Software Requirements Specification

for

<Admission Automation System >

Version 1.0 approved

Prepared by <Elite Force>

<PES University>

<September 15, 2023 >

Table of Contents

Revision History

Name	Date	Reason For Changes	Version
Elite Force	15/08/2023	Initial draft	1.0 draft 1

1. Introduction

1.1 Purpose

This SRS describes the software requirements for the Admissions Automation System (AAS), release 1.0. The AAS is a software system aims to automate and streamline the admission process for students participating in the COMEDK examination. The system covers the entire admission lifecycle, starting from the application for the COMEDK exam and concluding with the admission of students to respective colleges.

1.2 Product Scope

AAS efficiently manages the entire journey, from application submission to seat allocation, improving accuracy, speed, and user experience. The software's core objectives include automating validation, generating rankings, allowing college preferences, and implementing a fair and systematic seat allotment process. The AAS will be a web-based application that will be accessible to applicants, admissions staff, and faculty members.

1.3 References

1. https://www.comedk.org/
2. https://www.shiksha.com/engineering/comedk-uget-exam

2. Overall Description

2.1 Product Perspective

The product perspective for the "Admission Automation System for COMEDK" originates from the challenges encountered during the online application process and the overall admission procedures within COMEDK. These challenges primarily revolve around the lack of clarity regarding the various steps involved. To address these issues comprehensively, our objective is to develop a cohesive system that consolidates these challenges and offers effective solutions. This initiative seeks to replace the current, highly inefficient, and non-automated admission process with an automated alternative. Central to this endeavor is the requirement for a robust database encompassing student information, college details, and other pertinent data, which may pose a potential constraint.

2.2 Product Functions

- ***Portal for Application****:* Allows students to apply for the COMEDK exam and provides an online application form.
- ***Application Handling:*** Enables students to fill the application and validates application details.
- ***Ranking Management:*** Provides a portal for entering exam rankings after the examination.

- ***Cutoff Display:*** Displays college cutoffs based on the present year's trend.
- ***College Preference Selection:*** Allows students to choose their preferred colleges.
- ***Seat Allotment:*** Considers student choices, rankings, and available seats to allot seats in 3 rounds.
- ***Admission Process:*** Facilitates document verification, manages advance payment of fees and allots admission numbers.

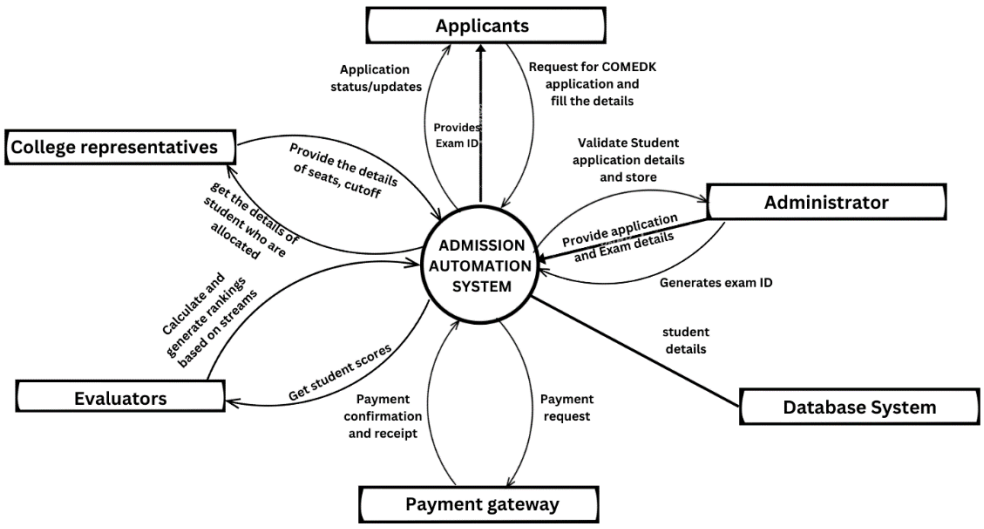

Figure 1: *Context diagram for release 1.0 of the Admission Automation System.*

2.3 User Classes and Characteristics

Applicants:
Applicants are prospective students applying for the COMEDK examination through the system. They apply for the examination through AAS portal and seek an intuitive and user-friendly interface to smoothly complete the application procedures. Also should be able to choose their preference of college. The system should facilitate a seamless experience for them, guiding them through the process efficiently.

Administrators:
Administrators within the educational institution are responsible for managing and overseeing the admission process through the system. They possess moderate to advanced technical skills, enabling them to handle system administration and database management tasks. They are responsible for tracking the applications. These users require access to various administrative features for monitoring the progress of the application and admission process

Examiners and Evaluators:
Examiners and evaluators are individuals involved in evaluating exam papers and determining rankings for applicants. They require access to the evaluation module and tools for accurate ranking generation.

The system should facilitate an efficient and secure evaluation process, ensuring fair ranking for the applicants.

College Representatives:
College representatives are staff members representing colleges participating in the admission process. They navigate and utilize the system for viewing allotted students and confirming admissions. These users require access to features related to confirming admissions and managing allotted seats.

Support and Helpdesk:
Support and helpdesk staff play a crucial role in providing assistance and guidance to users encountering issues while using the system. They will troubleshoot and resolve user-reported problems effectively. Access to a support module and logs(if possible) is essential for these users to track and address user queries promptly.

Payment Gateway:
The system is used to pay the required exam fees securely and efficiently, ensuring successful registration for the exam. Also aids in secure admission by paying the admission fees to the respective colleges.

2.4 Operating Environment

OE-1: The system shall be accessible through the following web browsers: Microsoft Internet Explorer versions 11 and above, Google Chrome (latest version) and Mozilla Firefox (latest version).
OE-2: The system shall operate on servers running the current corporate approved versions of Apache Web Server (version 2.4 and above), a robust choice for its reliability and efficiency in handling web requests.

2.5 Design and Implementation Constraints

CO-1: Resource constraints: The resources for the databases are not absolutely verified as they are just trends that have been followed by the previous years.
CO-2: Security constraints: The whole code base will not be written in php therefore, the code base may be prone to security issues.

2.6 User Documentation

UD-1: User Manual:
The User Manual will be divided into sections, each focusing on different aspects of using the system. It will start with an introduction to the system and its features. Subsequent sections will cover user registration, application submission, viewing results, and other functionalities. Each section will provide step-by-step instructions, accompanied by screenshots, to guide users effectively.

2.7 Assumptions and Dependencies

AS-1: Assuming that the data regarding colleges, including seat availability and other admission criteria, will remain consistent and up to date in the underlying database.
DE-1: The operation depends on the changes made in the COMEDK process

3. External Interface Requirements

External interface requirements are critical in the context of the "Automation of All Activities Related to Admission to Professional Course COMEDK" project. These interfaces specify how the software product interacts with different entities such as people, hardware components, other software systems, and communication channels. It is critical to have a well-defined set of interfaces in place to ensure a smooth and fast admission process for both candidates and administrators**.**

3.1 User Interfaces

UI-1: Logical Features of User Interfaces
The user interfaces in this project act as a link between the software product and its users, who each play a unique part in the admissions process.
The system is meant to serve two key user roles:

Administrators: The administrator interface will include a comprehensive dashboard that provides an overview of the admission process, application statistics, and tools for managing applicant data efficiently.
Applicants: Applicants will interface with the frontend system to submit admission applications, provide required documentation, and receive application status updates.

UI-2: GUI (Graphical User Interface):
The graphical user interface is created in a modern and user-friendly manner. It shall adhere to recognized GUI standards. A responsive design guarantees that the interface adapts to different devices and screen sizes, such as desktop computers, tablets, and smartphones.
UI-3: Buttons and functions that are standard:
Consistency shall be maintained across displays by the use of common buttons and actions such as "Submit," "Save," "Back," and "Logout", which will make navigation simple and straightforward.
UI-4: Keyboard Shortcuts and Help Functionality:
A "Help" button will be available on every screen to aid users in their interactions with the system, giving context-specific guidance. In addition, keyboard shortcuts are used to improve efficiency and cater to users who prefer keyboard-based interactions.
UI-5: Display of Error Message:
The error messages in the system are standardized for clarity and actionability. When problems develop, users receive clear and simple feedback, guaranteeing a pleasant application experience.

3.2 Hardware Interfaces

HI-1: Server Hardware
Dedicated servers with the requisite processing power and memory shall be employed to ensure the system can handle simultaneous user interactions efficiently.

HI-2: Storage Devices
The system will interact with various storage devices, encompassing both primary and backup storage. Data interactions primarily involve read and write operations, ensuring data integrity and availability.

HI-3: Network Connectivity
The software will have robust network connectivity to facilitate communication between software components and external systems. This connectivity encompasses databases, external payment gateways, and communication with external educational institutions.

3.3 Software Interfaces

SI-1: Interconnections with Other Software Components
The software interfaces of the present project encompass interconnections with diverse software components and external systems, each of which plays a crucial role in automating admission-related activities.

SI-1.1: Database Management System (DBMS): A specific DBMS, such as MySQL shall be utilized for efficient storage and retrieval of applicant data, admission records, and other pertinent information. SQL queries and data transfer protocols are meticulously defined to ensure data integrity and security.

SI-1.2: Operating System: The software shall be designed to operate on a designated operating system, with platform-specific functionalities. This ensures seamless compatibility and system stability.

SI-1.3: Web Services: Interface will be integrated with web services, which is essential for various functionalities, including online payment processing, document verification, and communication with external educational institutions.

SI-1.4: Third-Party Libraries: To expedite development and enhance functionality, certain third-party libraries and frameworks will be integrated. These libraries can include authentication modules, data validation tools, and other components that augment the system's capabilities.

SI-1.5: Communication with COMEDK: The interface enables retrieval of applicant data, updates on admission status, and the exchange of information pertinent to the admission process. The specifics of this interface are documented separately to ensure accurate and reliable communication.

3.4 Communications Interfaces

CI-1: Email Communication
The system will employ SMTP (Simple Mail Transfer Protocol) to send email notifications to applicants. These emails encompass critical information, including application status updates, deadlines, and other pertinent details.

CI-2: Web Browser Interaction
Applicants and administrators access the system through web browsers, employing HTTP/HTTPS protocols for secure data transfer. This web-based approach will ensure accessibility across a wide range of devices and platforms.

CI-3: Network Server Communications
Secure communication protocols such as HTTPS will be utilized to facilitate interactions with external servers. This includes communication with payment gateways to ensure the secure processing of financial transactions.
CI-4: Electronic Forms
The forms submitted by applicants through the web interface are meticulously designed to collect all necessary information securely and efficiently.
CI-5: Communication Security
The system will implement encryption mechanisms (e.g., TLS/SSL) to safeguard the confidentiality and integrity of data during transmission.
CI-6: Data Transfer Rates and Synchronization Mechanisms
Data transfer rates shall be optimized to prevent delays in processing applications and delivering timely updates. Synchronization mechanisms shall ensure real-time data consistency between the frontend and backend systems, as well as with external data sources.

4. System Features

4.1 System Feature-1: Online Application Submission

4.1.1 Description and Priority

This feature allows applicants to submit their applications online. It is of High priority, as it is a fundamental step in the admission process, enhancing efficiency for both applicants and administrators.

4.1.2 Stimulus/Response Sequences

Stimulus: An applicant accesses the online application portal and the applicant fills in the required information and uploads necessary documents.
Response: The system displays the application form with relevant fields for data input and the system validates and stores the applicant's data and documents securely.

4.1.3 Functional Requirements

REQ-1: The system must provide a user-friendly interface for applicants to complete the online application form.
REQ-2: The system must validate applicant data in real-time, checking for completeness and accuracy.
REQ-3: Applicants must be able to save their progress and return to complete the application later.
REQ-4: The system must allow applicants to upload and attach required documents (e.g., transcripts, certificates) in common file formats (PDF, JPEG).
REQ-5: The system should generate a unique application ID for each applicant upon submission.
REQ-6: If an applicant tries to submit incomplete or invalid data, the system must provide clear error messages indicating the issues and steps for correction.
REQ-7: The system should send an email confirmation to the applicant upon successful submission, including the application ID and important instructions.
REQ-8: Applicants should have the option to review and edit their submitted application before the final deadline

4.2 System Feature-2: Application Status Tracking

4.2.1 Description and Priority

This feature allows applicants to track the status of their applications. It is of Medium priority, providing transparency and reducing applicant inquiries.

4.2.2 Stimulus/Response Sequences

Stimulus: An applicant logs into their account and clicks on an application status for more details.
Response: The system displays the current status of their application, e.g., "Received," "Under Review," "Accepted," or "Rejected." The system provides additional information, such as the date of status update and any pending actions required from the applicant.

4.2.3 Functional Requirements

REQ-1: Applicants must be able to log into their accounts using their unique credentials (e.g., username and password).
REQ-2: The system should display the current status of the applicant's application prominently on the dashboard upon login.
REQ-3: Applicants should receive email notifications when there is a change in the status of their application.
REQ-4: In case of a status change requiring action from the applicant (e.g., additional documentation needed), the system should clearly communicate these requirements to the applicant.
REQ-5: For rejected applications, the system should provide a brief reason for rejection (e.g., "Incomplete Documentation" or "Not Meeting Minimum Criteria").

4.3 System Feature-3: Ranking Calculation

4.3.1 Description and Priority

This feature calculates rankings based on student exam scores for both engineering and medical streams. It is of High priority as it's crucial for seat allotment.

4*.3.2 Stimulus/Response Sequences*

Stimulus: Student exam scores are submitted.
Response: The system calculates rankings separately for engineering (PCM) and medical (PCMB).

4.3.3 Functional Requirements

REQ-1: The system must accept and store student exam scores for PCM and PCMB.
REQ-2: Rankings should be calculated based on predefined formulas for engineering and medical streams.
REQ-3: Rankings should be updated automatically as new scores are submitted.

4.4 System Feature-4: College Preference Selection

4.4.1 Description and Priority

This feature allows students to select their preferred colleges from a list. It is of Medium priority,

as it comes after ranking calculation.

4.4.2 Stimulus/Response Sequences

Stimulus: Student accesses the college preference selection interface and selects preferred colleges and submits choices.
Response: The system displays a list of available colleges, stores student preferences.

4.4.3 Functional Requirements

REQ-1: The system must provide a user-friendly interface for students to select their preferred colleges.
REQ-2: Colleges must be listed based on availability and proximity.
REQ-3: Students should receive confirmation of their selected college preferences.

4.5 System Feature-5: Seat Allotment - Rounds

4.5.1 Description and Priority

This feature is part of the seat allotment process for the first round. It checks the availability of seats in colleges, considering student rankings and preferences. It is of High priority as it's a critical step in the admission process.

4.5.2 Stimulus/Response Sequences

Stimulus: Seat allotment process for the first round is initiated.
Response: The system checks seat availability in selected colleges based on student rankings and preferences.

4.5.3 Functional Requirements

REQ-1: The system must retrieve and maintain up-to-date seat availability data for all colleges from the database.
REQ-2: The system should consider student rankings, preferences, and seat availability to make initial seat allotments.
REQ-3: In case of multiple students preferring the same seat, a fair allocation mechanism (e.g. based on ranking) should be implemented.
REQ-4: The system should generate a report of seat allotments for the first round and notify students of their allotted seats.
REQ-5: If the student prefers to join the college, ask for confirmation and allot a admission number based on the college.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

PE-1: The system operations such as user registrations and application submissions must have an

acceptable response time of no longer than 5 seconds.

PE-2: The system shall display confirmation messages to applicants within 3 seconds after the applicant submits information to the system.

PE-3: The system should be able to handle a significant increase in user traffic during peak admission periods without degrading performance.

5.2 Safety Requirements

SA-1: Ensure the system operates reliably by implementing fault tolerance mechanisms, load balancing and failover capabilities to minimize system downtime.

SA-2: System shall guarantee that admission process is not compromised by system errors or vulnerabilities by implementing error handling procedures and validation checks.

SA-3: The system should ensure applicant data is stored securely and data integrity is maintained. System shall implement robust data backup and recovery mechanisms to prevent data loss and ensure data availability.

SA-4: System crashes shall be prevented by implementing effective error handling mechanisms.

5.3 Security Requirements

SE-1: All network transactions that involve financial information or personally identifiable information shall be encrypted.

SE-2: Robust user authentication and authorization mechanisms should be implemented to prevent unauthorized access to sensitive data.

SE-3: For ensuring secure data transmission, data exchanged between the system and users must be encrypted (SSL/TLS).

5.4 Software Quality Attributes

Availability: System should have near-continuous availability (99%) to ensure applicants can access it at any time, especially during critical admission deadlines.

Correctness: The system must produce accurate and correct results in all operations, such as calculating scores or processing payments.

Maintainability: The codebase and architecture should be designed for easy maintenance and updates to meet evolving requirements.

Portability: The system should be deployable across various platforms and environments, ensuring it can serve a wide range of institutions.

Robustness: The system should gracefully handle unexpected inputs and error conditions without crashing or compromising data integrity.

Usability: The system shall have an intuitive interface and clear instructions hence prioritizing ease of use for applicants, administrators, and other stakeholders.

5.5 Business Rules

BU-1: User Roles and Permissions

Rule: Different user roles exist such as applicants, administrators, admission officers and reviewers. System shall ensure that each user role has specific permissions.

Functionality: Applicants can submit applications, view their status and make payments. Administrators can manage user accounts, officers can review applications and reviewers can assess applications.

BU-2: Application deadline

Rule: There will be a strict application submission deadline.

Functionality: System will prevent applications from submitting/modifying after the deadline.

BU-3: Payment Rules

Rule: Applicants must pay application fees.

Functionality: System shall facilitate secure payment processing and track its status.

BU-4: Multiple Rounds

Rule: Some admission processes may involve multiple rounds (counseling)

Functionality: System in that case will support the scheduling and management of multiple rounds.

6. Other Requirements

Legal Requirements: The system shall comply with all relevant data privacy and protection laws, including GDPR (General Data Protection Regulation) and local data protection regulations. Terms and conditions for using the system shall be clearly defined and presented to users during the application process

Appendix A: Glossary

AAS: Admission Automation System

COMEDK (Consortium of Medical, Engineering and Dental Colleges of Karnataka):An examination board for admission to private engineering and medical colleges in Karnataka, India.

PCM (Physics, Chemistry, Mathematics): A common subject combination in the COMEDK exam for engineering rankings.

PCMB (Physics, Chemistry, Mathematics, Biology): A subject combination in the COMEDK exam that includes Biology for medical rankings.

Applicant: An individual interacting with the system, such as students, administrators, or college representatives.

API (Application Programming Interface): A set of rules and protocols allowing different software applications to communicate with each other.

UI (User Interface):The means by which a user interacts with the software, including screens, pages, buttons, and icons.

UX (User Experience): The overall experience a user has while interacting with the software, encompassing usability, accessibility, and satisfaction.

Enrollment: The process of registering a student's details in the system for participation in the admission process.

Ranking: A numerical position assigned to a student based on their performance in the COMEDK exam.

Document Verification: The process of validating and authenticating the submitted documents for admission.

Admission Number: A unique identifier assigned to a student upon successful admission to a college.

Payment Gateway: An e-commerce service that authorizes payment for e-businesses and online retailers.