3. Requirements

3.1. Functional requirements

Req#	Requirements	Discription	Comments	Rate	SME Reviewed\Approved
FR_01	Student Enrollment Management	Automates student enrollment by converting student IDs into matriculation numbers.	Eliminates manual data entry, reducing errors.	High	K.Mihali A.Haldeda E.Shehu
FR_02	Scholarship Allocation	Manages and automates scholarship allocation based on predefined criteria.	Ensures fairness and transparency.	High	K.Mihali A.Haldeda E.Shehu
FR_03	Real-time Report Generation	Generates student-related reports automatically in real time.	Reduces manual workload and enhances accuracy.	High	K.Mihali A.Haldeda E.Shehu
FR_04	Student Data Security	Implements high-level security for student records.	Protects sensitive student information.	High	K.Mihali A.Haldeda E.Shehu
FR_05	Attendance Tracking	Tracks and monitors student attendance digitally.	Replaces traditional attendance methods.	High	K.Mihali A.Haldeda E.Shehu
FR_06	Fee Payment Processing	Manages student fee payments and financial records.	Ensures accurate and transparent transactions.	High	K.Mihali A.Haldeda E.Shehu
FR_07	Extracurricular Activity Management	Records and manages student participation in extracurricular activities.	Supports holistic student development.	Medium	K.Mihali A.Haldeda E.Shehu
FR_08	Student Profile Management	Maintains and updates student personal and academic details.	Ensures data consistency and accessibility.	High	K.Mihali A.Haldeda E.Shehu

FR_09	Course Registration	Enables students to register for courses online.	Simplifies the course selection process.	High	K.Mihali A.Haldeda E.Shehu
FR_10	Student Communication System	Sends notifications regarding academic and administrative updates.	Enhances communication between students and staff.	Medium	K.Mihali A.Haldeda E.Shehu
FR_11	Complaint and Request Management	Allows students to submit complaints and requests digitally.	Streamlines issue resolution.	Medium	K.Mihali A.Haldeda E.Shehu
FR_12	Document Generation	Automatically generates student-related documents (transcripts, certificates, etc.).	Reduces manual paperwork.	High	K.Mihali A.Haldeda E.Shehu
FR_13	Mobile Accessibility	Provides a mobile-friendly interface for students and staff.	Improves accessibility and usability.	Medium	K.Mihali A.Haldeda E.Shehu
FR_14	Workflow Automation	Automates administrative tasks such as approvals and notifications.	Enhances operational efficiency.	Medium	K.Mihali A.Haldeda E.Shehu

3.2 Non-Functional Requirements

Non-functional requirements specify criteria that determine the overall operation of the DOS-MS rather than individual behaviors. These include security, performance, availability, and compliance requirements. Unlike functional requirements, non-functional requirements are mandatory for ensuring a robust and usable system. Compliance with these requirements is typically evaluated with a simple "yes" or "no" response.

3.2.1 Product Requirements

3.2.1.1 Security Requirements

- Encryption of sensitive student and faculty data at rest and in transit.
- Implementation of multi-factor authentication (MFA) for all administrative users.
- Role-based access control (RBAC) to restrict unauthorized access to confidential records.
- Periodic penetration testing and security audits.
- Secure backup mechanisms to prevent data loss in case of cyberattacks.
- Compliance with GDPR and local data protection laws.

3.2.1.2 Performance Requirements

- The system should have a response time of less than 3 seconds for common operations.
- High availability (at least 99.9% uptime) during academic periods.
- Support for concurrent logins of at least 10,000 users without performance degradation.

3.2.1.3 Reliability Requirements

- Automated backups to ensure minimal data loss in case of failures.
- Redundancy and failover mechanisms for database availability.
- A disaster recovery plan with a maximum downtime of 15 minutes in case of failure.

3.2.2 Organizational Requirements

1. Training and Documentation

- Comprehensive manuals and documentation for students, faculty, and administrators.
- Training programs for university staff on system utilization.
- User-friendly helpdesk and support system integrated within DOS-MS.

2. Change Management

- Procedures for system updates, patches, and modifications.
- Version control and rollback plans for failed updates.

3.2.2.1 Environmental Requirements

1. Technologies Used

- Java-based backend.
- JavaScript, HTML/CSS for front-end components.
- Spring Framework for backend management.
- PostgreSQL or MySQL for database management.

2. Infrastructure and Hardware

- Minimum and recommended server and client hardware specifications.
- Compatibility with existing IT infrastructure.
- Environmental control for server rooms (temperature, humidity, power backup, etc.).

3. Software Dependencies

- List of required software, including OS, database, middleware.
- Compatibility with third-party tools like learning management systems (LMS).

4. Network Requirements

- Network bandwidth requirements for optimal system performance.
- Firewall and intrusion detection systems for security.
- Secure API communication with external services.

5. Data Storage and Management

- Storage capacity requirements based on expected student records.
- Data backup strategies and retention policies.
- Compliance with academic regulations for student record-keeping.

6. Environmental Security

- Physical security measures for university data centers.
- Monitoring and logging mechanisms to detect unauthorized access.

7. Integration with External Systems

- Integration with third-party financial management tools for fee processing.
- Compatibility with university ERP systems.
- Secure data exchange protocols for student record validation.

8. Scalability Testing Environment

- A dedicated testing environment to simulate system scalability scenarios.
- Performance benchmarks and stress testing procedures.

9. Regulatory Compliance Monitoring

- Compliance with university accreditation standards.
- Regular audits to ensure adherence to legal and institutional policies.

10. Usability Testing Environment

- Conducting UI/UX testing for accessibility improvements.
- Involvement of students and faculty in usability tests.

11. Training Facilities

- Dedicated training centers with necessary IT infrastructure.
- Online training modules and self-service documentation.

3.2.3 External Requirements

1. Integration

- Seamless integration with third-party payment gateways.
- Compatibility with external academic databases for student verification.
- API-based integration for external institutions or partner universities.

2. Regulatory Compliance

- Compliance with national and international academic policies.
- Adherence to data protection laws like GDPR for student data management.
- Compliance with educational accreditation bodies' regulations.

3.2.3.1 Ethical Requirements

1. Fair Student Management Practices

- Transparent evaluation and grading system.
- Prevention of bias in scholarship allocation.

2. Responsible Use of Student Data

- Ethical handling of student information.
- Explicit consent required before sharing student data with external entities.

3.2.3.2 Legislative Requirements

1. Data Protection and Privacy

- Compliance with local and international data privacy regulations.

- Secure storage and processing of student records.

2. University Governance Policies

- Compliance with university academic policies regarding student records, grading, and financial transactions.

3. Financial Regulations

- Compliance with educational funding policies for scholarship distribution.
- Integration with financial institutions for payment transactions.

3.3 Domain Requirements

1. Academic Record Management

- Secure and structured storage of student grades and attendance records.
- Audit logs for all record modifications.

2. Scholarship and Financial Aid Processing

- Automated eligibility checks for scholarships.
- Compliance with institutional financial aid policies.

3. Student Transition Management

- Automatic transition of students from high school applicants to fully enrolled university students.

4. Security and Data Protection

- Implementation of encryption for sensitive student information.
- Role-based access control for university personnel.

5. Scalability and Performance

- The ability to handle a growing number of student records.

6. Workflow and Process Automation

- Automation of administrative tasks, including course registration and reporting.

7. Audit and Reporting Capabilities

- Detailed reporting for compliance audits and administrative reviews.

8. Student Experience and Accessibility

- User-friendly interfaces for web and mobile platforms.
- Accessibility support for students with disabilities.
