### 3 Requirements

### 3.1Functional requirements

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| 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.