Team Guidlines

Last updated by | Melaya La Madrid | Jan 12, 2025 at 9:19 PM PST

Group 17 Members

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Ground Rules/Expectations

> - Attend all in-person labs and sections
>   - Must communicate absence AT LEAST 2 hours before class
>   - All missed in-person work must be made up before due date
> - All virtual communication through iMessage groupchat
>   - Respond to group messages by AT LEAST the next day (ASAP ~36 hours)
> - Group check-ins on class days (Lectures and Lab)
>   - Meet 30 min before class on presentation days
> - Finish Workshops in class (no leaving until assignment is submitted)
> - Delegate Milestone tasks in class and be finished by EOD Thursday
>   - Communicate when individual portions of assignment are completed
> - Communicate ANY extenuating circumstance that may reduce ability to complete quality work/contribute fully
> - Hold YOURSELF and team members accountable
> - **Open communication**
> - **Constructive feedback**
> - **Foster a positive environment**
> - **QUALITY AND EQUAL CONTRIBUTION FROM ALL MEMBERS**

Roles and Responsibilities

Member	Strengths	Responsibilities	Areas for Growth	Tasks
Melaya	Team leadership, communication, collaboration	Task delegation, time management, engage and motivate team	Organization, punctuality, constructive feedback	Submit workshops and milestones, lead discussion, facilitate group check-ins
Matt	Communication, technicals, attention to detail.	Develop solutions, help research, brainstorming	Delegating, punctuality, compromise	Market research, data analysis, frameworks.
Danae	Attention to detail, creative problem-solving, organization	Research project details, brainstorm solutions, help with team brainstorming	Confidence in presenting, balancing workload	Research key project topics, contribute ideas during meetings, double-check content accuracy
Livia	Communication, creative & holistic problem-solving, organization, task & resource management, technical skills	Ideation, team coordination, peer feedback, research, presentation and stand-ups, development	Time management, compromise	Research, wireframing, creating and organizing presentation materials, team feedback

Conflict Resolution Process

1. Bring up the problem early, make use of peer feedback sessions, or one-on-one if appropriate.
2. Communicate all views, grievances etc. and find common goals. Refer to the expectations and ground rules outlined in this contract. Outline a plan for future improvement.
3. If a member consistently violates this contract even after communication and agreements, consult the rest of the team to decide how to proceed.
4. A Team Warning may be issued if agreed upon by the majority of the remaining group members

Ongoing Peer Feedback

- Conduct weekly feedback sessions to discuss team dynamics and individual contributions.
  - Feedback should be given during Workshop days, upon the release of milestone submission grades and feedback, and during the development process for each deliverable.
- Focus feedback on specific examples and actionable solutions.
- Ensure all members feel supported and heard.
- Use feedback sessions to align on deliverables and expectations before major deadlines.

Final Review and Agreement

We share these goals and expectations and agree to these policies, procedures, and consequences.

Member signatures:

Melaya La Madrid
Danae Rivas
Matthew Nguyen
Livia Lazaga

Executive Summary

Last updated by | Livia Lazaga | Mar 14, 2025 at 6:47 PM PDT

Executive Summary

Course registration at GSU has long been a source of frustration for students, administrators, academic advisors, and IT teams. Challenges like unintuitive UI, course capacity conflicts, system slowdowns and crashes during peak times, and the lack of automation have led to dissatisfaction.

Our solution provides a course registration platform designed to streamline the process, enhance user experience, and support administrative needs. We prioritize:

- **Accessibility:** The platform is fully accessible, meeting WCAG 2.1 AA standards with features like screen reader support and customizable readability, ensuring all students can easily navigate the system.
- **Intuitive UI & Automation:** With smart search, predictive course recommendations, and automated waitlist management, we simplify the process for students. Real-time notifications keep them informed about course availability and waitlist changes, reducing manual intervention.
- **Support for Stakeholders:** For students, it offers stress-free registration with schedule comparison, real-time waitlist updates, and faster enrollment. For advisors, it provides real-time course tracking to streamline scheduling support. For IT teams, it ensures reliable performance and security compliance.
- **System Performance**: Scalable, high-performance infrastructure ensures reliable operation during peak registration times, reducing downtime and eliminating slowdowns for all users.

This redesigned registration system transforms the entire enrollment experience, providing students with the tools they need to succeed and progress in their degrees while reducing stress. Advisors will have more time to offer personalized guidance as they efficiently track courses and waitlists. With a reliable, high-performance system, students can navigate the registration process confidently, while our intuitive UI ensures a smooth, stress-free experience for all stakeholders.

Current State

Last updated by | Melaya La Madrid | Feb 9, 2025 at 9:51 PM PST

Issue

Global State University's course registration system is outdated, inefficient, and unable to meet the demands of its 45,000 students and 3,200 faculty and staff. The existing system isn't built to handle high traffic during peak registration periods, frequently crashing during crucial times. Its unintuitive interface is uninformative, not mobile-friendly, and lacks real-time updates and automation regarding waitlists, scheduling, and prerequisites. The system lacks integration with key systems like the Degree Audit System, Academic Planning System, and Student Information System.

Impact

The inefficiencies and limitations of GSU's registration system increase the workload, confusion, and stress levels, of students and staff alike. The increasingly apparent impacts of this outdated system include:

- Students losing the opportunity to get into core courses or meet their requirements, and increasing confusion and frustration with their registration experience and academic paths.
- Academic advisors, IT Services, and the University Registrar are met with overwhelming amounts of demands and inquiries from students due to problems resulting from failures in the system
- Frequent system crashes during the most important registration times create a domino effect of issues that spread throughout many groups that rely on it.

Context

The registration system was designed more than two decades ago when the university had fewer students and simpler academic needs. Today, the diverse student body includes international students, students with disabilities, and those navigating modern academic structures such as hybrid courses and cross-disciplinary programs.

This system fails to accommodate these needs, particularly during high-demand registration periods, and doesn't offer mobile access or meet accessibility standards. The outdated infrastructure limits the university’s ability to adapt to modern educational demands.

Stakeholders

The registration system at GSU is relied on and interacted with by a wide range of individuals and groups such as:

- Undergraduate and graduate students who rely on the system to register for the courses that they are attending GSU to take.
- The IT Services staff who handle troubleshooting, maintenance, and frequent crashes on the complex and fragile system.
- Administrative and Academic Advising staff encounter a cascade of frustrated and confused students as a result of failures in the system.
- Disability Services users who are unable to register effectively due to the uninclusive that does not account for varying user needs, along with the staff who support such users

The Need for Action

GSU's system is unfit for the needs and demands of the modern and ever-evolving education landscape. GSU needs a modern registration system that is reliable, scalable, and accessible and will enhance the

registration process by providing students and advisors with an intuitive interface and real-time automated tools to improve guidance and reduce friction. Additionally, it will reduce IT and administrative workload by ensuring system stability and scalability.

Investing in this solution will improve the experience for all stakeholders and align with GSU's mission to support student success.

Problem Statement

Last updated by | Matthew C. Nguyen | Jan 15, 2025 at 5:01 PM PST

Problem

Lack of intuitive design and poor ease of use in the University Registration system

Impact

This poor usability causes delays and stress for students trying to register for courses. Advisors struggle to guide students effectively without reliable tools, and IT staff face added pressure to handle system issues during busy periods.

Context

Poor backend development because the older registration system did not anticipate high user volumes. Complex programs and university needs do not user interface features.

Who's Impacted

The usability impact is on students. Secondary impact is on IT department that must support student problems with registration system. Student service are impacted by student inability to register.

The Need

A modern, user-friendly system with mobile access and real-time updates is needed to improve the registration experience for everyone.

Miro Board - Ecosystem Map Diagram + Knowledge Board

Link

Stakeholders

Last updated by | Melaya La Madrid | Feb 9, 2025 at 10:30 PM PST

Stakeholder Group	Needs	Problems	Major Value and Benefits from Solution
Undergraduate and Graduate Students	- More mobile-friendly interface - Saving schedule scenarios - Real-time waitlist updates, including push notifications to phone - Automatically check prerequisites and display degree requirements - Auto-registration based on selected courses	- Slow system during crucial moments (peak registration times), and sometimes it even crashes - Outdated interface - No ability to create backup schedules - Obscure waitlist process, no built-in prereq checker - Hard-to-use navigation for finding courses	- Smoother user experience while registering regardless of device - Increased convenience from having all relevant information in one place - Transparency for better decision-making (e.g. waitlist spots)
IT Services and Staff	- API-first architecture - Cloud-native system and containerized - 99.99% uptime, even during peak load times - Monitoring and logging capabilities - Automated testing and deployment support - Better authentication, authorization controls, and fully encrypted data - Compliance with FERPA and other regulations	- System is not scalable/reliable, unable to handle peaks during registration periods smoothly (performance degradation) - System has limited monitoring and logging capabilities - Integration with other university systems is complex and fragile	- Better backup and recovery capabilities - Ability to pinpoint problems once they happen quickly, and have enough information to fix them - Reliable system reduces burden on IT staff to fix during peak hours - API-first means smoother integration with other systems
Administrative and Academic Advising Staff	- Adjust capacities based on external factors, and notify affected students - Cross-listed courses to be automatically handled - Better, real-time data about waitlist demand and registration patterns - Simulate different	- Lack of real-time data - Inconsistent course prerequisite checking - English-only interface - Communication tools to notify students about changes aren't implemented - Limited capabilities and audit trails of registration actions	- Automated system saves time and reduces human error in special cases (e.g. cross-listed courses) - More information to be communicated to students - Improved future course planning with comprehensive data

Stakeholder Group	Needs	Problems	Major Value and Benefits from Solution
	registration scenarios - Multi-language support - Visa compliance tracking - Clear visibility of requirements for full-time enrollment		
Disability Services Users and Staff	- Full compliance with WCAG 2.1 standards - Support for assistive technologies - Flexible time limits for registration - More information on course accessibility - Integration with accommodation management systems - Simplified navigation - Better error messages	- Lack of accessibility - not compatible with screen readers and other assistive technologies - System causes time pressure on students - Courses need a better way to be flagged for specific accommodation needs	- Better accessibility for users of assistive technologies - Improved integration with systems streamlines processes - Accessible course materials can be ensured and student needs can be met at scale - Students with disabilities can register effectively and have equal access to courses

Solution Vision

Last updated by | Melaya La Madrid | Mar 15, 2025 at 10:34 PM PDT

Vision Statement

Modern registration for modern needs: A seamless, scalable, and student-centered system.

GSU's redesigned system serves all users of all abilities across all devices.

Solution Idea

Global State University (GSU) needs a modern, integrated, and intuitive course registration system that eliminates inefficiencies and enhances the user experience.

We propose a cloud-based, API-first system that is reliable, mobile-friendly, and accessible to all students, including those with disabilities. By incorporating automation, real-time updates, and better integration with academic systems, our proposed solution ensures a frictionless registration experience that reduces stress on students, faculty, advisors, and IT staff.

This system will feature a user-friendly interface with real-time waitlist updates, automated prerequisite verification, and schedule simulation tools. It will also integrate seamlessly with degree audit systems, academic planning tools, and student information databases to provide a comprehensive registration experience. With improved monitoring, logging, and containerized infrastructure, IT staff can ensure system reliability and peak performance during high-traffic registration periods.

Target Audience

- **Students:** Registering for courses, exploring options, and planning academic schedules.
- **Academic Advisors & Administrative Staff:** Assisting students with registration, tracking course demand, and managing courses.
- **IT Services:** Maintaining system reliability, troubleshooting issues, and ensuring security compliance.
- **Disability Services:** Ensuring accessibility compliance and support for assistive technologies.

Benefits

- **For Students:**
  - A more convenient and easy-to-use system, enhancing overall experience and reducing frustration
  - Quicker decision making and better ability to register for desired courses
- **For Academic Advisors & Administrative Staff:**
  - More informed decisions to provide better guidance to students
  - More efficiently managed courses and simulated scenarios reduced manual work
- **For IT Staff:**
  - Reliable and high-performing registration system that scales easily, minimizing downtime and technical issues

    - Better protection of student data and minimized risk of breaches
- **For Disability Services:**
    - Students with disabilities can access the registration system more easily, reducing barriers and promoting a more equitable experience

Alignment with Organization Objectives

- **Enhancing Student Success:** A streamlined and accessible registration process allows students to focus on their education rather than logistical challenges.
- **Supporting Administrative Efficiency:** Reducing manual processes ensures smoother operations for advisors and department administrators.
- **Modernizing IT Infrastructure:** Implementing a modern, scalable, and secure system supports GSU's long-term technology strategy.
- **Promoting Inclusivity and Accessibility:** Ensuring that all students, including those with disabilities, can navigate the registration system effectively.

Objectives and Key Results

Last updated by | Danae Rivas | Mar 16, 2025 at 5:36 PM PDT

Objective 1: Improve Student Registration Experience

- **Key Results**:
  - Achieve a **90% satisfaction rate** in post-registration surveys during the first cycle.
  - Reduce the **average time to complete registration by 30%** within the first release.
  - Increase the number of students successfully registering on their first attempt to **85%**.

Objective 2: Enhance System Accessibility and Inclusivity

- **Key Results**:
  - Achieve **WCAG 2.1 Level AA compliance** by the system's launch.
  - Ensure **95% of accessibility-focused test cases** pass during user testing.
  - Conduct **three feedback sessions** with students using accessibility tools, improving their satisfaction by **20%**.

Objective 3: Increase System Reliability and Performance

- **Key Results**:
  - Maintain **99.99% uptime** during peak registration periods.
  - Successfully handle at least **5,000 concurrent users** during load testing.
  - Resolve **90% of reported technical issues** within **48 hours**.

Objective 4: Empower Academic Advisors

- **Key Results**:
  - Provide advisors with **real-time course capacity data** for **100% of courses**.
  - Reduce advisor workload by **20%** by automating prerequisite tracking.
  - Achieve a **90% satisfaction rate** among advisors using new dashboard tools.

Objective 5: Streamline Administrative Processes

- **Key Results**:
  - Automate **80% of manual processes** for waitlist and capacity management.
  - Reduce **course registration-related IT support tickets by 40%**.
  - Ensure **seamless integration** with existing tools like **DARS** by the first release.

Role and User Needs

Last updated by | Danae Rivas | Mar 16, 2025 at 5:32 PM PDT

Role 1: Students

Purpose & Goals

- Register for courses required for their degree efficiently and without errors.
- Manage schedules and receive real-time updates on course availability and prerequisites.
- Plan alternative schedules in case of conflicts.

Skills & Requirements

- Basic proficiency with computers and mobile devices.
- Ability to navigate scheduling tools effectively.

Work Activities & Tasks

- Searching for courses, adding/removing them from schedules (regular during registration).
- Joining waitlists for full courses (as needed).
- Finalizing course schedules and resolving conflicts (critical during registration).

Task Characteristics

- Tasks are often performed alone, are time-sensitive, and require multitasking.
- Uses course catalog, prerequisites, degree plans, and registration deadlines.

Needs Related to the System

- A mobile-friendly interface for easy registration and schedule management.
- Real-time notifications about course availability and waitlist status.
- Tools to compare multiple schedule scenarios before finalizing.

Role 2: Academic Advisors

Purpose & Goals

- Guide students on course selection and degree progression.
- Assist in resolving registration conflicts and managing overrides.
- Access real-time course availability and prerequisite data for efficient advising.

Skills & Requirements

- Strong knowledge of degree requirements and university policies.
- Effective interpersonal and communication skills.

Work Activities & Tasks

- Reviewing student schedules and advising on course selection (regular during registration).
- Addressing registration conflicts, including prerequisites and schedule overlaps (as needed).
- Collaborating with IT staff to resolve system-related issues (occasional).

Task Characteristics

- Tasks are collaborative with students and require quick decision-making.
- Uses academic records, course schedules, and degree audit tools.

Needs Related to the System

- A dashboard with real-time course capacity and prerequisite tracking.
- Reporting tools to identify common registration issues.
- Integration with systems like Degree Audit Reporting System (DARS) for seamless advising.

Role 3: IT Staff

Purpose & Goals

- Maintain system reliability, scalability, and security.
- Monitor system performance during high-demand periods.
- Resolve technical issues reported by students and staff.

Skills & Requirements

- Expertise in system monitoring, troubleshooting, and scalability management.
- Strong understanding of data security and privacy regulations.

Work Activities & Tasks

- Monitoring system uptime and load capacity (continuous during registration).
- Resolving technical issues and deploying updates (ongoing).
- Performing security audits to ensure data integrity (quarterly).

Task Characteristics

- Tasks are critical during peak registration periods and involve high-risk problem-solving.
- Uses error logs, performance metrics, and user feedback reports.

Needs Related to the System

- A scalable architecture capable of handling high user demand.
- Automated alerts for system downtimes and security vulnerabilities.
- Integration with student records and payment platforms for seamless data management.

Role 4: Department Administrators

Purpose & Goals

- Manage course offerings and ensure accurate capacity data.
- Resolve escalated registration issues from advisors and students.
- Generate reports on registration trends to support decision-making.

Skills & Requirements

- Proficiency in database management and reporting tools.
- Understanding of department-specific course needs and policies.

Work Activities & Tasks

- Updating course availability and managing capacity (regular).
- Resolving scheduling conflicts for impacted students (as needed).
- Analyzing registration trends for capacity planning (quarterly).

Task Characteristics

- Tasks require collaboration with advisors, IT staff, and department heads.
- Moderate time sensitivity, especially during registration and add/drop periods.

Needs Related to the System

- Tools to monitor and update course capacity in real-time.
- Reporting features to analyze registration patterns.
- Secure access controls to protect course and student data.

Features and Benefits

Last updated by | Livia Lazaga | Mar 14, 2025 at 10:40 PM PDT

Shopping Cart

Description:

- This feature will allow users to plan out schedule scenarios by adding courses to their Cart, and allow users to manage, add to, and edit their course selections before finalizing. Students can do this long before registration opens, allowing them to be ready as soon as it does open. Users can select courses and send them to the registrar directly from the Cart.

Benefits:

- **Students**: Allows students to plan schedules before registration, reducing last-minute decisions. Direct registration from the Cart improves efficiency and decreases stress.
- **Advisors**: Provides a tool to help students share and discuss planned schedules during advising sessions, streamlining guidance.
- **Organization**: Reduces errors during registration by offering students a structured preview of their options.

Real-Time Updates and Waitlists

Description:

- The system will provide real-time updates on course availability, capacity changes, and registration time slots for courses in their Cart. If a course section is full, there will be a waitlist that users can join. Students will receive instant notifications when a seat becomes available in a course they are waitlisted for.

Benefits:

- **Students**: Reduces stress and confusion during registration by ensuring accurate and up-to-date information.
- **Advisors**: Helps them provide accurate guidance to students during course planning.
- **Organization**: Increases transparency and reduces manual processes for course management.

Mobile-Friendly Interface

Description:

- A fully responsive and mobile-friendly interface will allow students to register for courses, view their schedules, and receive notifications on any device.

Benefits:

- **Students**: Empowers students to register anytime, anywhere, on the go. Improves accessibility for users who rely on mobile devices.
- **Advisors and Staff**: Reduces the need for extra support since students can independently address their registration needs.

- **Organization**: Enhances user satisfaction and increases overall system usability by meeting modern accessibility expectations.

Automated Course Conflict Verification

Description:

- The system automatically verifies prerequisites for selected courses, as well as flagging course conflicts and suggests alternative, non-conflicting sections when applicable.

Benefits:

- **Students**: Reduces frustration and confusion by ensuring that they enroll in courses that they are eligible for and that align with their academic progress and schedules.
- **Advisors**: By automatically flagging ineligible courses, advisors save time and reduce workload, allowing more time to focus on nuanced academic planning beyond the registration system.
- **Organization**: Enhances system efficiency and reduces manual interventions to improve the overall course enrollment accuracy.

Automated Course Recommendations

Description:

- Using predictive algorithms based on data from the Student Information System and the Degree Audit System, the system will recommend courses based on a student's degree progress, past course performance, and common enrollment patterns. The recommendations will prioritize courses needed for graduation and suggest alternatives for full courses.

Benefits:

- **Students:** Helps students make informed course selections and stay on track for graduation.
- **Advisors:** Provides a data-driven tool to support academic advising and reduce scheduling conflicts.
- **Organization:** Improves student retention and graduation rates by guiding students toward optimal course selections

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Smart Course Search

Description:

- Students can apply various preference filters such as course codes, departments, credit hours, learning formats (online, hybrid, in-person), and keywords to refine their search. Leveraging a predictive algorithm, the system dynamically populates results based on past search behaviors and course popularity, helping students find the most relevant courses quickly and efficiently. The smart search also suggests courses based on students' degree requirements and academic history, ensuring they make informed decisions that align with their educational goals.

Benefits:

- **Students:** Saves time and effort by quickly narrowing down course options, ensuring they can find courses that fit their needs.
- **Advisors:** Helps advisors guide students and help them explore their options quickly and efficiently.

- **Organization:** Increases registration efficiency by reducing student confusion and minimizing registration errors.

Enhanced Accessibility Features

Description:

- The system will include comprehensive accessibility features to ensure it meets WCAG 2.1 guidelines. These features will include customizable text sizes, high-contrast themes, screen reader support, and keyboard navigation. The system will also provide voice-command functionality for hands-free access to registration.

Benefits:

- **Students:** Ensures all students, including those with visual, auditory, or mobility impairments, can use the system independently and efficiently.
- **Advisors and Staff:** Reduces the need for additional support by making the system universally accessible, improving the overall student experience.
- **Organization:** Promotes inclusivity and ensures compliance with accessibility laws, demonstrating the institution’s commitment to equity and accessibility.

Course Schedule Visualizer

Description:

- The Schedule Visualizer feature allows students to view their course schedules in a dynamic calendar format. It provides a clear, color-coded display of all registered courses, including the days, times, and locations of each class. Students can easily identify potential schedule conflicts and see available timeslots as they search for additional courses.

Benefits:

- **Students:** Simplifies the scheduling process by allowing them to clearly visualize their course load, identify conflicts, and optimize their schedule based on preferences and availability.
- **Advisors:** Helps advisors review and suggest adjustments to students' schedules with a clear, visual representation of their course selections, making advising sessions more efficient.
- **Organization:** Reduces the number of registration errors caused by scheduling conflicts and ensures students are able to create optimal schedules, enhancing the overall registration experience and reducing administrative workload.

Architecture Requirements

Last updated by | Melaya La Madrid | Mar 16, 2025 at 11:56 PM PDT

Architecture (Non-Functional) Requirements

Usability

Description	Rationale	Acceptance Criteria and Metrics
Users should be able to intuitively figure out the system and its main functions.	System is used by all students and a majority of staff, so it needs to be easy-to-use. Students need to focus on school while staff need to focus on their tasks. Therefore, there needs to be less time spent on figuring out how to use the system.	• 90% of users complete tasks on the first attempt during registration. • Intuitive interface. • 40% decrease to academic advisor help requests/appointments and IT Service tickets.

Accessibility

Description	Rationale	Acceptance Criteria and Metrics
The system must comply with WCAG 2.1 Level AA standards and include features like universal design implementation, assistive technology compatibility, and alternative communication formats.	Ensuring accessibility makes the system inclusive for students with disabilities and enhances usability for all users.	• Pass WCAG 2.1 Level AA compliance audits. • 95% of users in accessibility testing complete registration without assistance.

Scalability

Description	Rationale	Acceptance Criteria and Metrics
System must be able to handle high user volume and growing workload; needs to handle growth in both user base and functionality.	Increasing student numbers and attendance requires high user intake and availability to adapt and handle a growing student population. Also, new registration needs and features with modern course requirements.	• Add capacity without downtime. • Support 20% annual growth in user base. • Handle 30% increase in peak loads. • Support addition of new course types. • Accommodate new programs and departments. • Integration with future systems.

Security

Description	Rationale	Acceptance Criteria and Metrics
The system needs to implement security measures that ensure data validity and protection, and comply with related regulations.	Data security is vital to protecting users from bad agents or otherwise unauthorized persons. In an industry such as education, there are a lot of regulations in place to protect the right to privacy for students.	• 99% of data encrypted both in transit and at-rest. • Authorization levels/admin permissions across the entire system. • 98% of registration transactions are recorded on an audit log.

Peformance

Description	Rationale	Acceptance Criteria and Metrics
The system needs to perform consistently, reliably, and quickly.	Quality and consistent performance in a system that many stakeholder groups rely on, and often must maintain high performance during high-traffic and high-stakes scenarios and periods.	• Primary API - forward system integrations. • Advanced scaling capabilities. • Enhanced security features. • Secondary integrations. • Advanced analytics. • Mobile optimization with 90% of devices opening the app within 1000ms

Architecture (Non-Functional Requirements)

Last updated by | Melaya La Madrid | Mar 15, 2025 at 10:53 PM PDT

Security Needs

Encryption: 99.9% of data will be encrypted both at-rest and in-transit by modern advanced encryption standard (AES).

Authentication: Users will be authenticated through standard open authorization protocol, which ensures credentials stay secure, even inside an internal system (OAuth 2.0).

Security roles: There will be security access tiers that distinguish between students, administrative staff, and IT staff, respectively. Access will vary depending on tiers and allow GSU to ensure appropriate users can only perform authorized actions.

AES encryption, OAuth, and tier access are standard industry practices in end-user software to ensure privacy protection. Data cannot be intercepted, credentials must be proven through a secure external source, and the system will simply not allow unintended access to the wrong users.

Scalability Needs

User Growth: Handle initial user base of 45k students concurrently, and support 2% yearly user growth by current predictions of future student body enrollment.

Data Growth: Capacity of 10TB of internally stored registration data. Capability to smoothly upgrade storage horizontally at an approximate rate of 5% yearly (estimated size of a new year's worth of registration, additional courses, etc., and accounting for data archival of older courses/registration data to other servers).

Availability Needs

Uptime: 99% uptime during normal operation, falling to 92% during system updates and maintenance.

Recovery: Maximum of 20 minute system recovery time, redirecting users to a backup system if necessary for no more than 2 hours.

Interoperability Needs

Communication: Communication with all other university systems (e.g. SIS, LMS and FAMS) through a private API hosted on GSU servers, reducing modifications to existing systems as much as possible.

Data exchange: All key non-internal data should be accessible by other systems, including but not limited to: all course information, waitlist status, capacity data, etc.

Sustainability Goals & Needs

- Meet PAS 2060 standards for carbon offsetting and GHG emissions from servers (PAS 2060)
- Maximum system power consumption of 1k watts daily

Standards and Compliance Needs

- Fully compliant with FERPA and PPRA (FERPA, PPRA)
- User Interface meets all WCAG 2.1 Standards (Web content accessibility guidelines 2.1)

Risks, Assumptions, and Dependencies

Last updated by | Livia Lazaga | Mar 16, 2025 at 7:33 PM PDT

Risks

1. **Timeline Delays**
   Description: There's a possibility of delays, which could lead to missed deadlines and additional project costs.
   Mitigation: To reduce this risk, the project will be regularly monitored with progress reviews, including weekly check-ins and milestone evaluations. Early detection of delays will allow for corrective action to keep the project on track.

2. **Technical Compatibility and Performance Issues**
   Description: There is a risk that the new course registration system may face technical compatibility issues with existing hardware or software platforms at GSU, potentially causing delays or system failures during high-demand periods like course registration. This could result in user dissatisfaction and reduced system reliability.
   Mitigation: To address this, a thorough pre-implementation testing phase will be conducted on all hardware and software used across the university. This will ensure that any compatibility issues are identified and resolved before the full system rollout.

3. **Challenges with System Integration**
   Description: Integrating the new registration system with existing systems (e.g., SIS, LMS, FAMS) could cause data inconsistencies or technical glitches.
   Mitigation: Thorough testing will be done on the integration process with legacy systems, followed by a phased deployment to ensure that all issues are addressed before full implementation.

4. **Resistance from Users**
   Description: Users, including students and faculty, may resist transitioning to the new system due to unfamiliarity or dissatisfaction with changes.
   Mitigation: A comprehensive change management plan will provide training sessions, user guides, and a feedback loop to ease the transition. Early adopters and pilot users will be used to refine the system based on real-world feedback.

5. **Security and Compliance Risks**
   Description: There's a risk of non-compliance with data protection laws such as FERPA, or potential breaches of sensitive student data.
   Mitigation: The system will be designed with built-in security features, including encryption and secure login protocols. Regular audits and compliance checks will ensure that all regulations are followed.

Assumptions

Business Assumptions:

- **Sufficient Funding and Resources:** The necessary funding and technology are available, and the projected costs remain within budget.
- **University Adoption:** It is assumed that the University will fully adopt and endorse the new registration system, ensuring cooperation across all departments.
- **Compliance with Laws and Regulations:** The solution will adhere to all applicable legal requirements, such as FERPA for student privacy, as well as accessibility standards like WCAG 2.0 and ADA 508.
- **Beneficial**: Our solution will be beneficial to our users and stakeholder groups

Project Management Assumptions:

- **System Accessibility:** The registration system will be accessible both as a mobile app (via the app store) and as a website, offering a user-friendly experience across devices.
- **Data Integration:** Integration with existing GSU databases and third-party systems will be feasible, allowing for accurate course registration, financial aid, and other academic processes.
- **Scalability:** The system will be scalable, and able to handle large numbers of users (students, faculty, and administrators) concurrently, particularly during peak registration periods.

User Assumptions:

- **User Willingness to Adopt:** Students, faculty, and staff will be open to using the new system and will engage with the system's features without significant resistance.
- **Basic Tech Literacy:** It is assumed that users (students, staff, and faculty) possess the basic tech literacy needed to use the system without additional support.
- **Internet Access:** All users will have reliable internet access, enabling smooth interactions with the system.

Dependencies

- **Current System Integration**: The project depends on successful integration with existing GSU systems (e.g., DAS, SIS, LMS, and FAMS) for accurate student data and course management.
- **User Feedback from Testing** Successful implementation relies on real feedback from students during the testing phase to identify issues and optimize the system. Their insights will be essential for making final adjustments before full deployment.
- **Collaboration with IT Support Teams**The project's success will depend on the support of GSU's IT department for system setup, ongoing maintenance, and troubleshooting.
- **Email Notification Services**: To send registration reminders, waitlist updates, and system notifications to users.
- **University Security**: GSU's authentication and servers are secure

Out of Scope

Last updated by | Melaya La Madrid | Feb 9, 2025 at 8:35 PM PST

1. Third-Party External Systems (e.g., third-party apps)

The primary focus of our solution is improving GSU's internal registration system. Integrating with external systems would require significant resources and time for coordination with third-party vendors.

2. Course Scheduling

Our solution will not handle the generation or management of course schedules, which is under the responsibility of the academic departments. Our focus is on the registration process, from course availability to enrollment, no the behind-the-scenes scheduling logic.

3. Outside User Support

The system will cater only to GSU students, faculty, and staff. Other users such as visitors or external auditors will not be included in the solution.

4. Non-Standard Browser Support

The system will be optimized for modern browsers such as Chrome, Firefox, and Edge. Older browsers or less common platforms will not be supported as they do not align with the project's timeline and user needs.

5. GSU Website Redesign

While this project aims to make the registration system more user-friendly and mobile responsive, a similar complete redesign to the GSU website is outside the scope of this project. We will focus on the registration interface but other websites and website elements will not be addressed.

Prioritization, Roadmap, and Initial Iterations

Last updated by | Matthew C. Nguyen | Mar 16, 2025 at 9:04 PM PDT

The following chart outlines the features, goals, metrics and tasks for each release in the roadmap. Releases are targeted for the beginning (i.e. within the first calendar week) of the specified quarter.

Feature/Capability	Q3 2025 "1.0 - Foundations"	Q4 2025 "1.0.1"	Q2 2026 "1.1"
Overhauled UI	✓		
Mobile-Friendly	✓	Enhanced	
Live Course Availability	✓		
API-First Architecture	✓		
Automatic Prerequisite verification	✓		
WCAG Compliance	2.0	2.0 with some 2.1	2.1
Instant Desktop Notifications		✓	
Mobile push notifications		✓	
Shopping Cart			✓
Preview Schedules			✓
Goals	- Implement intuitive UI and core systems - Integrate modern and scalable infrastructure as a solid foundation for future updates	- Increase stability and reliability of system - Improve registration efficiency and transparency - Refine mobile UX	- Expand accessibility to a greater number of users - Drive stakeholder quality-of-life

Feature/Capability	Q3 2025 "1.0 - Foundations"	Q4 2025 "1.0.1"	Q2 2026 "1.1"
Success Metrics	- 70% less IT tickets from general student body - 50% increase in mobile users from legacy - 80% satisfaction on UX surveys	- 20% of notifications see engagement - Additional 30% increase in mobile users - 60% decrease in bug reports	- Usage of shopping cart by 20% of students - 90% satisfaction among accessibility feature users - 70% of schedules sent directly to registration through preview feature
Supporting Tasks	- Stakeholder formal training - Data migration - Security compliance audit	- Email campaign - Physical, campus-wide advertisements - Support team training	- Comprehensive surveys - Study on stakeholder impact - Accessibilty compliance audit

Approach to Prioritization:

1. Develop critical infrastructure and platform with core functionality that can support enhancements
2. Ensure major institutional goals and key stakeholder needs are met with features/enhancements.
3. Take advantage of changes that create the most value for the least effort.
4. Package sufficient improvements so that each update is meaningful and drives real value to users

Rationale behind prioritization:
In line with the above approach:

"Foundations", our initial release, completely overhauls the current system with our new mobile-friendly UI, and carries over core functionality from the original GSU registration system. It also adds quality-of-life enhancements such as live course availability, auto-verification of prerequisites. This meets compliance and simple value delivery requirements.

The **2.0.1 release**, with a tighter timeline, focuses on ironing out minor issues that may have arisen during launch, as well as driving adoption through an enhanced mobile-specific interface, and notifications on desktop and mobile.

Release 2.1.0 adds new functionality such as full screen-reader support, bringing the system fully to WCAG 2.1 compliance. It also adds a shopping cart feature and a schedule preview feature. This phasing strategy ensures all key systems are stable when live in order to ensure all key stakeholders receive the best experience possible.

Research and Analysis Summary

Last updated by | Melaya La Madrid | Mar 15, 2025 at 11:13 PM PDT

Research and Analysis Summary

To gather information for our current state, we applied various research techniques, focusing on the needs of stakeholders. Our knowledge board identified key needs like real-time waitlist updates, audit trails, and accessibility improvements.

Stakeholder analysis for students, revealed the importance of waitlist visibility, with expressed frustration over uncertainty regarding their position. Additionally, feedback from IT staff emphasized the need for robust performance during peak periods. To address these issues, we used competitor analysis to explore how other universities manage waitlist updates and high-capacity traffic.

A SWOT analysis highlighted the need for a system update. Strengths included familiarity and backend stability, while weaknesses pointed to poor accessibility, outdated design, and performance issues. Competitor analysis showed that other universities offer mobile registration, multi-platform compatibility, and modern, intuitive interfaces.

We also researched accessibility needs through existing tools for users with disabilities who interact with online systems differently. Important features gathered are screen reader compatibility, keyboard navigation, readability enhancements, and simple design.

Furthermore, extensive research was done on various existing online standards and guidelines in order to align our project with modern needs and restrictions. For our project we will focus AES, OAuth 2.0, PAS 2060, FERPA, PPRA, and WCAG 2.1. Meeting all current standards will help create a seamless and intuitive system.

Moving forward, we plan to engage stakeholders through a combination of user testing, feedback loops, and consultation. We will conduct usability testing with students to ensure the system meets their needs for waitlist visibility and user-friendly design. IT staff will be involved in performance testing to handle high traffic, and disability services will provide feedback on accessibility features.

Through this research, we aim to create a more user-friendly, accessible, and efficient registration experience for all users.

Change Log

Last updated by | Matthew C. Nguyen | Mar 16, 2025 at 9:05 PM PDT

Current State

Feedback Received:
"Very clear and well organized!"

Our initial current state received only positive feedback, no significant changes were suggested for this section. A minor revision was made to the Stakeholders section to include Disability Services users and staff, better matching to our project's target users. The Current State page should provide accurate context and overview of our project. Slight changes were also made to paragraph organization for readability purposes and maintaining a clean look.

Stakeholders

Feedback Received:
"Update this section going forward so that the naming of your stakeholders aligns exactly with the stakeholders listed on your Current State page. Bullets would also help with clarity of this page."

Based on the feedback, the Stakeholders page table naming has been revised to align with the terms used in Current State section. This update ensures consistency across project documentation, which is important for readability and review. Further, Stakeholder Group names were bolded to set apart from other text in the table and clarify labeling. Additionally, the Needs, Problems, and Major Value and Benefits from Solution sections have been organized into bullet points to improve and readability. This change helps to clarify stakeholder roles and relevance to the project. This makes understanding stakeholder information more straightforward and enhances overall comprehension.

Features and Benefits

Feedback Received:
"Great job! Features and Benefits are incredibly well organized, especially with the organization, stakeholders, and end users separated for their individual benefits."

We have updated this page so that our features and benefits align with the solution that we decided on at the time of our executive final presentation, allowing this page to be accurately reflective of the features and benefits that our product offers.

Objectives and Key Results

Feedback Received:
"Well done!"

As no specific improvements were suggested, we conducted a final review for clarity and consistency. Minor adjustments were made to wording for better readability while maintaining the original intent and measurable goals outlined in our OKRs.

Role and User Needs

Feedback Received:
"Well done!"

No major revisions were needed for this section. However, we reviewed and confirmed clarity and consistency with other project documentation to maintain alignment. Minor refinements were made to enhance readability, ensuring the descriptions remained clear and user-friendly for all stakeholders.

Non-Functional Requirements and System Constraints

Feedback Received:
"Great job! Description, Rationale, Acceptance Criteria, and Metrics are cohesive and clear.
Re-iterating to not use 100% as a benchmark for achievement. Even a 98%-99% allows for there to be a some discrepancy that was unforeseen or unable to be avoided.
Put the text under the Acceptance Criteria and Metrics in bullet points. It's easier to go and pick through what the individual Acceptance Criteria and Metrics are."

To revise this, I reformatted the Acceptance Criteria and Metrics text into bullet points as per instructor suggestion. I also changed benchmarks to be under 100 to allow for discrepancies or unavoidable circumstances.

Prioritization, Roadmap, and Initial Iterations

Feedback Received:
"Well Done!"

No major revisions were needed, as the roadmap was not specifically addressed in feedback. However, the versions were changed from 2.0, 2.0.1, 2.1 to 1.0, 1.0.1 and 1.1 for clarity per a TA suggestion to improve clarity, and the appropriate references were updated.

Risks, Assumptions and Dependencies

Feedback Received:
"Well Done!"

No major revisions were needed for this page, and no feedback was provided directly for Risks, Assumptions, and Dependencies. Small formatting changes, such as lines between sections and bolding subheadings, have been made to improve coherence and readability.

Research Summary

Feedback Received:
"Update the APA citation section to say “References”. Really appreciate the moving forward paragraph."

For the Research Summary page, the APA citation section title was changed to "References", per instructor feedback. This update corrects the section to follow standard academic formatting to match APA style, maintaining professional organization. This change of title clearly identifies the section crediting sources in a way widely recognized.
Revision
Updated the Research and Analysis page to cover new information from researching standards and guidelines.

References

Feedback Received
"rather than linking out to websites you should include the relevant information and add the reference to the reference location."

All direct links on the Architecture (Non-Functional Requirements) page were changed to include relevant information and then APA in-text citation to its corresponding reference. The direct links were then added as APA citations in the references table. This format of references instead of direct links maintains professional and easily accessible information organization.

Backlog

Feedback Received:
"Great work! Epics, User Stories, and Acceptance Criteria are detailed and clear. The current titles of the User Stories should instead be in the description, so that the text isn't cut off and it's easier to read."

To improve readability, we updated the User Stories by moving their titles into the description section instead of keeping them as titles. This prevents text from being cut off and makes it easier for users to read the full details of each story.
This change ensures that the backlog remains organized and easy to navigate, improving clarity for both our team and future users reviewing the backlog.

ID	Title	Work Item Type	State	Effort
25	Efficient Course Planning and Scheduling	Epic	New	5
12	Course Cart Management	User Story	New	
13	Scheduling Conflict Alerts in Cart	User Story	New	
57	Schedule Option Preview	User Story	New	
24	Smart Course Search and Reccomendations	Epic	New	6
47	Personalized Course Recommendations	User Story	New	
48	Filter Courses by Time, Professor, and Availability	User Story	New	
49	Smart Course Search with Auto-Suggestions	User Story	New	
22	Accessible and Inclusive UX	Epic	New	4
17	Customizable Student Dashboard	User Story	New	
44	Screen Reader Compatibility for Registration	User Story	New	
45	Accessible High-Contrast & Text Size Options	User Story	New	
46	Keyboard-Only Navigation for Registration	User Story	New	
21	High System Performance & Security Compliance	Epic	New	8
19	System Availability & Security During Peak Registration	User Story	New	
43	Enforce Strong Security Protocols for Data Protection	User Story	New	
50	Fast Course Processing at Registration Opening	User Story	New	
51	Fast Security Incident Response for Prevention & Mitigation	User Story	New	
1	Mobile Friendly UI	Epic	New	4
3	Mobile-Friendly Registration	User Story	New	
9	Mobile-Friendly Course Search	User Story	New	
32	Mobile Course Registration	User Story	New	
34	Fast Mobile Registration	User Story	New	
2	Advisor Support Tools	Epic	New	4
18	Assigned Student Registration Overview	User Story	New	
35	Student Registration Status View for Advising	User Story	New	
36	Integrated Student Records and Registration View	User Story	New	
37	Real-Time Course Availability & Prerequisite Dashboard	User Story	New	
38	Student Registration Conflict Identification Tool	User Story	New	
39	Reports on Common Registration Issues	User Story	New	
4	Integrated IT Support	Epic	New	6
40	Real-Time System Performance Dashboard	User Story	New	
41	Automated Downtime Alerts for IT Staff	User Story	New	
42	Security Audit Report Generation	User Story	New	
26	Automated Waitlist and Enrollment Management	Epic	New	5
14	Real-Time Seat Availability Updates	User Story	New	
15	Waitlist Seat Notification	User Story	New	
52	Full Waitlist and Enrollment Monitoring	User Story	New	
53	Waitlist Position Tracking	User Story	New	
54	Instant Enrollment Notification	User Story	New	
55	Real-Time Waitlist Updates	User Story	New	
56	Manual Waitlist Management for Exceptions	User Story	New	

References

Last updated by | Melaya La Madrid | Mar 15, 2025 at 10:53 PM PDT

References

Advanced encryption standard (AES). (n.d.-a). https://nvlpubs.nist.gov/nistpubs/FIPS/NIST.FIPS.197-upd1.pdf

Course registration case study. (n.d.-b). https://sceweb.sce.uhcl.edu/helm/REQ_ENG_WEB/My-Files/mod1/univreg_cs/URCaseStudy.pdf

CourseStorm, Inc. (n.d.). *The Complete Student Registration System: 8 parts you need*. The Complete Student Registration System: 8 Parts You Need. https://go.coursestorm.com/the-complete-student-registration-system

Ferpa. FERPA | Protecting Student Privacy. (n.d.). https://studentprivacy.ed.gov/ferpa

OAuth 2.0. OAuth. (n.d.). https://oauth.net/2/

PAS 2060 - carbon neutrality. BSI. (n.d.). https://www.bsigroup.com/en-US/products-and-services/standards/pas-2060-carbon-neutrality/

PPRA. PPRA | Protecting Student Privacy. (n.d.). https://studentprivacy.ed.gov/content/ppra

University Registration System Level 1 [classic]. Creately. (n.d.). https://creately.com/diagram/example/itj5kxjf2/university-registration-system-level-1-classic

Web content accessibility guidelines (WCAG) 2.0. W3C. (n.d.-a). https://www.w3.org/TR/WCAG20/

Web content accessibility guidelines (WCAG) 2.1. W3C. (n.d.-b). https://www.w3.org/TR/WCAG21/