Hamdard University

Department of Computing

Final Year Project

A Website for DoC, Hamdard University

FYP-001/FL24

Software Design Specifications

Submitted by

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17/01/2025	*1.0*	*Final document*	*Syeda Noreen Zahra*

Definition of Terms, Acronyms, and Abbreviations

Term	**Description**

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DoC	*Department of Computing*
FYP	*Final Year Project*
CMS	*Content Management System*
Dynamic Website	*A website that updates its content dynamically based on user interaction or data changes.*
Chatbot	*chatbot that operates on a predefined set of rules, scripts, or decision trees to interact with users*
Timetable	*A schedule of classes and activities organized by section and semester.*
Database	*An organized collection of data stored electronically for easy access, management, and retrieval.*
SQL	*Structured Query Language, used for managing and querying relational databases.*
Prototype Methodology	*A software development approach focused on iterative refinement based on user feedback.*
Admission Form	*A form used to collect details from prospective students applying to the department.*
Complaint Box	*A feature allowing users to submit feedback or report issues for resolution.*
Library Database	*An online catalog providing information about books and resources available in the library.*
Frontend	*The part of a website that users interact with directly, including design and layout.*
Backend	*The server-side logic of a website that handles data storage, processing, and functionality.*
SMTP	*Simple Mail Transfer Protocol*
SFTP	*Secure File Transfer Protocol*

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1. Introduction

1.1 Purpose of Document

The purpose of this Software Requirements Specification (SRS) document is to describe everything needed to build a website for the Department of Computing at Hamdard University. This website will make it easy for students, faculty, and administrators to access information, and stay updated. Here's why this document is important:

1. ***Clarify What Needs to Be Built***
   It explains all the features and tools the website will include, like subpages for programs (Computer Science, Artificial Engineering, and Software Engineer etc.), faculty details, timetables, announcements, and automated forms.

2. ***Centralize All Requirements***
   It gathers all the technical and functional details in one place, ensuring everyone working on the project understands the goals and how the website should function.

3. *Improve Communication*
   The website will allow:

   - *Students to access information easily.*

   - *Faculty to make announcements and manage tasks efficiently.*

   - *A chatbot to answer user questions.*

4. ***Save Time with Automation***
   It defines how various forms (applications, fee concessions, complaints) will be submitted and automatically emailed to the relevant person

5. ***Guide the Technical Team***
   It specifies the tools, software, and hardware required to build the website, ensuring the development team knows what technology to use.

6. ***Define Roles and Responsibilities***
   It documents who can do what on the website (e.g., only the HOD can post announcements and update the timetable).

1.2 Intended Audience
The purpose of this project is to:

1. *Current students and faculty of computing department at Hamdard University.*

2. *Prospective students interested in the Department of Computing and its sub-disciplines.*

   Visitors seeking information computing department.

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1.3 Abbreviations

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2. Overall System Description

2.1 Project Background

The proposed project involves developing a dynamic and user-friendly website for the Department of Computing (DoC) at Hamdard University. The primary purpose is to create an online centralized platform that enhances communication, resource accessibility, and transparency for students, faculty, and prospective students.

Key Objectives:

1. Provide comprehensive departmental information, including faculty profiles, batch advisors, program coordinators, and library resources.

2. Introduce integrated features like:

   - Admission forms to simplify the application process.

   - A complaint box for resolving issues efficiently.

   - Section-wise timetables for better academic scheduling.

   - A news and announcements area to keep the department updated.

   - A chatbot for addressing frequently asked questions.

   - Centralize resources, including student records and library book databases, for better accessibility.

2.2 Problem Statement

Currently, the Department of Computing does not possess a centralized online platform that provides access to essential information regarding faculty, courses, schedules, forms, and other resources. The lack of automated systems for form submissions, schedule management, and communication with administrators results in inefficiencies and delays. There is a pressing need for straightforward access to specific departmental information, such as semester schedules, faculty details, and an efficient method for submitting complaints and announcements.

2.3 Project Scope

1. **Department Overview Pages**: Comprehensive pages dedicated to Computer Science, and Software Engineering, Artificial Intelligence each detailing faculty members, batch advisors, coordinators, and the department head.

2. **Semester Timetables**: A management system for viewing and updating semester timetables, allowing Coordinators and Heads of Departments (HODs) to make necessary changes.

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3. **Forms Automation:** *Online forms, including general application forms, fee concession requests, attendance forms, and complaint submissions, which will be automatically forwarded to the relevant faculty or administrators.*

4. **Admission Form:** *A dedicated admissions form that will be submitted to Hamdard University admission office.*

5. **Complaint Box**: *A feature that allows students to send complaints directly to both the HOD and the coordinator.*

6. **Announcement System**: *A portal where only the HOD and Dean can log in to make announcements to students and faculty.*

7. **Chatbot Integration**: *A chatbot that provide responses to frequently asked questions and queries, leveraging the university's existing information.*

2.4 Not In Scope

1. *Integration with external educational systems beyond Hamdard University.*

2. *Non-academic departments (e.g., administration, non-computing departments).*

3. *Mobile app version of the website (only the web-based version will be developed).*

4. *Advanced AI features beyond the chatbot for providing automatic suggestions or handling dynamic data   interpretation.*

2.5 Project Objectives

1. **Centralize Information**: *Develop a website that serves as a single point of access for faculty details, semester timetables, course information, forms, and announcements.*

2. **Improve Communication:** *Facilitate seamless communication between students, faculty members, and administrators, reducing delays and inefficiency.*

3. **Automate Administrative Processes**: *Implement a system for form submission (e.g., fee concession) that forwards to the relevant authority and triggers escalation if no response is received within a specified time.*

4. **Enhance Student Experience:** *Integrate a chatbot to ensure students can easily find the information they need, like timetables, faculty c, and department-specific details.*

5. **Ensure Accessibility:** *Provide students, faculty, and staff easy access to department-specific pages and schedules*

2.6 Stakeholders & Affected Groups

*The proposed **Department of Computing (DoC) website** involves multiple stakeholders and user groups that will benefit from or interact with the platform. These include the following:*

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1. Primary Stakeholders:

1. Students (Current):

- o Access to detailed faculty and department information.
- o Simplified admission processes via the integrated admission form.
- o Ease in finding timetables, library resources, and announcements.
- o Mechanisms to provide feedback or raise complaints.

2. Faculty Members:

- o Improved communication through a centralized platform.
- o Access for updating timetables and handling complaints.
- o Detailed visibility for their professional profiles.

3. Batch Advisors & Program Coordinators:

- o Streamlined management of student records and departmental updates.
- o Tools to upload, sort, and manage data like timetables or announcements.

4. Head of Department (HOD):

- o Tools for handling escalated complaints and announcements.
- o Improved communication with students and faculty.
- o Access to submission data for forms and feedback.

5. Dean of FEST (Faculty of Engineering, Science, and Technology):

- o Administrative oversight through escalated complaints and major announcements.
- o Ability to directly address the faculty and students via announcements.

2. Secondary Stakeholders:

1. Administrative Staff:

- o Simplified handling of forms like admission form, fee concession form, and general application form.
- o Enhanced efficiency in responding to complaints and queries.

2. Library Staff:

- o Streamlined book database management, allowing for easier updates and accessibility for students.

3. Affected Groups:

1. Visitors and Alumni:

- o Prospective students and alumni will gain easy access to departmental information and resources, fostering engagement and trust in the department.

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2.7 Operating Environment

The **Department of Computing (DoC) website** will operate in a secure and reliable environment to ensure smooth functionality for all users, including students, faculty, and administrative staff. Below is a detailed description of the operating environment:

1. Web Hosting Environment:

Platform:
The website will be hosted on a cloud-based web server or university-maintained server to ensure scalability and reliability.

Operating System:

Linux-based systems (e.g., Ubuntu) for web hosting.

Windows for local development environments.

Web Server:
Apache or Nginx for hosting the web application.

2. User Devices:

- *Supported Devices*:
  The website will be responsive and accessible via:

- *Desktops and laptops (Windows, macOS, Linux).*

- *Mobile devices (iOS and Android).*

- *Tablets (all major platforms).*

Browsers:

- *Google Chrome*

- *Mozilla Firefox*

- *Microsoft Edge*

3. Network Requirements:

- *Local Access*:
  The website will be accessible via the university's LAN for administrative purposes.

- *Internet Access*:
  Public access for students, faculty, and prospective students from external locations using secure HTTPS protocols.

- *Bandwidth*:
  Moderate bandwidth usage to accommodate multiple users accessing resources like timetables, forms, and chatbot services simultaneously.

4. Software:

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- *Frontend*:

  HTML, CSS, JavaScript, and frameworks like React.js or Bootstrap for a responsive and interactive UI.

- *Backend*:

  Node.js or Python for server-side logic.

- *Database*:

  MySQL/PostgreSQL for managing records like timetables, library resources, and user submissions.

5. Security Measures:

- *Protocols*:
  HTTPS for encrypted communication between the website and users.

- *Authentication*:
  Role-based access for faculty, HOD, Dean, and students to ensure secure data management.

- *Backup System*:
  Regular data backups using SFTP solution to prevent data loss.

6. Maintenance and Updates:

The website will be managed by a designated web administrator from the department, who will handle updates for:

- *Timetables.*

- *Announcements.*

- *Faculty and departmental information.*

2.8 System Constraints

1. Technical Constraints

- *Static Timetable Management*:

  Initial timetable uploads will be manual, as the system does not support automated synchronization with internal scheduling tools.

- *Chatbot Dependency*:

  The chatbot relies on data from website. Inaccurate or outdated data on the website could affect chatbot responses.

- *Search Functionality Scope*:

  The search system is limited to the content available on the DoC website and cannot retrieve information from external sources.

2. Resource Constraints

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- *Hardware Requirements:*

  The system requires modern computers or servers with sufficient processing power for hosting and data management. Limited access to these resources could delay deployment.

- *Human Resources:*

  Dependence on web developers, database administrators, and testers for development and maintenance may cause delays if skilled personnel are unavailable.

3. Security Constraints

- *Role-Based Access:*

  The system enforces role-based access for different stakeholders (e.g. HOD, coordinators, and students).

  Mismanagement of access roles could compromise data integrity.

- *Email-Based Communication:*

  Integrated forms and the complaint box rely heavily on email for communication, which could lead to delays if the email system encounters issues.

4. Development Constraints

- *Methodology:*

  The use of an evolutionary prototyping methodology means features will be developed and refined iteratively.

  This may delay the final delivery of certain functionalities.

5. Performance Constraints

- *Concurrent Users:*

  o *The system is designed for moderate traffic and may require scaling for high user loads.*

- *Internet Dependency:*

  Internet access is required for users to access the website and for functionalities like email and chatbot integration.

2.9 Assumptions & Dependencies
1. Assumptions

- *Timetable Management:*

  Timetables will be uploaded manually by web administrators and not automatically synchronized with internal systems.

- *Email-Based Communication:*

  Integrated forms (e.g., admission, complaint, fee concession) will rely on email systems for notifications and responses.

- *Data Availability:*

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Accurate and up-to-date departmental data (e.g., faculty profiles, library resources) will be provided and maintained by the department.

- *User Feedback:*

  Regular feedback from students, faculty, and administrators will be available to improve the website using the evolutionary prototyping approach.

- *Moderate Traffic:*

  The system assumes a moderate number of concurrent users and is not designed for heavy traffic without scaling.

- *Device Compatibility:*

  Users will access the website through supported devices and modern browsers.

- *Administrative Roles:*

  Role-based access will be appropriately assigned and maintained to ensure system security and functionality.

2. Dependencies

- *External Systems:*

  Dependence on the university's email server for automated notifications and communication.

- *Hosting Environment*

  Availability of a secure and reliable hosting environment (e.g., a university-maintained server or cloud-based hosting).

- *Development Tools and Frameworks:*

  The project relies on tools like VS Code, languages HTML, CSS and Javascript, framework Bootstrap or React.js (frontend), Node.js or Python (backend), and MySQL databases for development and deployment.

- *Skilled Personnel:*

  Access to skilled developers, database administrators, and testers for smooth development and maintenance.

- *Internet Connectivity:*

  Reliable internet access for public users to interact with the website and its features (e.g., chatbot, announcements, form submissions).

- *Timely Inputs:*

  The project depends on timely inputs from stakeholders, such as faculty information, library data, and feedback from users.

- *Security Measures:*

  To secure the system, use strong encryption (SSL/TLS), implement multi-factor authentication, validate and sanitize inputs, enforce role-based access control, regularly update software, and monitor for suspicious activities.

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3. External Interface Requirements

3.1 Hardware Interfaces

The Department of Computing (DoC) website will interact with various hardware systems to ensure smooth operation, secure access, and efficient functionality. Below are the details of the hardware interfaces:

1. Web Hosting Server

- *Purpose*:
  Hosts the website and backend systems for accessibility by students, faculty, and administrators.

- *Specifications*:
  - Processor: Quad-core or higher (e.g., Intel Xeon, AMD Ryzen).
  - RAM: Minimum 8 GB (16 GB recommended for scalability).
  - Storage: SSD with at least 500 GB for fast read/write operations.
  - Network: 1 Gbps Ethernet for high-speed connectivity.

- *Behavior*:
  Ensures reliable uptime, supports multiple concurrent users, and processes requests efficiently.

2. User Devices

- *Purpose*:
  Provides access to the website for students, faculty, and staff.

- *Supported Devices*:
  - **Desktops and Laptops***: Windows, macOS, and Linux operating systems.*
  - **Mobile Devices***: iOS and Android platforms.*
  - **Tablets***: All major tablet devices.*

- *Behavior*:
  Responsive website design ensures compatibility and consistent user experience across devices.

3. Administrative Systems

- *Purpose*:
  Used by administrators, faculty, and HODs for tasks like timetable uploads, announcements, and record management.

- *Specifications*:
  - Computers or laptops with updated operating systems (Windows 10/11,).
  - Minimum Hardware: Dual-core processor, 4 GB RAM, and 500 GB HDD/SSD.
  - Peripherals: Internet access, keyboard, and mouse for input.

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- *Behavior*:
  Facilitates secure login for authorized personnel to access backend functionalities.

4. Networking Hardware

- *Purpose*:
  Supports communication between the website, database, and email server.

- *Components*:

  - **Routers and Switches**: *Ensure stable connections within the LAN and to the internet.*

  - **Firewall Hardware**: *Protects the server from unauthorized access and cyber threats.*

- *Behavior*:
  Provides uninterrupted and secure connectivity for hosting and data transmission.

5. Backup and Storage Systems

- *Purpose*:
  Ensures data reliability and recovery in case of system failure.

- *Specifications*:

  - *Network-attached storage (NAS) or cloud-based backup solutions.*

  - *Capacity: At least 1 TB storage for maintaining backups of website data, user records, and forms.*

- *Behavior*:
  Periodic backups prevent data loss and allow quick recovery during system failures.

6. Peripheral Devices (Optional)

- *Printers and Scanners*:

  - *Used by administrative staff for processing forms and other documentation.*

3.2 Software Interfaces

The Department of Computing (DoC) website will interface with several software systems and applications to deliver its functionalities. Below are the details for each application:

1. Information About DoC:

- *Purpose*:
  Provides data for the chatbot to answer queries related to admissions, course details, fee structure, and other university-specific information.

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- *External Owner:*
  DoC ,Hamdard University

- *Interface Details:*

    - *Security: Token-based authentication.*

2. University Email Server

- *Purpose:*
  Automates email notifications for form submissions, complaints, and announcements.

- *External Owner:*
  DoC ,Hamdard University

- *Interface Details:*

    - *Protocol: SMTP for sending emails.*

    - *Configuration:*

        - *SMTP Host: e.g., smtp.hamdard.edu.pk.*

        - *Port: 587 (TLS) or 465 (SSL).*

        - *Authentication: University-provided credentials for secure access.*

3. Timetable Database

- *Purpose:*
  Stores and manages batch-wise and semester-wise timetables for students and faculty.

- *External Owner:*
  Department of Computing, Hamdard University.

- *Interface Details:*

    - *Integration: CRUD operations (Create, Read, Update, Delete) via secure database direct SQL queries.*

    - *Behavior: Allows HOD and coordinators to update and retrieve timetables through an admin portal.*

4. Chatbot

- *Purpose:*
  Provides conversational assistance to users.

- *External Owner:*
  Department of Computing

- *Interface Details:*

    - *Integration: chatbot platform.*

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o   ***Behavior****: The chatbot pulls data from the DoC website to answer user queries.*

5. Library Database (Internal System)

- ***Purpose****:*
  Manages a searchable inventory of books available in the department's library.

- ***External Owner****:*
  Department of Computing Library.

- ***Interface Details****:*

  o   ***Integration****: Direct connection with the database for querying book records.*

  o   ***Behavior****: Provides users with the ability to search for books via the website.*

7. Administrative

- ***Purpose****:*
  Allows authorized users to manage announcements, events, and news updates.

- ***External Owner****:*
  Department of Computing IT Team.

- ***Interface Details****:*

  o   ***Integration****: Internal admin panel linked to the website database.*

  o   ***Behavior****: Restricted to authenticated users (e.g., HOD and coordinator) for making updates.*

8. Backup System

- ***Purpose****:*
  Ensures data safety by maintaining regular backups of website data, timetables, forms, and announcements.

- ***External Owner****:*
  Department of Computing IT Team.

- ***Interface Details****:*

  o   ***Integration****: cloud-based storage for secure backup processes.*

  o   ***Behavior****: Periodically backs up critical data for recovery during failures.*

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3.3 Communications Interfaces

The Department of Computing (DoC) website relies on various communication interfaces to connect with systems, devices, and users. These interfaces ensure secure and efficient data exchange and accessibility.

1. Local Area Network (LAN)

- *Purpose:*
  Facilitates secure internal communication for administrative tasks like timetable updates, announcements, and database management.

- *Details:*

  - *Protocol:*

    - *HTTP/HTTPS for accessing the website on the intranet.*

    - *SQL for connecting to the local database.*

  - *Behavior:*

    - *Administrative staff and faculty can use the LAN to access backend systems for uploads and updates.*

  - *Security:*

    - *Firewalls and VLAN segmentation to isolate sensitive data and restrict unauthorized access.*

2. Internet Communication

- *Purpose:*
  Provides public access to the website and supports external communications like email notifications and chatbot integration.

- *Details:*

  - *Protocols:*

    - *HTTPS for secure web access.*

    - *SMTP for sending emails (e.g., form submissions and complaints).*

  - *Behavior:*

    - *Students and prospective users access the website from external locations.*

    - *Facilitates email-based workflows for form submissions and responses.*

3. Communication with Database Systems

- *Purpose:*
  Enables storage and retrieval of information, such as faculty profiles, timetables, and library data.

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- *Details:*

    o *Protocols:*

        ▪ *SQL for database queries.*

    o *Behavior:*

        ▪ *Real-time retrieval of data for timetables, records, and library resources.*

        ▪ *Admins use secure access to update information.*

4. Backup and Failover Communication

- *Purpose:*
  Ensures data reliability by backing up critical information.

- *Details:*

    o *Protocols:*

        ▪ *SFTP for secure backup file transfers.*

    o *Behavior:*

        ▪ *Regular backups are sent to a remote or cloud-based storage system for disaster recovery.*

5. User Communication Devices

- *Purpose:*
  Enables interaction between users (students, faculty, and staff) and the website.

- *Details:*

    o *Protocols:*

        ▪ *HTTPS for secure and encrypted communication with users.*

    o *Behavior:*

        ▪ *Responsive design ensures compatibility across devices (desktops, laptops, tablets, and mobile phones).*

6. Networking Hardware Communication

- *Purpose:*
  Maintains stable connections between systems and devices.

- *Details:*

    o *Hardware:*

        ▪ *Routers, switches, and firewalls for efficient routing and security.*

    o *Behavior:*

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- *Ensures uninterrupted communication between the website, database, and email servers.*

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4. System Functions / Functional Requirements

4.1 System Functions

Based on the project proposal for the Department of Computing website, here is an example of how system functions and attributes can be organized for the website:

System Functions

Ref #	Functions	Category	Attribute	Details & Boundary Constraints
R1.1	Integrated Admission Form: Collect student admission information securely	Evident	System Response Time	Form submission within 5 seconds
R1.2	Complaint Box: Allow students and faculty to submit complaints and feedback	Evident	Email Response Time	Complaint submission should be acknowledged within 5 minutes
R1.3	Section-wise Timetable: Display semester-specific timetables for students and faculty	Evident	Data Upload Speed	Timetable must be uploaded manually but visible to users within 10 minutes
R1.4	Events and News Announcement Area: Display announcements and events for the department	Evident	Display Time	Events must be displayed within 3 seconds of the user visiting the page
R1.5	Library Books Database: Searchable list of books available in the department's library	Hidden	Search Efficiency	Search results should appear within 2 seconds after query submission
R1.6	FYP Forms: Enable students to fill and submit Final Year Project forms	Evident	Submission Time	FYP form submission should take no longer than 2 minutes
R1.7	Chatbot: Assist users with frequently asked questions and provide quick information	Frill	Response Time	Chatbot should provide responses within 3 seconds

System Attributes / Nonfunctional Requirements

Attribute	Details and Boundary Constraints	Category
Response Time	The system should respond to form submissions within 5 seconds.	Mandatory
Concurrent User Load	The system must support at least 10 simultaneous users without performance degradation.	Mandatory
Data Upload Speed	Timetable and event data should be uploaded and available to users within 10 minutes.	Optional
Search Speed	The system should return library book search results in under 2 seconds.	Optional

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User Interface	*The interface should be browser-based with a responsive design for various devices.*	*Mandatory*
System Availability	*The system should be available 24/7 with scheduled maintenance downtime, not exceeding 2 hours per month.*	*Mandatory*
System Security	*All forms, particularly the admission form, should use secure HTTPS protocols for data transmission.*	*Mandatory*

Category Explanation:

- **Evident:** *These are functions visible to users, like filling out the admission form or submitting complaints. Users will directly interact with these functions.*

- **Hidden:** *These functions are behind the scenes, like maintaining the library database, but they are crucial for the system's overall performance.*

- **Frill:** *Optional features that add value but are not critical for the basic functionality of the website, such as the chatbot.*

These system functions and attributes outline both the functional and nonfunctional requirements for the Department of Computing website. The system will be responsive, secure, and efficient, with a focus on user-friendliness and accessibility.

4.2 Use Cases

Describe the following items:

- *Actors & use cases*

- *Use case diagrams*

- *High level, essential use cases*

Actors & Use Cases

Actors:

1. **Student**: *Views timetables, faculty info, library books, and submits forms.*

2. **Faculty**: *Manages timetables, views personal info, and reviews complaints.*

3. **Administrator**: *Manages website content, uploads timetables, and updates library database.*

4. **Prospective Student**: *Submits General form.*

5. **Chatbot**: *Provides automated answers to FAQs.*

Use Case Diagram

Actors interact with use cases like:

- **Student**: *View Timetable, Submit Forms, Chat with Chatbot.*

- **Faculty**: *Manage Timetable, Review Complaints, Chat with Chatbot.*

- **Administrator**: *Upload Timetables, Manage Content, Review Complaints.*

- **Prospective Student**: *Submit Admission Form.*

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- *Chatbot: Provide FAQ Assistance.*

High-Level Use Cases

- *Student: View timetable, submit forms, chat with chatbot.*

- *Faculty: View timetable, submit/review complaints, chat with chatbot.*

- *Administrator: Upload timetables, update content, review complaints.*

- *Prospective Student: Submit admission form.*

- *Chatbot: Provide FAQ assistance.*

4.2.1 List of Actors

4.2.1 List of Actors and Use Cases

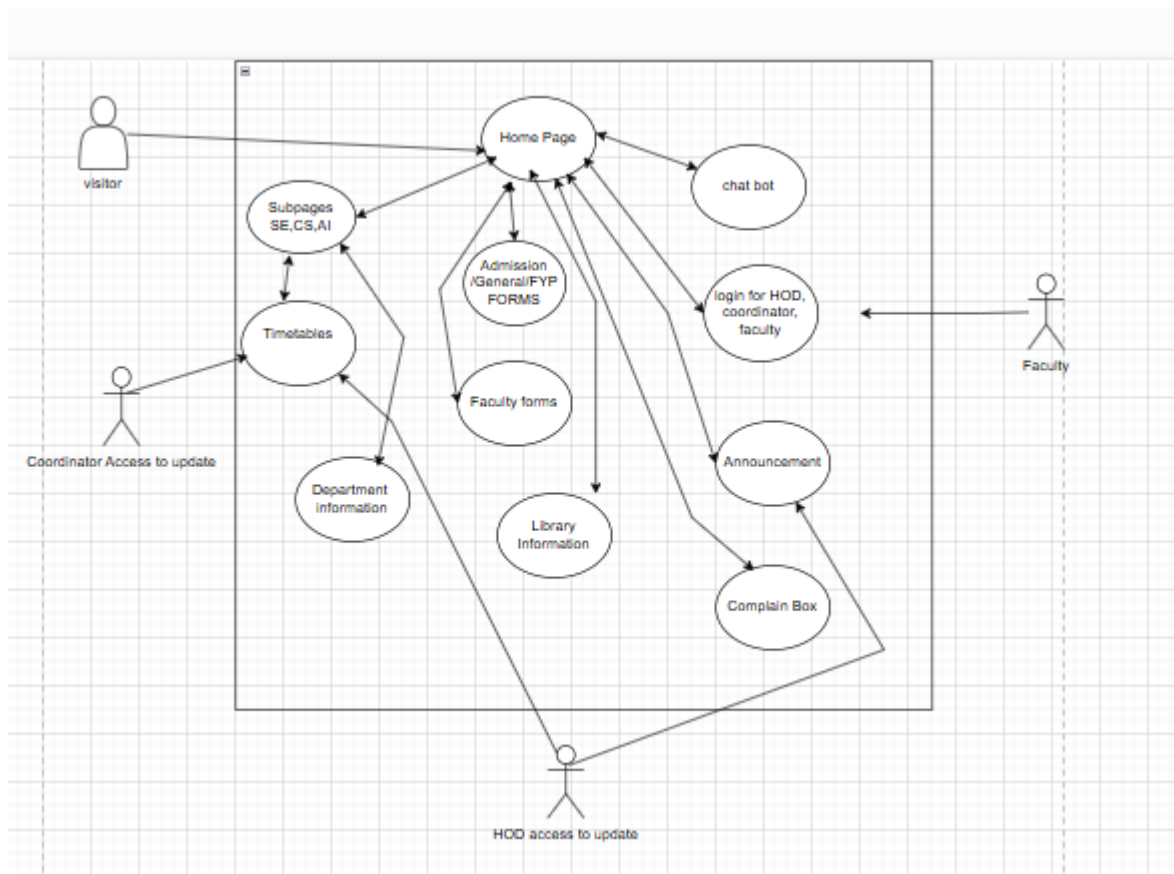| Actor	Use Cases
Student	- View Timetables - Submit Admission Form - Submit Complaints - Search Library Books - Chat with Chatbot
Faculty	- View Personal and Departmental Information - Manage Timetable - Review Complaints - Submit Complaints - Search Library Books - Chat with Chatbot
Administrator	- Upload and Manage Timetables - Update Faculty and Departmental Information - Maintain Library Book Database - Review and Manage Complaints - Monitor User Interactions with Chatbot
Prospective Student	- View Admission Information - Submit Admission Form
Chatbot	- Provide FAQ Answers - Assist Users with Website Navigation

4.2.2 List of Use Cases

Use Case	Description
View Timetables	Display semester-wise timetables for students and faculty.
Submit Admission Form	Allow students to submit an online admission form.
Submit Complaints	Provide a form to submit feedback or complaints.
Search Library Books	Allow users to search and view available library books.
Chat with Chatbot	Provide automated responses to common questions.
Manage Timetables	Faculty manage and update their own timetables.
Review Complaints	Admin reviews and manages submitted complaints.
Update Faculty Information	Admin updates faculty and departmental details.
Monitor Website Content	Admin ensures website content is current and accurate.
Register for Events	Students register for events and activities.
Display News and Announcements	Show updates and announcements for the department.

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Manage Final Year Projects	*Admin manages forms and records for Final Year Projects.*
Sort/Search Records	*Users sort and search through student, faculty, or event records.*

4.2.3 Use Case Diagram

4.2.4 Description of Use Cases
Use Case: Access Timetables

Section	*Details*
Name	*Access Timetables*
Actors	*Visitor, Coordinator, HOD, Faculty*
Purpose	*Allow users to view or update timetable details.*

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Description	Visitors can view timetables. Coordinators and HODs can manage timetable updates.
Cross References	Functions: R1.1, R1.2
Pre-Conditions	Timetables must be preloaded and accessible in the system.
Successful post-conditions	Users can view or update timetable information successfully.
Failure post-conditions	Errors occur in accessing or saving timetable data.

Typical Course of Events:

Actor Action	System Response
1. User selects "Timetables" from the home page.	System displays timetable details.
2. Coordinator or HOD modifies timetable details.	System saves updates and confirms the changes.

Alternative Course:

Step	Description
. Error in data upload or update.	System notifies the user about the error and prompts retry.

Use Case: Submit Complaint

Section	Details
Name	Submit Complaint
Actors	Student, Faculty, Administrator
Purpose	Allow users to submit and manage complaints.
Description	Students and faculty submit complaints, while administrators review them.
Cross References	Functions: R2.3
Pre-Conditions	Complaint submission feature must be enabled.
Successful post-conditions	Complaint is submitted and stored in the system.
Failure post-conditions	Complaint is not submitted or an error occurs.

Typical Course of Events:

Actor Action	System Response
1. User navigates to the "Complaint Box" section.	System loads the complaint submission form.

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2. User fills out and submits the form.	*System stores the complaint and sends a confirmation message.*

Alternative Course:

Step	*Description*
Network error during submission.	*System notifies the user to try again later.*

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5. Non - Functional Requirements

5.1 Performance Requirements

1. The website should load within 3 seconds for all users with an average internet speed of 5 Mbps.
2. Concurrent usage should support at least 100 users simultaneously without noticeable lag.
3. The search functionality (e.g., library book database, faculty profiles) should retrieve results within 1 second on average.
4. The integrated admission and complaint forms should process and submit data within 5 seconds after the user clicks the submit button.
5. The website must maintain a 99.5% uptime during operational hours.
6. Dynamic elements, such as event announcements and timetable uploads, should update in real time (or within 5 minutes for manual updates).

5.2 Safety Requirements

1. The website must comply with data protection regulations such as GDPR or local equivalents to ensure the safety of user data.
2. User credentials and sensitive information (e.g., admission forms, complaint submissions) must be encrypted using AES-256 or equivalent.
3. Regular security audits must be performed to identify and mitigate vulnerabilities, especially for the database and user interaction forms.
4. Implement safeguards against common web vulnerabilities, including SQL injection, cross-site scripting (XSS), and cross-site request forgery (CSRF).
5. User-uploaded data (e.g., complaints or general forms) should be sanitized to prevent malicious inputs.
6. Backup mechanisms should ensure that all data is saved securely and can be recovered within 24 hours in case of an incident.
7. Ensure that the complaint box and chatbot are monitored to prevent malicious or inappropriate use.

5.3 Security Requirements

- Use secure login credentials with role-based access.
- Encrypt sensitive data in transit (TLS 1.3) and at rest (AES-256).
- Regularly apply security patches and conduct penetration testing every 6 months.
- Implement input validation to prevent attacks and maintain secure session handling.
- Maintain activity logs for 6 months and enable quick backup recovery within 2 hours

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5.4 Reliability Requirements

- *Ensure **99.5% uptime** with downtime scheduled off-peak.*
- *Provide clear **error handling** and maintain **data integrity** during operations.*
- *Use a **failover mechanism** for server recovery within 5 minutes.*
- *Design for **scalability** to handle up to 300 users in future upgrades.*
- *Set up **real-time monitoring** with alerts for system issues.*

5.5 Usability Requirements

*. The website should have an **intuitive and user-friendly interface** accessible to both tech-savvy and non-technical users.*

*Ensure **responsive design** for seamless use on desktops, tablets, and smartphones.*

*Key features like forms, search functionality, and timetable access should be **easily navigable** within 3 clicks.*

*Provide **multi-language support** for English and Urdu if feasible in future iterations.*

*Include **tooltips, FAQs, and chatbot assistance** for user guidance.*

5.6 Supportability Requirements

- *Use **modular code architecture** to simplify updates and feature enhancements.*
- *Ensure compatibility with major **browsers (Chrome, Firefox, Edge)** and common versions of **mobile OS**.*
- *Maintain **comprehensive documentation** for developers and administrators for troubleshooting and updates.*
- *Provide a **feedback mechanism** to gather user input for iterative improvements.*
- *Plan for **routine maintenance** with minimal downtime, ensuring future upgrades can be applied without disrupting current functionality.*

5.7 User Documentation

- ***Comprehensive User Manual:***
  Provide a detailed user manual covering all website features, including navigation, forms, search functionality, timetable access, and the complaint box.

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- *Quick Start Guide:*
  Include a short guide with step-by-step instructions for first-time users to quickly access essential features like admissions, events, and library searches.
- *Help and Support Section:*
  Offer an integrated help page with FAQs, troubleshooting steps, and contact details for technical support.
- *Tooltips and On-Screen Guidance:*
  Implement tooltips and contextual help for interactive elements such as forms and search bars.
- *Video Tutorials (Optional):*
  Provide short video guides for commonly used features, like submitting forms, using the chatbot, or searching the library database.
- *Periodic Updates:*
  Ensure the documentation is updated with every significant website enhancement or new feature release.

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6. *References*

List References