

# Phase 1 – System Scoping & Analysis: Online Course Registration System

Project Title: Online Course Registration System

Course: SW 301 – Object-Oriented Analysis and Design

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## 1. Project Overview & Main System Objectives

### 1.1 Project Motivation (Why It's Needed)

Universities today depend heavily on reliable digital solutions to handle the complex process of student course enrollment. Many existing systems lack the tools students need to plan effectively for their academic progress. Major issues include:

- **Reactive Enrollment:** Students often learn about issues like unmet prerequisites, full sections, or registration delays *only during* the registration period.
- **Scattered Information:** Important details such as degree plans, prerequisites, and course sequences are stored across multiple websites or manual documents.
- **Administrative Bottlenecks:** Advisors and staff spend large amounts of time resolving problems after they occur due to system limitations.

The proposed Online Course Registration System aims to shift this process into a proactive planning approach, enabling smoother academic progression and reducing registration conflicts.

### 1.2 Main Goals of the System

The system, designed as a Student Academic Planning and Enrollment Platform, seeks to:

- **Support Student Self-Planning:** Offer user-friendly tools that let students create long-term academic plans validated automatically against degree rules.
- **Improve Registration Efficiency:** Provide fast, error-free enrollment processes that enforce prerequisites, co-requisites, and seat capacities.
- **Enhance Administrative Control:** Equip academic staff with tools to manage catalogs, registration periods, and institutional policies.

- **Ensure Data Accuracy:** Maintain one authoritative source for all course and enrollment information, integrated with the existing Student Information System (SIS)
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## 2. Stakeholder and User Identification (Actors)

The platform must cater to three main categories of users, each with distinct interaction patterns and system needs.

Actor	Description / Primary Role
Enrolled Student	The primary user; accesses academic planning tools, searches the catalog, manages personal course schedules, and executes the final registration.
Course Faculty	The instructor of record; manages communication within their specific course sections, views class rosters, and handles policy-based enrollment exceptions.
Academic Administrator	The back-office user; manages the course catalog, defines academic terms, sets system-wide registration policies, and maintains user accounts/permissions.

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## 3. Core Functional Requirements

### 3.1 Student Functions (Planning & Registration)

- **Create Academic Plans:** Build multi-term course sequences.
- **Automatic Validation:** Check plans against degree requirements and prerequisite rules.
- **Catalog Search:** Filter courses by requirement type, campus, mode of delivery, and time.

- **Registration Actions:** Register, drop, or swap courses within allowed periods.
- **Alerts & Notifications:** Receive updates about waitlists, conflicts, or advising holds.

### 3.2 Faculty Functions (Course Oversight)

- **View Rosters:** Access and export official student lists.
- **Process Exceptions:** Approve or deny requests for prerequisite or capacity overrides.
- **Class Communication:** Share announcements or materials with enrolled students.

### 3.3 Administrator Functions (System Configuration)

- **Set Up Terms & Schedules:** Establish dates, course offerings, and enrollment periods.
  - **Define Policies:** Configure credit limits, prerequisites, and class capacities.
  - **Manage User Access:** Assign and update roles for all system users.
  - **Run Reports:** Generate insights on course demand, enrollment patterns, and audit logs.
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## 4. Quality Attributes (Non-Functional Requirements)

Category	Requirement Description
Usability	The interface must be <b>mobile-responsive</b> and require less than 5 minutes of training for a first-time student user.
Performance	Must handle simultaneous student logins during the first 15 minutes of the registration period (peak load) without service degradation. Page load times for course search must be sub-1.5 seconds.

<b>Security</b>	Must use multi-factor authentication (MFA) for administrative access. All student PII and academic records must be encrypted both in transit and at rest.
<b>Maintainability</b>	The system must employ a <b>modular architecture</b> (e.g., microservices) to allow for independent updates to components like the scheduling module or the degree audit engine.
<b>Reliability</b>	The system must achieve a <b>99.9% uptime</b> during scheduled registration periods. Transaction logs must ensure all enrollment changes are fully auditable.

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## 5. Operational Constraints & Underlying Assumptions

### 5.1 Constraints

- **Regulation Compliance:** Must follow student privacy laws (e.g., FERPA).
- **System Integration:** Must interface with the existing Student Information System.
- **Technology Requirements:** Must use institution-approved technology such as Java/Spring and designated database systems.

### 5.2 Assumptions

- **Accurate Data Supply:** SIS reliably provides updated student and course information.
- **Advisor Responsibilities:** Advisors continue handling complex academic exceptions outside the automated workflow.
- **User Technical Skills:** Users possess basic familiarity with web navigation

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## 6. Core Use Cases and Detailed Descriptions

The **Use Case List** outlines the foundational activities supported by the SAPEP.

UC ID	Use Case Name	Primary Actor(s)	Focus
UC01	<b>Draft Multi-Term Academic Plan</b>	Student	Planning
UC02	<b>Search &amp; Select Courses</b>	Student	Enrollment
UC03	<b>Execute Course Registration</b>	Student	Enrollment
UC04	<b>Withdraw from Course</b>	Student	Enrollment
UC05	<b>View Personal Schedule &amp; Audit</b>	Student	Information
UC06	<b>Manage Course Section Data</b>	Administrator	Configuration
UC07	<b>Define Registration Period</b>	Administrator	Configuration
UC08	<b>Manage System User Roles</b>	Administrator	Security
UC09	<b>Generate System Report</b>	Administrator	Reporting
UC10	<b>Post Course Announcement</b>	Faculty	Communication
UC11	<b>View Student Roster</b>	Faculty	Information

UC12	<b>Review Enrollment Exception Request</b>	Faculty	Policy
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## 7. Detailed Use Case Descriptions

### 7.1 Student Use Cases

UC ID	UC Name	Description	Preconditions	Postconditions
UC01	<b>Draft Multi-Term Academic Plan</b>	The Student builds a sequenced list of courses for future terms, potentially saving multiple scenarios. The system immediately flags prerequisite issues or credit overloading.	The student is logged in and has a declared major/program.	A new or updated <b>Academic Plan</b> is saved to the student's profile.
UC02	<b>Search &amp; Select Courses</b>	The Student browses the current term's catalog, applying dynamic filters (e.g., time, location, instructor) and adds desired courses to a temporary <b>Enrollment Cart</b> .	The current academic term course catalog is active and loaded.	The Enrollment Cart reflects the student's selected course sections.

<b>UC03</b>	<b>Execute Course Registration</b>	The Student submits the courses in their Enrollment Cart. The system performs <b>real-time validation</b> against all rules (time conflict, capacity, prerequisites, registration window) and finalizes the enrollment.	It is the student's active registration window, and the student has no holds.	The student is either successfully <b>enrolled</b> in the courses or placed on the <b>waitlist</b> ; registration status is updated in the SIS.
<b>UC04</b>	<b>Withdraw from Course</b>	The Student selects a currently registered course and drops it. The system validates that the withdrawal is permitted within the defined academic drop/add period.	The course is currently listed on the student's official schedule.	The course is removed from the student's schedule, and the seat capacity for that section is incremented.
<b>UC05</b>	<b>View Personal Schedule &amp; Audit</b>	The Student views their finalized weekly class schedule (timetable) and a summary of their progress towards their degree (degree audit report).	The student has at least one registered course or a saved academic plan.	The student's current schedule and degree completion status are displayed.

## 7.2 Faculty Use Cases

<b>UC ID</b>	<b>UC Name</b>	<b>Description</b>	<b>Preconditions</b>	<b>Postconditions</b>

<b>UC10</b>	<b>Post Course Announcement</b>	The Faculty member creates and publishes an announcement or update viewable only by students enrolled in their specific course section(s).	Faculty members are assigned to the active course section.	The announcement is viewable to all registered students; an optional email notification is triggered.
<b>UC11</b>	<b>View Student Roster</b>	The Faculty member accesses the final, confirmed list of all students officially registered in their course section(s).	Faculty members are logged in and assigned to the course.	The system displays student names, IDs, and optionally, contact information based on privacy rules.
<b>UC12</b>	<b>Review Enrollment Exception Request</b>	The Faculty member reviews a student's request for an override (e.g., capacity or prerequisite waiver) and chooses to <b>Approve</b> or <b>Reject</b> the request.	A Student has submitted an active exception request for the Faculty's course.	The request status is updated (Approved/Rejected), and the student is notified. If approved, the student is then allowed to self-enroll.

### 7.3 Administrator Use Cases

UC ID	UC Name	Description	Preconditions	Postconditions



<b>UC06</b>	<b>Manage Course Section Data</b>	The Administrator creates new course sections for an academic term, defining the course code, meeting times, location, capacity, and assigned instructor.	The administrator has appropriate permissions and the new academic term is created.	The course catalog data is updated for the term; a <b>Course Section</b> is created or modified.
<b>UC07</b>	<b>Define Registration Period</b>	The Administrator configures the start date, end date, and eligibility criteria (e.g., seniority, program) for various registration windows within an academic term.	The Administrator has full system configuration privileges.	Registration policies for the term are active and enforced by the system scheduler.
<b>UC08</b>	<b>Manage System User Roles</b>	The Administrator adds, edits, or deactivates user accounts (Student, Faculty, Admin) and assigns/revokes their security roles and permissions.	Administrator is logged in with elevated security privileges.	User access permissions and account status are updated in the system's identity management module.
<b>UC09</b>	<b>Generate System Report</b>	The Administrator selects report parameters (e.g., enrollment statistics, waitlist reports, course demand) and triggers the system to generate the required data visualization or export file.	The system contains active enrollment data for one or more academic terms.	A detailed report file (e.g., PDF, CSV) is generated and delivered to the administrator.

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## 8. Use Case Diagram

## Online Course Registration System - Use Case Diagram



