# Design Specification Document (DSD) – Hospital Management System (HMS)

## 1. Introduction

### 1.1 Purpose

The purpose of this Design Specification Document is to provide a detailed architectural and design plan for the Hospital Management System (HMS). It defines the system architecture, database schema, user interface design, and interactions between different modules.

### 1.2 Scope

This design ensures scalability, maintainability, and security for HMS. It covers all major modules including Authentication, Admin, Doctor, Patient, Appointments, and Billing.

## 2. System Architecture

The HMS will follow an MVC (Model-View-Controller) architecture with layered design:

1. Presentation Layer – User Interfaces for Admin, Doctor, and Patient.

2. Business Logic Layer – Handles appointment scheduling, prescriptions, billing, and reporting.

3. Data Access Layer – Provides communication with the database using ORM frameworks.

4. Database Layer – MySQL database to store structured data securely.

### 2.1 Technologies

- Front-End: ASP.NET MVC with Razor, Bootstrap, CSS, jQuery  
- Back-End: ASP.NET Core Web API  
- Database: MySQL  
- Communication: HTTPS protocol for secure data transfer

## 3. Module Design

### 3.1 Authentication & Authorization

Provides secure login and registration for Admin, Doctor, and Patient roles. Ensures role-based access control to protect sensitive data.

### 3.2 Admin Panel

Features:  
- Manage Users (CRUD)  
- Manage Doctors (Profiles, Schedules)  
- Manage Patients (Records, History)  
- Generate Reports  
- Configure system settings

### 3.3 Doctor Panel

Features:  
- View appointments and schedule  
- Access patient history  
- Provide prescriptions digitally  
- Update availability

### 3.4 Patient Panel

Features:  
- Register and login  
- Book, reschedule, or cancel appointments  
- View visit history and prescriptions  
- Make online payments  
- Track billing records

### 3.5 Appointment Management

Central module connecting Patients and Doctors. Prevents overlapping appointments, provides automated reminders, and maintains appointment history.

### 3.6 Billing System

Generates bills after consultations or treatments. Supports multiple payment methods including cash, card, and online payments. Stores invoices in patient records.

## 4. Database Design

The database will be designed in MySQL with normalized tables. Example tables include:

- Users (UserID, Name, Role, Email, Password)  
- Doctors (DoctorID, Name, Specialty, Availability)  
- Patients (PatientID, Name, Contact, MedicalHistory)  
- Appointments (AppointmentID, PatientID, DoctorID, Date, Status)  
- Prescriptions (PrescriptionID, PatientID, DoctorID, Medicine, Dosage)  
- Billing (BillID, PatientID, AppointmentID, Amount, PaymentMethod, Date)

## 5. User Interface Design

The HMS will provide a responsive web interface. Key UI elements include:

- Login & Registration screens  
- Admin dashboard with management panels  
- Doctor dashboard with appointments and patient history  
- Patient dashboard with booking, history, and payments  
- Reports and analytics screens for Admin

## 6. Security Design

- Encrypted passwords stored in database  
- Role-based access control  
- HTTPS for secure communication  
- Regular backups to prevent data loss