**FUCTIONAL REQUIREMENTS**

1. **User Authentication & Role-Based Access Control:**
   * **Requirement:** The system must provide secure login mechanisms for different types of users, including administrators (university staff), faculty members, and students. Access permissions should be defined based on roles to ensure proper data security and integrity.
   * **Justification:** Different users will have varying levels of access and functionality within the system, and maintaining security and integrity is paramount to the system's reliability and trustworthiness.
2. **Comprehensive CGPA Calculation & Management:**
   * **Requirement:** The system must be able to compute the Cumulative Grade Point Average (CGPA) for individual students based on their grades in different subjects and semesters, adhering to the specific grading system used by the university.
   * **Justification:** Accurate CGPA calculation is the core functionality of the system, and it should be adaptable to various grading patterns to serve different institutions effectively.
3. **Performance Analysis & Visualization Tools:**
   * **Requirement:** The system must provide tools for analyzing student performance across various metrics, including subject-wise performance, semester-wise trends, and comparative analyses. It should also allow the visualization of this data through graphs and charts.
   * **Justification:** Providing insightful analytics helps educational institutions in recognizing trends, understanding strengths and weaknesses, and making informed decisions.
4. **Data Import/Export & Integration:**
   * **Requirement:** The system should support importing and exporting student grade data from and to various formats like CSV, Excel, etc. Integration with existing Student Information Systems (SIS) should be considered for seamless data transfer.
   * **Justification:** Flexibility in handling data ensures that the system can be effectively utilized within different university infrastructures without necessitating a complete overhaul of existing processes.
5. **Student Report Generation & Printing:**
   * **Requirement:** Students should be able to view, download, and print their CGPA reports. These reports should be presented in a clear and professional format, containing all necessary details of their academic performance.
   * **Justification:** Enabling students to access their own performance data fosters transparency and allows them to take ownership of their academic progress. It also facilitates administrative processes by making these reports readily available.

**OBJECTIVES**

1. To design and implement a robust and secure authentication system that enables administrators, faculty members, and students to log in with specific access permissions, ensuring data security and integrity across the platform.
2. To develop an adaptable and precise CGPA calculation engine that caters to different subjects and semesters, conforming to the specific grading rules of various educational institutions, and manages the entire student grade record efficiently.
3. To create intuitive analysis tools that facilitate the examination of student performance across different parameters, including subjects, semesters, and comparative metrics, and present this information through comprehensive visual representations like graphs and charts.
4. To build a flexible data handling mechanism that supports the seamless import and export of student grade information in various formats, and integrates with existing Student Information Systems (SIS) to ensure efficient data transfer without requiring substantial changes to existing workflows.
5. To offer a user-friendly interface that allows students to view, download, and print their CGPA reports in a professional format, incorporating all necessary academic details, thereby promoting transparency and ownership of their academic achievements.