to their work timetables, ensuring that despite the differences in their roles and responsibilities, the timetable's representation will follow a consistent format. Doctor's timetable shall display appointments booked by patients and schedule for meeting with hospitalized patients. Nurse's timetable shall display tasks assigned by doctors at defined timeslots. This feature is straight forward and does not require user input.	2		
REQ-20	**Surgery Planning**	Doctor	Doctor shall be able to place surgeries for a	The system will enable doctors to plan and schedule surgeries for patients whenever necessary. Through the surgery planning	1		

			patient if necessary	feature, doctors can select a patient and input details such as the type of surgery, the proposed date and time, the operating room, and any required surgical team members or equipment. The system will verify the availability of necessary resources, including operating rooms and staff, before finalizing the scheduling. Once the surgery is scheduled, notifications will be sent to relevant departments, such as the surgical team, anesthesiologists, and nursing staff, ensuring proper coordination and preparation. The system will also update the patient's portfolio with the planned surgery details, allowing tracking and monitoring of their treatment plan. This feature ensures efficient and accurate surgery planning while supporting clear communication across all involved teams.			
REQ-21	**Emergency Handling & Alerts**	Doctor, Nurse	Handle emergency cases with priority assignment and notification.	The system will provide a dedicated emergency handling mechanism to efficiently manage urgent medical cases. When an emergency arises, doctors, nurses, administrators, or	1		

				members of the emergency response team can initiate the process by flagging the case as high priority. The system will immediately override standard scheduling protocols, reallocating resources such as staff, rooms, and equipment to address the emergency. Notifications will be sent in real time to all relevant personnel, including the emergency response team, ensuring they are promptly informed and prepared to act. The system will prioritize the case within the workflow, dynamically adjusting schedules and reallocating resources as needed, without disrupting critical ongoing activities. If needed, patients meetings with doctors can be reallocated on another time.			
REQ-22	**Request room cleaning**	Patient Receptionist Nurse	Users of this feature shall be able to make requests for room cleaning. Their request should be pushed into the stack of actions.	The system will provide a feature allowing patients, receptionists, and nurses to request room cleaning efficiently. Users can submit a cleaning request directly through the system by selecting the room and specifying any additional details if needed, such as urgency or specific cleaning requirements. Once a request is made, it will be added to a prioritized stack of cleaning actions.	2		

				The system will maintain this action stack dynamically, ensuring that requests are processed in the order of submission unless marked as high priority, which will move them to the top of the stack. Notifications will be sent to housekeeping staff, enabling them to view and address the requests promptly.			
REQ-23	**Process Room Cleaning**	Housekeeping	Housekeeping shall access the stack of room cleaning calls and shall be able to update room cleaning status.	The system will allow housekeeping staff to access the prioritized stack of room cleaning requests submitted by patients, receptionists, or nurses. Each request in the stack will include details such as the room number, timestamp, urgency level, and any specific cleaning instructions. Housekeeping staff can view these requests and select one to mark as "In Progress" when they begin cleaning a room. Once the cleaning is completed, they will update the request status to "Completed," ensuring accurate tracking and transparency. The system will automatically update the stack to reflect the current status of each request, ensuring that pending tasks remain visible and prioritized appropriately.	2		
REQ-24	**Staff scheduling**	Manager	Create and display work schedules	The system will allow managers to create and display work schedules	2		

			for doctors, nurses, and other staff.	for doctors, nurses, and other staff members. Managers can input schedule details such as staff names, roles, assigned shifts, on-call hours and days off. The system will provide a user-friendly interface that ensures schedules are clear and easy to manage. It will also include features like conflict detection to prevent overlapping shifts or scheduling errors. Once schedules are finalized, they will be made accessible to staff members in a standardized format, ensuring consistency and clarity. Changes on doctors shift directly affects their availability on appointment scheduling feature done by patients, so if the manager wills to change doctors shift at some days, the system shall trigger an alert. This functionality ensures efficient staff management and helps maintain smooth hospital operations.			
REQ-25	**Report Generation**	Manager	Manager shall require a report generation based on different filter.	The system will provide managers with the ability to generate reports based on various filters to meet their specific requirements. Managers will be able to select from predefined filters, such as staff performance,	2		

				patient admission trends, bed occupancy rates, emergency cases arrived in hospital, inventory levels on Pharmacy and financial data. Additionally, they will have the option to apply custom filters, like date ranges, departments, or specific criteria. Once the desired filters are applied, the system will compile and generate detailed, accurate reports in a user-friendly format, such as tables, charts, or graphs. This functionality ensures that managers can easily access actionable insights and make informed decisions based on the data.			
REQ-26	**Library and Literature search**	Doctor Nurses	The system should provide a digital library and literature search feature for doctors and nurses, to access medical research, journals, books and clinical guidelines.	The system will include a robust digital library and literature search feature specifically designed for doctors and nurses. This feature will allow healthcare professionals to access a wide range of medical resources, including research papers, journals, eBooks, clinical guidelines, and other relevant publications. Users will be able to perform searches using keywords, topics, authors, or publication dates to locate specific materials efficiently. The system will support features like bookmarking and downloading required literature. This	3		

				feature aims to enhance knowledge-sharing and support evidence-based medical practices for improved patient care.			
REQ-27	**Vaccination Management**	Patient	The system will include a vaccination management feature to help patients effectively manage their vaccination records.	The system will include a vaccination management feature to help patients effectively manage their vaccination records. This feature will allow patients to view their vaccination history, including details such as the type of vaccine, date of administration, and the age that it should be taken. The system will also enable scheduling upcoming vaccinations based on the recommended timelines, helping patients stay on track with their immunization plans. Automated reminders via SMS will be sent to patients as their vaccination dates approach, ensuring they are well-informed and prepared.	1		
REQ-28	**Resource Allocation**	Manager	The system should enable efficient allocation and tracking of hospital resources, including medical	The system will enable managers to efficiently allocate and track hospital physical resources and equipment. It will provide real-time visibility into the availability, location, and status of critical assets, such as medical devices, hospital beds, wheelchairs, and diagnostic machines. Managers	2		

			staff and equipment.	will be able to assign these resources to specific departments or cases based on current requirements and priorities. It will also track inventory levels for essential supplies, ensuring timely restocking and minimizing disruptions			
REQ-29	**Ambulance Management**	Reception	Reception shall be able to track availability of ambulances and location status of occupied ambulances	The system will include an ambulance management feature that allows receptionists to efficiently track the availability and location of ambulances. Receptionists will have access to real-time information showing whether ambulances are available, on route, or occupied with patients. For occupied ambulances, the system will display their current location by usage of GPS. This feature will assist in coordinating ambulance services effectively, ensuring prompt response times during emergencies and minimizing delays in patient transport. The system will also update the status of ambulances dynamically when ambulances are detected in hospital position.	1		
REQ-30	**Permission Granting**	Admin	Assign different access levels based on user roles.	The system enforces permissions to prevent unauthorized access.	2		

REQ-31	**Visitor Management**	Reception	Receptionists shall be able to register visitor for all hospitalized patients and record them at patients portfolio.	The system will include a visitor management feature that allows receptionists to register visitors for all hospitalized patients. When a visitor arrives, the receptionist can log their details, such as name, contact information, relationship to the patient, and visit timings. This information will be securely stored and automatically linked to the corresponding patient's portfolio, providing a detailed record of all visitors. This functionality ensures accurate tracking, supports hospital security protocols, and allows for quick reference if needed.	3		

Non-Functional Requirements

ID	Type	Requirement
NF-REQ-01	Usability Requirement	The system shall provide an intuitive, user-friendly interface that allows medical professionals to efficiently access patient records, schedule appointments, and perform administrative tasks without extensive training.
NF-REQ-02	Usability Requirement	The system shall include comprehensive user documentation, tutorials, and an interactive help feature to assist staff in learning the system quickly.
NF-REQ-03	Usability Requirement	The system shall offer a role-based dashboard with customized layouts for doctors, nurses, receptionists, and administrative staff to improve efficiency.
NF-REQ-04	Usability Requirement	The system shall be accessible to people with disabilities, ensuring keyboard navigation, screen reader compatibility, and color contrast options.
NF-REQ-05	Usability Requirement	The system shall include a notification center that displays alerts for appointment reminders, pending lab results, system downtime notifications, and urgent medical updates.
NF-REQ-06	Performance Requirement	The system shall support a minimum of 1000 concurrent users without experiencing performance degradation.
NF-REQ-07	Performance Requirement	The system shall process at least 500 transactions per second under normal hospital workload.
NF-REQ-08	Performance Requirement	The system shall retrieve patient records in less than 2 seconds, ensuring quick access to medical data.
NF-REQ-09	Performance Requirement	The system shall maintain an average response time of 200 milliseconds for database queries.

NF-REQ-10	Performance Requirement	The system shall ensure that 95% of all user interactions complete within 1 second, including appointment scheduling and billing transactions.
NF-REQ-11	Performance Requirement	The system shall be designed to handle peak traffic periods such as mass emergency admissions without performance degradation.
NF-REQ-12	Availability Requirement	The system shall have an uptime of 99.9%, ensuring uninterrupted operation of critical hospital services.
NF-REQ-13	Availability Requirement	The system shall allow hospitals to schedule maintenance downtime with prior notifications to all users to minimize disruptions.
NF-REQ-14	Availability Requirement	The system shall ensure that no more than 1 hour of unscheduled downtime occurs per year, meeting high-reliability standards.
NF-REQ-15	Data Backup Requirement	The system shall automatically back up patient records and hospital data every 15 minutes to prevent data loss.
NF-REQ-16	Data Backup Requirement	The system shall store daily, weekly, and monthly backups in multiple geographically distributed locations for disaster recovery.
NF-REQ-17	Data Recovery Requirement	The system shall ensure that in the event of data corruption or loss, full data recovery can be performed within a maximum of 30 minutes.
NF-REQ-18	System Error Handling Requirement	The system shall log all errors, including hardware failures and software crashes, and notify system administrators immediately.
NF-REQ-19	Security Requirement	The system shall require multi-factor authentication for hospital staff accessing sensitive information.
NF-REQ-20	Security Requirement	The system shall implement role-based access control to limit access to patient data based on user roles.
NF-REQ-21	Security Requirement	The system shall log all failed login attempts and notify administrators if unauthorized access is suspected.

NF-REQ-22	Security Requirement	The system shall implement biometric authentication (fingerprint or facial recognition) for high-security areas like surgery places.
NF-REQ-23	Security Requirement	The system shall include intrusion detection mechanisms, ensuring that any unauthorized access attempts trigger alerts for security personnel.
NF-REQ-24	Security Requirement	The system shall be regularly tested for vulnerabilities, including penetration testing and security audits.
NF-REQ-25	Organizational Requirement	The system shall comply with hospital IT policies, ensuring alignment with existing medical record-keeping practices.
NF-REQ-26	Organizational Requirement	The system shall allow customizable workflows that can be adapted based on different hospital policies and procedures.
NF-REQ-27	System Downtime Management Requirement	The system shall display real-time notifications to users if system downtime is scheduled, with at least 24-hour prior notice.
NF-REQ-28	System Downtime Management Requirement	The system shall provide offline capabilities for critical functionalities, allowing emergency data entry and retrieval during network failures.
NF-REQ-29	Organizational Requirement	The system shall allow hospital administrators to define operational rules and permissions, ensuring compliance with internal governance policies.
NF-REQ-30	Organizational Requirement	The system shall maintain historical patient records for a minimum of 10 years, in compliance with medical record retention laws.
NF-REQ-31	External Requirement	The system shall comply with local healthcare regulations, ensuring legal compliance for patient data protection.
NF-REQ-32	External Requirement	The system shall integrate with government health databases, allowing hospitals to report public health data and access national patient records.

NF-REQ-33	System Alert Requirement	The system shall send automated alerts via email and SMS to hospital IT personnel in case of critical system failures.
NF-REQ-34	External Requirement	The system shall include multi-language support, ensuring usability for diverse staff and patients in international hospital networks.