## **Final Report and Design**

# iPlan

Team: Hello World

Members: Cameron Files, Leighlyn Ha, Sesario Imanputra, Josh

Kennedy, Christopher O'Keefe, Kevin Wang

# **Summary Table**

Task	Members
Creating Team Norms	Everyone
Post Team Description	Everyone
Creating Personas	Everyone
Hunt Statement/Research Plan	Everyone
Generative Research Interviews	Everyone
Generative Research Questionnaire	Everyone
Mid-quarter Project Check In	Leighlyn, Sesario, Josh, Christopher and Kevin
Summary Briefing: Design Project Review of Existing Applications Used	Everyone
Group Project Requirements Specification	Everyone
Finding Relevant Design Guidelines and Patterns	Everyone
Card sorting	Christopher and Leighlyn
Low fidelity design prototype	Christopher and Leighlyn
High-fidelity design prototype	Everyone
Usability Testing	Cameron, Josh, Leighlyn, and Christopher
Final Design PPT Readout	Everyone

## **Summary Briefing**

### **Evaluation Criteria**

- Number of different web pages:
- Notification types (email, in-app, SMS):
- Has schedule visualization:
- Lists required classes for graduation in major:
- · Has course search with filters:
- Has automatic registration:
- Planning ahead tools:
- Course/professor evaluation results:

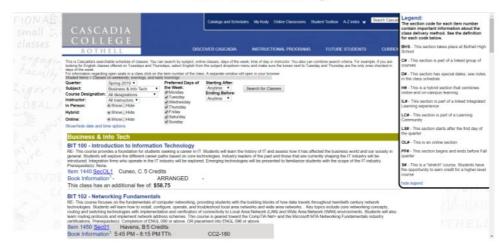


#### Registration Page





#### Class Information Page



### Cascadia College: Criteria Evaluation

- Number of different web pages: 2 (one for registration, one for class information)
- Notification types (email, in-app, SMS): None
- Has schedule visualization: No
- Lists required classes for graduation in major: Yes (but requires separate degree audit page)
- Has course search with filters: Yes (can sort by subject, quarter, instructor, type of class [in-person/hybrid/online], date/time)
- Has automatic registration: No
- Planning ahead tools: No
- Course/professor evaluation results: No

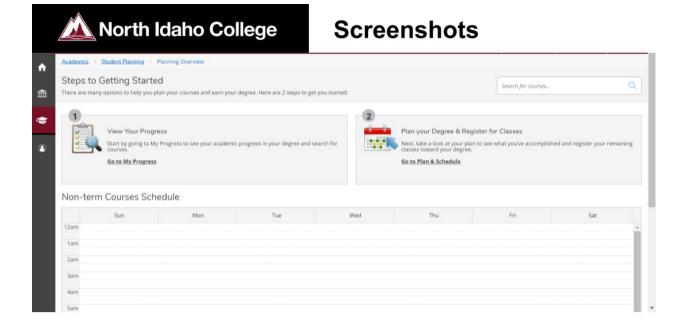
### Cascadia College: Strengths/Weaknesses

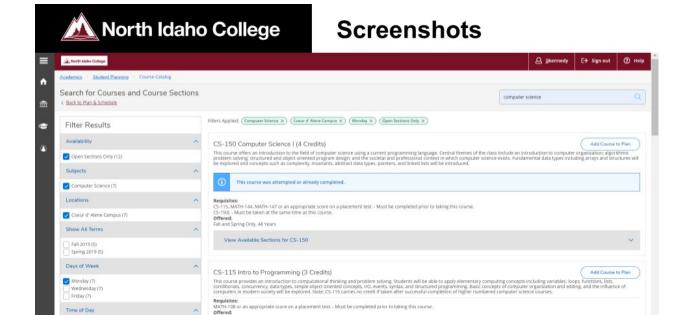
#### Strengths

- The design for the class information page is simple and clear (all class information is in one place)
- Using the filter function on the class information is useful for finding classes that fit with your personal schedule, interests and preferences

#### Weaknesses

- You have to get the class SLN and manually enter that into the registration page (increases the risk for registering the wrong class because it requires manual input)
- The registration page does not use most of the space on the screen
- There is no way to plan out your schedule for future quarters (This requires you to look through the class information page to plan out a schedule of classes that might change, and the user may mix up the class information in their schedule)
- Before getting to the registration, you are required to take a brief demographic survey.
- To drop a class, you have to "add" a SLN number to drop (this is not intuitive for users who think they might be adding that class instead of dropping it)







### Criteria

- Number of different web pages: 2; Planning/Registration and Course Searching
- Notification types (email, in-app, SMS): Email;
- Has schedule visualization: Yes
- Lists required classes for graduation in major: Yes; View Progress and Degree Audit
- Has course search with filters: Yes; Instructor, Course Level, Location,
   Type (online, lecture, hybrid), Time Range, Availability, Subjects, Term,
   Days of Week, Course Type
- Has automatic registration: No; But one button press to register for selected courses for the semester
- Planning ahead tools: Yes; Planning timeline and schedule
- Course/professor evaluation results: No

### Strengths/Weaknesses

#### Strengths

- Many different course filters to fit location, time, course, and instructor needs
- All information needed is available within a single application (except for instructor/course evaluations)
- Easily see which courses: have been completed, are in progress, and are still needed to finish a
  program
- Plan and save courses by semester
- · One click registration after course sections have been selected
- In-app advisor messaging

#### Weaknesses

- No automatic registration
- Must be enrolled to use application and view available course sections
- No course petitioning program

### **UW SLN Registration: Criteria Evaluation**

- · Requires a total of five web pages:
  - o Course catalog identifying the courses SLN code, schedules, credits, attached instructor, and location.
  - Class schedule displays student's current schedule, includes SLN code, schedules, credits, attached instructor, and location.
  - o CEC (Course Evaluation Catalog) Examining individual professor ratings.
  - o RateMyProfessors examining individual professor ratings and student's experience with that professor.
  - o notify.uw.edu setup student notification on courses availability
- Non-existent notification system.
  - Notify.uw.edu, an external website, is available to set up notification system for user.
- Schedule visualization is available as part of the system.
  - Visualisation presents monday to friday from 8:30pm to 9:30pm with 30 minute increments
- List required classes for graduation in major is available through a hyperlink to myplan.uw's DARS system
- · Course book marking unavailable although it does show available courses.
- Registration is done manually by students starting at 6am at varying dates.
  - Student's registration dates is determined by registration period.
- . Schedule finder feature can be used to plan ahead
  - o The feature can only look one quarter ahead
  - Feature displays a course's SLN code, schedules, credits, attached instructor, and location.

### **UW SLN Registration: Strengths/Weaknesses**

#### Strength

- Functions well on registering for upcoming quarter or modifying courses in current quarter.
- Visually displays current schedules for the quarter
- Offers direct process of registering for class without using external tools

#### Weakness

- SLN registration is limited in functionality. This is true as most of their functions are hyperlinks to other UW websites.
- Only some Admin features appear on the SLN registration interface. Other features, such as CEC, can only be accessed externally through a search engine.
- Missing functionality of bookmarking interested courses. As a result, user is forced to open multiple tabs of of the course catalog website.
- o Ergonomically displeasing. Design of the website is outdated and unorganized
- Functionality in preparing students for future quarters is poor as it only sees one quarter ahead.

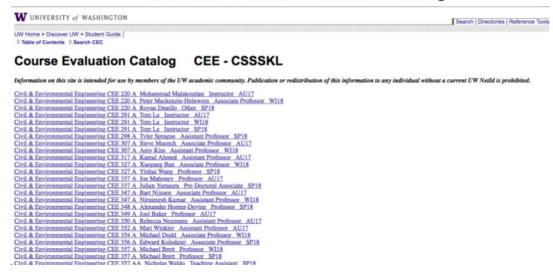
### **UW SLN Registration:**

#### Screenshot1 - Registration Page



### **UW SLN Registration:**

#### Screenshot2 - Course Evaluation Catalog



### **UW MyPlan: Criteria Evaluation**

- Number of different web pages: 5
  - Mandatory
    - MyPlan course descriptions (summary, instructor, prerequisites, etc.), schedules/availability
    - uw.edu Registration with SLN endpoint of process, SLN code input, course eligibility
  - Optional
    - notify.uw.edu separate notification system, Email and SMS options available
    - Course Evaluations Catalog for reviewing courses/professors, part of course picking process
    - RateMyProfessors for reviewing professors, part of course picking process

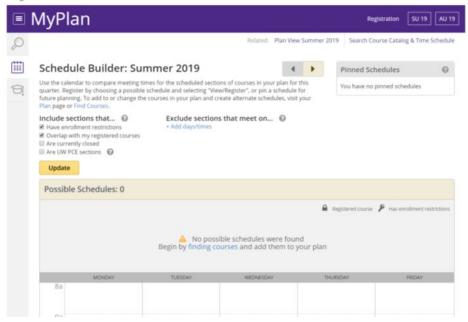
### **UW MyPlan: Criteria Evaluation**

- Notification types (email, in-app, SMS): Email, SMS through notify.uw.edu
- Has schedule visualization: Yes in "Build a Schedule"
- Lists required classes for graduation in major: Yes in "Audit Degree (DARS)"
- Has course search with filters: Yes in "Find a Course"
- Has automatic registration: No
- Planning ahead tools: Yes in "View Academic Year", "Audit Plan"
- Course/professor evaluation results: Yes through Course Evaluation Catalog

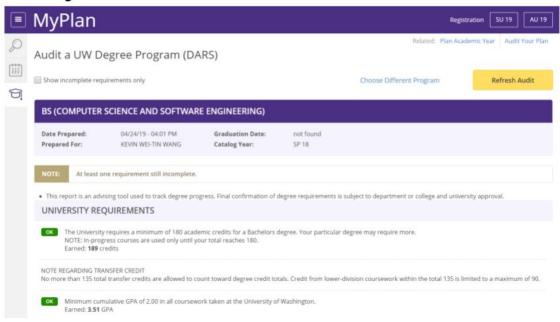
### **UW MyPlan: Strengths/Weaknesses**

- Strengths
  - Compared to UW SLN registration
    - Consolidates many necessary registration tools into one location.
    - Visually/aesthetically modernized
  - Offers bookmarking for courses/programs
  - o Offers schedule planning: backup courses, schedule visualization, planning for next quarters
- Weaknesses
  - Not all necessary tools available through MyPlan alone
    - User still needs UW SLN registration to actually perform registration process
    - Notify.uw.edu connected to MyPlan but still separate tool
    - Course evaluation catalog is separate tool, visually/functionally inconsistent
  - o May not clearly warn user of missing prerequisites
  - Unclear what classes fulfill what requirements (for program and for other courses w/ prerequisites)

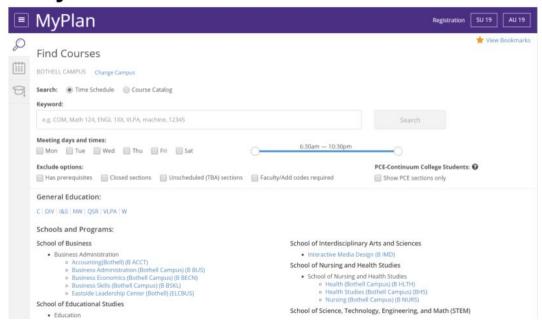
### **UW MyPlan: Screenshots**



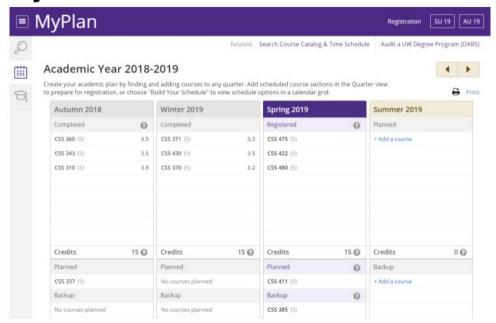
## **UW MyPlan: Screenshots**



## **UW MyPlan: Screenshots**



## **UW MyPlan: Screenshots**



## Requirements Specifications

## **PACT**

#### **People**

- Primary users are students, so all website features are geared toward what students need in order to register for classes.
- Website designed for inexperienced users to navigate and find relevant information (e.g. all registration functions in one place, top menu bar so users can see what they can do on the website, recommended classes, home screen with most important information, tooltips to explain symbols/buttons, etc.)
- More experienced users can (in a way) customize the website by choosing what information is displayed on the home screen, setting course preferences, using advanced filter options, building backup schedules, using auto-register, etc.
- Designed to be color-blind friendly--users should be able to distinguish different elements and text from the background without seeing color differences.

#### **Activities**

- Main purpose of activity is to register for classes.
- Can have high usage during registration period openings.
- Registration can be an activity that is interrupted, so website is designed so
  users can save their registration progress through bookmarked classes and
  schedules.
- Registration is typically carried out alone, so coordination/communication with others was not considered important (except with an advisor).
- Website prompts users for confirmation when registering (to prevent registering for classes the user did not want).

#### Context

- Registration can be done at home, on campus, or on the go through mobile devices, so the registration system was designed as a website for easy accessibility from different electronic devices.
- Registration can happen in crowded and quiet places, so the website does not rely on sound to notify users of any problems.
- Registration can happen during anytime of day or night.
- The auto-registration feature will change the way registration is done, and collaboration with UW officials is necessary.

### **Technology**

- Primary method of interacting with the registration system is through an electronic device (PC, laptop, mobile device, etc.).
- Will need to pull existing course data and student information data from several UWB databases.
- Has many forms, lists, and buttons for users to enter class preferences, create schedules, filter courses, etc.
- Depending on the action being performed, will output degree progress, course information, bookmarked courses, academic schedules, and registration information where appropriate.

## System Requirements

### **Functional Requirements**

#### **General Requirements**

Req-ID	Requirement
FR-GR-01	The system shall provide access to class schedules, descriptions, student plans, and registration from within a main hub page.
FR-GR-02	Users shall be able to set course preferences (used to filter search results and to recommend classes). (See "Course Preferences")
FR-GR-03	The system shall notify users of class closure, changes in class schedules or instructors, registration deadlines, and auto-register activities. (See "Notifications")
FR-GR-04	Users shall be able to set notification preferences (when and where notifications are sent and when to delete notifications). (See "Notification Preferences")
FR-GR-05	The system shall provide recommendations for next classes to take. (See "Recommendations")
FR-GR-06	Users shall be able to automatically register for valid courses once their registration period opens. (See "Auto-Register")
FR-GR-07	The system shall display the user's Degree Audit Report (DAR) upon user request.

FR-GR-08	The system shall display the course evaluation results for specific professors or courses upon user request.
FR-GR-09	The system shall display the RateMyProfessor's rating for specific professors and provide a link to the RateMyProfessor's page for the specified professor(s) upon user request.
FR-GR-10	The system shall provide students with the option to follow premade course treks, which lay out a full series of recommended courses that meet graduation requirements. (See "Course Treks")
FR-GR-11	The system shall provide students with the ability to petition/request a course to be given during a selected quarter.
FR-GR-12	The system shall allow users to browse for classes. (See "Course Browsing")
FR-GR-13	The system shall provide the ability to directly compare at least two classes concurrently.
FR-GR-14	The system shall provide a schedule building/planning tool. (See "Academic Schedule")
FR-GR-15	The system shall allow users to contact an academic advisor (at least through email).
FR-GR-16	The system shall allow users to request an add code for a particular valid class (e.g. no time conflicts, no unfulfilled prerequisites, etc.).

#### **Course Filters**

Req-ID	Requirement
FR-CF-01	The course search shall be able to filter by course times (in 10-minute intervals) and days of the week.
FR-CF-02	The course search shall be able to filter by course instructor.
FR-CF-03	The course search shall be able to filter by course category/subject.
FR-CF-04	The course search shall be able to filter by a course's UW course evaluation rating (course + instructor rating).
FR-CF-05	The course search shall be able to filter by the instructor's RateMyProfessor rating.
FR-CF-06	The course search shall be able to filter by the quarter(s) a course is

	offered.
FR-CF-07	The course search shall be able to filter by a course's credit amount.
FR-CF-08	The course search shall be able to filter by core or elective courses.
FR-CF-09	The course search shall be able to filter by the number of available seats.
FR-CF-10	The course search shall be able to filter by online, in person, or hybrid courses.
FR-CF-11	The course search shall be able to filter courses by the number and type of required prerequisites it has.
FR-CF-12	The course search shall be able to filter courses by the general education requirements it fulfills (e.g. VLPA, I&S, QSR, etc.)
FR-CF-13	The course search shall be able to filter courses by course level (100, 200, etc.).
FR-CF-14	The course search shall be able to filter courses by open/closed sections (i.e. hide all closed courses or not).
FR-CF-15	The course search shall be able to filter courses by whether add codes are required or not.
FR-CF-16	The course search shall be able to filter courses based on whether the student has already taken the course or not.
FR-CF-17	The course search shall be able to filter courses by the number of times students are required to attend the course on campus.
FR-CF-18	The course search shall be able to filter courses by which degree requirement(s) the course fulfills (e.g. electives, core courses, english composition, etc.). This is based on the student's selected degree.
FR-CF-19	The course search shall be able to filter courses by all or selected user course preferences. (See "Course Preferences").
FR-CF-20	The course search shall be able to filter courses by whether or not a course time conflicts with the courses already registered for or added to the student's academic plan for the quarter the student is registering for.
FR-CF-21	The course search shall be able to filter courses by general career interest categories.

#### **Course Preferences**

Req-ID	Requirement
FR-CP-01	Users shall be able to set a preference for available/unavailable times (in 10-minute intervals) and days of the week for taking courses.
FR-CP-02	Users shall be able to set a preference for specific course instructors.
FR-CP-03	Users shall be able to set a preference for specific course categories/subjects.
FR-CP-04	Users shall be able to set a preference for UW course evaluation rating (course + instructor rating) (range).
FR-CP-05	Users shall be able to set a preference for instructor RateMyProfessor rating (range).
FR-CP-06	Users shall be able to set a preference for a specific quarter or range of quarters when courses are offered.
FR-CP-07	Users shall be able to set a preference for a specific course credit amount range.
FR-CP-08	Users shall be able to set a preference for core or elective courses.
FR-CP-09	Users shall be able to set a preference for courses that are online, in person, or hybrid.
FR-CP-10	Users shall be able to set a preference for the number and type of required prerequisites a course has.
FR-CP-11	Users shall be able to set a preference for the type(s) of general education requirements a course fulfills (e.g. VLPA, I&S, QSR, etc.)
FR-CP-12	Users shall be able to set a preference for a specific course level (100, 200, etc.) or range of course levels.
FR-CP-13	Users shall be able to set a preference for whether add codes are required for a course or not.
FR-CP-14	Users shall be able to set a preference to hide courses that have already been taken by the user.
FR-CP-15	Users shall be able to set a preference for the number (range) of times the user is required to attend the course on campus.

FR-CP-16	Users shall be able to set a preference for which degree requirement(s) a course fulfills (e.g. electives, core courses, english composition, etc.). This is based on the student's selected degree.
FR-CP-17	Users shall be able to set a preference to hide courses with times that conflict with courses already registered or added to the user's academic plan for the quarter the user is registering for.
FR-CP-18	Users shall be able to set a preference for courses within a general career interest category.

#### **Notifications**

Req-ID	Requirement
FR-N-01	The system shall notify users of registration period openings and closings 1 week before, 1 day before, 1 hour before, and immediately when these events happen (by defaultif the user has not registered or set auto-register for the quarter in question) or according to notification preferences.
FR-N-02	The system shall notify users of class opening/closure (when a planned class becomes open or full) and class instructor or schedule changes (for planned classes) immediately (by default) or according to notification preferences.
FR-N-03	The system shall notify users when the system auto-register successfully registered for classes, when the system auto-register failed to register for classes (due to schedule conflicts, closed courses, etc.), and when auto-register is set and a planned course(s) becomes invalid (time conflict, closed, etc.) immediately (by default) or according to notification preferences.
FR-N-04	The system shall display the 5 most recent notifications to the system home page and all notifications on the notifications page.
FR-N-05	The system shall send notifications to the user's UW email address (by default) or according to notification preferences.
FR-N-06	Users shall be able to view selected or all notification details.
FR-N-07	Users shall be able to manually delete selected or all notifications.
FR-N-08	Before a user manually deletes selected/all notifications, the system will ask for confirmation before deletion.

FR-N-09	The system will delete notifications from the past registration period once the next registration period opens (by default) or according to notification
	preferences.

#### **Notification Preferences**

Req-ID	Requirement
FR-NF-01	Users shall be able to set a preference for when to receive notifications for registration deadlines: 1-3 weeks before, 1-7 days before, 1-23 hours before, 1-59 minutes before, and/or immediately; or none at all.
FR-NF-02	Users shall be able to set a preference on whether or not to receive notifications for class opening/closure, class instructor or schedule changes, and/or auto-register activities.
FR-NF-03	Users shall be able to set a preference on how notifications will be sent: via UW email address (default), specified email address(es), and/or text messages to a specified number(s).
FR-NF-04	Users shall be able to set a preference for when to delete old notifications: when the next registration period opens (default) or a specified number of days, weeks, and/or months past.

#### Recommendations

Req-ID	Requirement
FR-R-01	The system shall recommend courses (based on the student's degree and/or course trek, progress in meeting degree/trek requirements, course preferences, currently planned classes, and past classes) for the next quarter the student has not registered for.
FR-R-02	If a planned course has a time conflict(s) with another planned/registered course(s), there are missing prerequisites for a planned course, or a planned course becomes full, the system will recommend alternative sections and/or other classes that have not been taken, do not have time conflicts, do not have unfulfilled prerequisites, are still open, meet degree/trek requirements, and match as close as possible to course preferences.
FR-R-03	The system shall also recommend courses that are beneficial to take in combination (concurrently).
FR-R-04	The system shall display the top 5 recommended classes by default.

FR-R-05	The user can choose to view more or less than the top 5 class
	recommendations (from 1 to the entire list).

**Auto-Register** 

Req-ID	Requirement
FR-AR-01	The auto-register function can only be set if all planned courses do not have time conflicts with each other/registered courses or with the student's schedule preferences, do not have unfulfilled prerequisites, and are still open.
FR-AR-02	If auto-register cannot be set, the system will alert the user about why auto-register cannot be set (e.g. time conflict, closed section, etc.).
FR-AR-03	If auto-register is set and all planned courses are valid (still open, no unfulfilled prerequisites, and no time conflicts), the system will automatically register the user for the planned classes once the user's registration period opens.
FR-AR-04	If auto-register is set and a planned course(s) becomes invalid (time conflict, closed, etc.), the system will notify the user. (See "Notifications")
FR-AR-05	If auto-register is set, the current planned course schedule becomes invalid (time conflict, course closed, etc.), and the user has created 1 or more backup plans and indicated that they should be registered as a backup, the system will try to register for the next backup plan (ordered from highest priority to lowest priority). (See "Academic Schedule")

#### **Course Treks**

Req-ID	Requirement
FR-CT-01	Users shall be able to choose a course trek to follow (based on desired degree, any degree minors, and/or general career interest).
FR-CT-02	The course trek shall provide a full list of recommended classes to take to complete.
FR-CT-03	The course trek shall provide an initial ordering of all required classes for the user to follow.
FR-CT-04	The course trek ordering of classes can be modified by the user to fit student preferences, time scheduling, number of credits per quarter, etcso long as the new order is valid (i.e. prerequisite courses should be taken before courses requiring those prerequisites are taken).

FR-CT-05	The course trek ordering of classes shall be automatically modified to reflect courses the student has already taken/is taking.
FR-CT-06	The course trek shall indicate the user's progress by showing which classes have/have not been taken.
FR-CT-07	The system shall display the user's selected course trek upon user request.
FR-CT-08	Users shall be able to change/drop their course trek.
FR-CT-09	The system shall prompt the user for confirmation if the user chooses to change/drop their current course trek.

#### **Course Browsing**

Req-ID	Requirement
FR-CB-01	Users shall be able to view courses for the current quarter (if registration is still open), the next quarter, or up to the next 3 quarters.
FR-CB-02	Users shall be able to search for a particular course(s) by entering the course SLN number, course name, subject/category, general career interest category, or professor name.
FR-CB-03	Users shall be able to filter search results by specific criteria. (See "Course Filters")
FR-CB-04	The system shall display a list of available CSS courses upon user request. (See "Course List")
FR-CB-05	When a course from the course list is selected, the system shall display additional details about the course. (See "Course Details")

#### Course List

Req-ID	Requirement
FR-CL-01	Users shall be able to sort the course list based on closest match to filter criteria, course code (e.g. CSS 310, CSS 430, etc.), or course title (e.g. Cybersecurity, Operation Systems, etc.).
FR-CL-02	By default, courses on the list shall be displayed with the course code (e.g. CSS 422), course title (e.g. Hardware), quarter offered, number of credits, and general education requirements met.

FR-CL-03	The course list shall have an option to also display course section times, locations, and instructors and an option to display a shortened course description upon user request.
FR-CL-04	The course list shall indicate whether a course is a core class or an elective.
FR-CL-05	The course list shall indicate whether a student has taken a course already.
FR-CL-06	The course list shall indicate whether the course has already been registered for and/or added to the user's academic plan for that particular quarter.
FR-CL-07	The course list shall indicate whether all sections for a course are closed.
FR-CL-08	The course list shall indicate whether a course is recommended by the system.
FR-CL-09	The course list shall indicate whether a course is a projected course that does not have a set schedule yet (usually for future quarters).
FR-CL-10	The course list shall indicate whether an add code is required for a course.
FR-CL-11	The course list shall indicate whether all sections for that course have times that conflict with the user's academic schedule (available/unavailable times) and any courses already registered/added to that schedule.

#### **Course Details**

Req-ID	Requirement
FR-CD-01	When a course is selected, the system shall display any prerequisites the class has.
FR-CD-02	When a course is selected, the system shall display a brief description of the course by default.
FR-CD-03	When a course is selected, users shall be able to view a more detailed course description (including potential topics covered and types of assignments and projects involved in the class) and a link to the UWB course descriptions page for that class.

FR-CD-04	When a course is selected, users shall be able to view the course rating based on UW course evaluations, and a link to the UW course evaluations page for that class.
FR-CD-05	When a course is selected, the system shall display all sections for the course.
FR-CD-06	When a course is selected, the system shall allow users to directly register for a particular section within that course, as long as all prerequisites are fulfilled, there is no time conflict with other registered courses for that quarter, the course is still open, the user's registration period is still open, the section does not require an add code, and the course has not already been registered.
FR-CD-07	When a course is selected and the user chooses to directly register for a selected valid section (i.e. no time conflicts, section is still open, etc.), the system shall prompt for confirmation before registering.
FR-CD-08	When a course is selected, if the user tries to directly register for a section that has unfulfilled prerequisites, there is a time conflict with other registered classes, the section is closed, the user's registration period is closed, the section requires an add code, and/or the course has already been registered, the system shall not register that course and instead display an error message on why the registration failed.
FR-CD-09	When a course is selected, users shall be able to unregister for a particular course section if it was already registered for that particular quarter.
FR-CD-10	If a course is selected and the user chooses to unregister for a section that has already been registered for that particular quarter, the system shall prompt the user for confirmation before unregistering.
FR-CD-11	When a course is selected and the user tries to unregister for a course section that is not registered for that particular quarter, the system shall display an error message explaining why unregistration failed.
FR-CD-12	When a course is selected, the system shall allow users to add that section to their academic plan, either as part of the primary schedule or a backup schedule.
FR-CD-13	For each displayed course section of a selected course, the course section designation (e.g. A, B, etc.), class type (in-class, hybrid, online), number of credits, meeting time and location, instructor, section SLN number, and number of seats available shall be displayed.

FR-CD-14	The system shall update the displayed number of available seats per course once the number of seats changes.
FR-CD-15	When a course section is selected, users shall be able to view the instructor RateMyProfessor rating and a link to the RateMyProfessor webpage for that instructor.
FR-CD-16	When a course section is selected, users shall be able to view required textbooks for the class (if any), and a link to the UW page for textbooks for that class.
FR-CD-17	When a course section is selected, the system shall provide a link to the course time schedule for that section, in addition to showing the section's meeting time and location.
FR-CD-18	When a course section is selected, the system shall indicate whether that section has a time conflict with the user's academic schedule (available/unavailable times) and any courses added to that schedule.
FR-CD-19	When a course is selected, the system shall display all quarters for which that course is available/planned to be available.
FR-CD-20	When a course is selected, the system shall display all related subjects/categories that course falls under.
FR-CD-21	When a course is selected, the system shall display all potential degree requirements that the course can fulfill (based on the user's selected degree, if any).
FR-CD-22	When a course is selected, the system shall indicate whether a section within that course has already been registered for and/or added to the user's academic plan for that quarter.

#### **Academic Schedule**

Req-ID	Requirement
FR-AS-01	Users shall be able to add courses to their academic schedule for the current, upcoming, and/or future quarters.
FR-AS-02	When a user attempts to add a course section to their academic plan that has unfulfilled prerequisites, a time conflict with the user's academic schedule and/or courses added to that schedule, the section is closed, the user's registration period is closed, the section requires an add code, and/or the course has already been registered, the system shall warn the user of any/all of the previously mentioned restrictions that apply.

FR-AS-03	When displaying a user's academic schedule, the system shall indicate which courses have unfulfilled prerequisites, a time conflict with already registered courses or other courses in the schedule, the section is closed, an add code is required, and/or the course has already been registered.
FR-AS-04	The schedule builder shall indicate whether a user's registration period is open or closed for a selected academic schedule quarter.
FR-AS-05	Users shall be able to remove courses from their academic schedule from current, upcoming, and/or future quarters.
FR-AS-06	Users shall be able to undo/redo their 20 most recent actions in the course schedule builder.
FR-AS-07	Users shall be able to manually register (in single click) for all courses in a valid schedule (no time conflicts, unfulfilled prerequisites, etc.) for the quarter in which their registration period is open.
FR-AS-08	When a user chooses to register for all courses in a valid schedule (no time conflicts, unfulfilled prerequisites, etc.), the system shall prompt the user for confirmation before registering.
FR-AS-09	If a user attempts to manually register for all courses in an invalid schedule (time conflicts, unfulfilled prerequisites, etc.), the system shall not register and instead display an error message on why registration failed.
FR-AS-10	Users shall be able to manually unregister (drop/withdraw) from registered courses in the academic schedule.
FR-AS-11	If a user chooses to unregister for a registered course in the academic schedule, the system shall prompt for confirmation before unregistering.
FR-AS-12	If a user tries to unregister for an unregistered course, the system shall display an error message explaining why unregistration failed.
FR-AS-13	Users shall be able to create backup schedules for a given quarter.
FR-AS-14	Users shall be able to add courses to a backup schedule.
FR-AS-15	Users shall be able to remove courses from a backup schedule.
FR-AS-16	Users shall be able to indicate whether a backup schedule should be registered as a backup in case auto-register fails to register for the main schedule.

FR-AS-17	Users shall be able to rank backup schedules according to priority (to determine which backup schedule auto-register will try to register for next in case it failed to register for the current schedule).
FR-AS-18	Users shall be able to view selected academic schedules and/or backup plans (including past, present, future, or all schedules/backup plans)
FR-AS-19	Users shall be able to view course details for a selected course in their academic plan. (See "Course Details")
FR-AS-20	Users shall be able to create/edit/delete notes for a selected course.
FR-AS-21	Users shall be able to view a time format of selected academic schedules and/or backup plans by day, weekdays, the entire week, month, quarter, academic year, or a custom day/week/month range specified by the user.

## **Non-Functional Requirements**

### Usability

Req-ID	Requirement
NFR-U-01	On average, 95% of students who start the registration process shall be able to finish registering for their desired classes before their registration period deadline (ignoring external constraints, such as class full or not having the required prerequisites before registering for a class).
NFR-U-02	Users shall be able to register with at most 4 pages and with at minimum 1 system page open during registration.
NFR-U-03	On average, new users shall be able to register for classes with one hour or less total time spent actively choosing and registering for classes on their first attempt.
NFR-U-04	On average, moderate-to-experienced users shall be able to register for classes with 15 minutes or less total time spent actively choosing and registering for classes.
NFR-U-05	On average, users shall be able to correct any single mistake within 3 minutes or less upon realizing the mistake.
NFR-U-06	On average, first time users should only make at most 5 mistakes upon their first attempt at registering.
NFR-U-07	On average, moderate-to-experienced users should only make 2 or less mistakes upon registering.

NFR-U-08	At least 80% of surveyed users should indicate that they are satisfied with the system.
NFR-U-09	At least 80% of surveyed users should indicate that the registration process is easy or relatively easy.

#### Accessibility

Req-ID	Requirement	
NFR-AC-01	Users shall be able to register for classes using a laptop (or PC), tablet, mobile phone, or other device with internet connectivity to the system site.	
NFR-AC-02	The system shall be accessible via at least the top ten web browsers.	
NFR-AC-03	The system shall provide options to increase text font size for users with problems viewing small words.	
NFR-AC-04	The system shall provide a high-contrast option for color-blind users.	
NFR-AC-05	The system shall provide at minimum the following language options:	

### **Availability**

Req-ID	Requirement
NFR-AV-01	The system shall have a 99.5% uptime throughout a year, and 99.9% uptime during peak registration periods.

#### Robustness

Req-ID	Requirement
NFR-R-01	The system shall save the user's academic schedule, selected classes, and currently opened system windows each time the user makes a change, or after every 3 minutes (if changes are made faster than every 3 minutes).

#### Performance

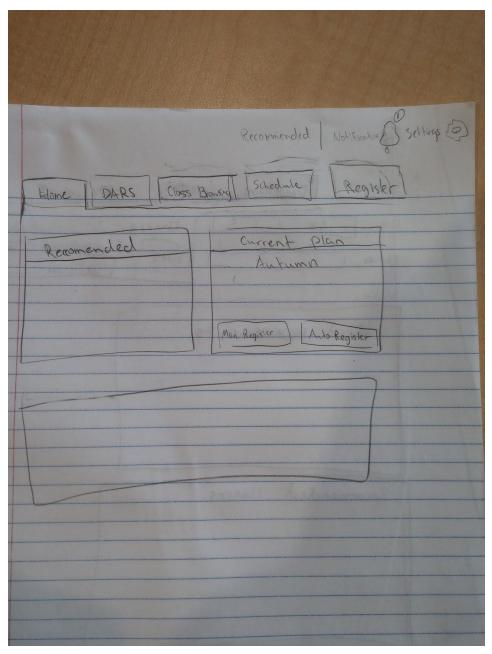
Req-ID
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NFR-P-01	When displaying or filtering search results, the system shall have on average a 1 second or less delay, and an 0.1 second or less delay for all other user activities/interactions (e.g. clicking on a button, scrolling the screen, etc.). This applies during both peak and non-peak registration
	times.

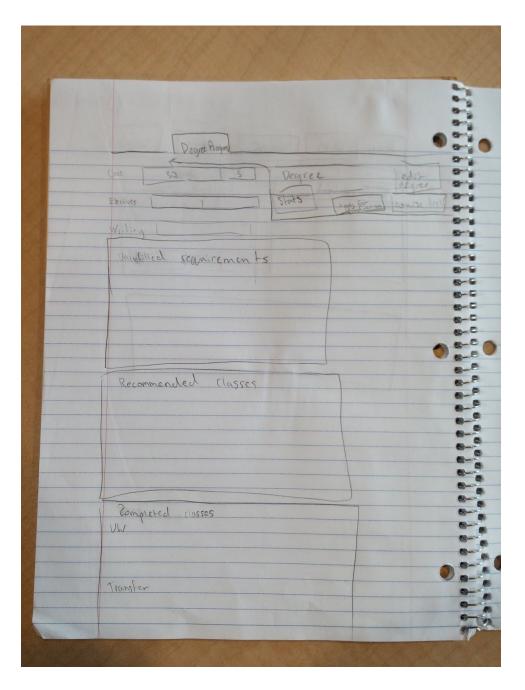
#### Security

Req-ID	Requirement
NFR-S-01	The system shall only allow users with a University of Washington student login to access registration information (e.g. view classes, build a schedule, register for classes, etc.).

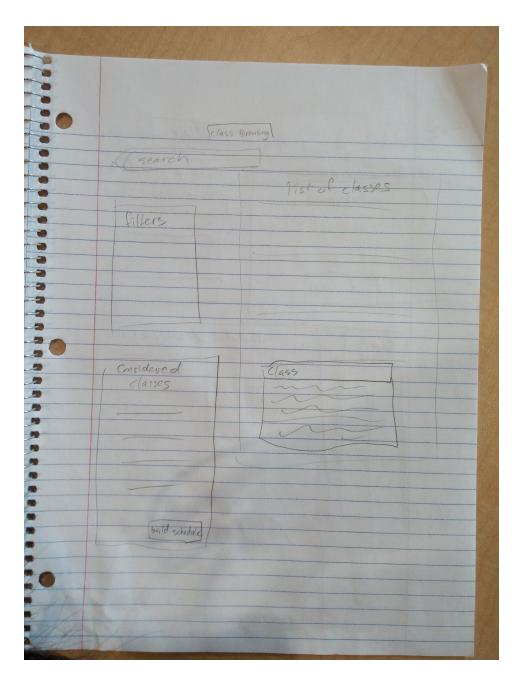
## **Early Design Paper Prototyping**



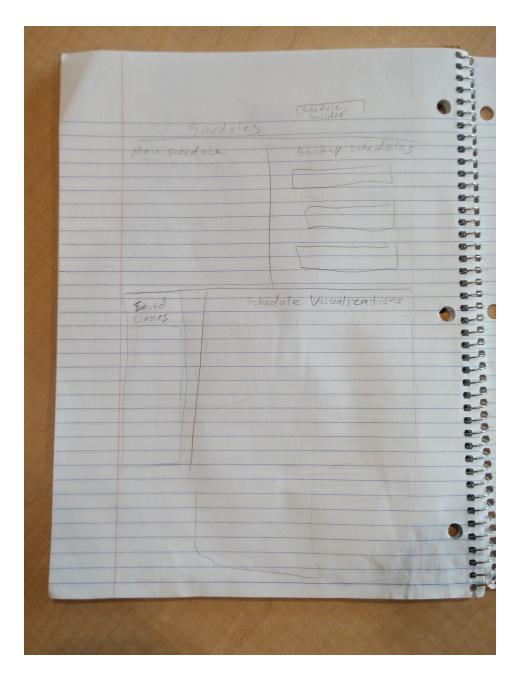
Basic structure of home page with panels that provide a quick overview of relevant registration information.



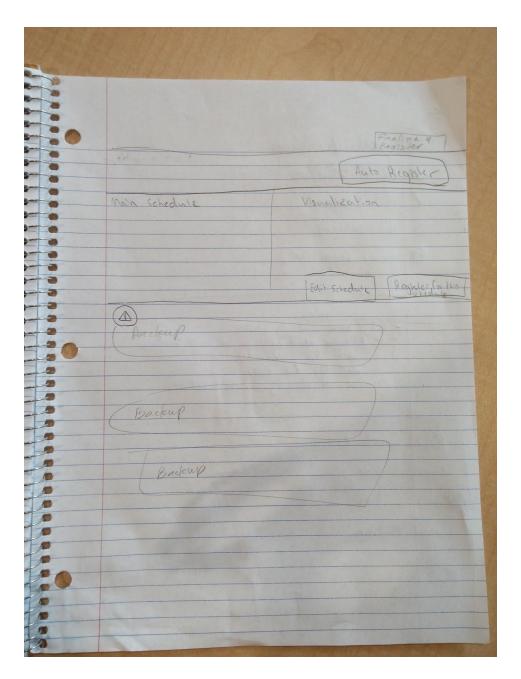
Degree Progress page that shows degree progress stats and progress visualization, incomplete requirements, recommended classes that fulfill incomplete requirements, and completed requirements with corresponding completed courses.



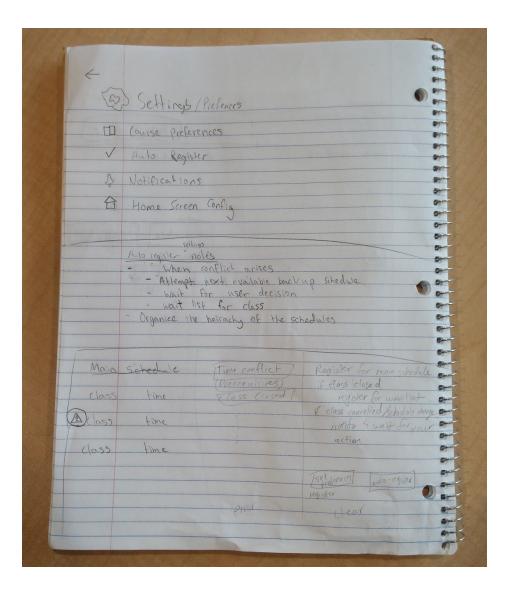
Course Browsing page that shows a list of available courses, filters for course list, and bookmarked courses. It also shows how more course details are displayed when a given course is selected.



Schedule Builder page that displays main schedule and schedule visualization, list of backup schedules, list of bookmarked courses, and a section to directly compare two courses based on summary of course details.



Registration page that shows summary of main schedule and schedule visualization, available backup courses if any, and options to edit selected schedule, manually register, or set auto-register.



This page is split into three sections. The top section outlines the basic structure of the settings window (what should go into the top menu bar). The middle section describes basic options for auto-register. The bottom section outlines information sections in the auto-register window.

## **Final Interface Design**

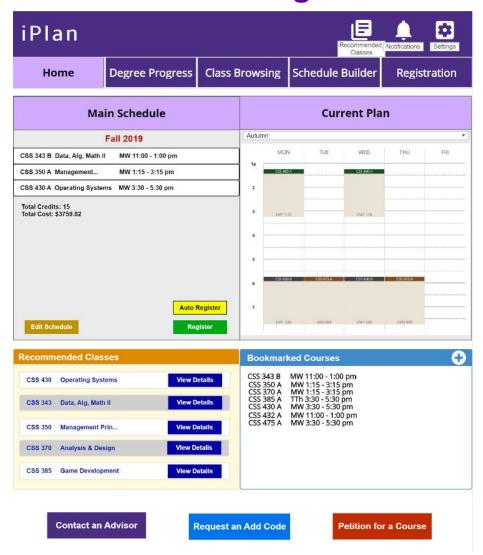
### **Link to Prototype:** (May not work if free trial expired)

https://preview.uxpin.com/222ca56ca075835b46436bbb15e4b20e834d7204#/pages/11 2278521

## **Overall Design Decisions**

- We chose to use a tab-based menu system that was consistently present on the top of each main page as the primary navigation means. This is because most websites follow this convention, so users expect a menu bar to be toward the top of a page.
- We aligned the menu tab titles in the order in which a student typically goes through the
  registration process, first seeing what classes need to be taken based on degree
  requirements, then seeing what classes are available, to building a working schedule,
  and finally registering for chosen classes.
- The home page was created as a way to provide a quick overview of a student's
  registration progress--showing their existing schedule, recommended classes, and
  currently bookmarked courses. This was also intended to be customizable so more
  experienced users can use the home page as a shortcut for registration.
- We chose to use the UW purple theme to provide a sense of identity with UW, since we are designing a system for UW students.
- Auto-registration was included, since our generative research found that many students did not like getting up at 6:00 am to register.
- We chose to have a recommended classes icon at the top right of each main page to provide users with a quick shortcut to a list of recommended classes, since we thought that it would be helpful at each stage of registration (from degree progress to building a schedule).
- We also chose to have a notifications icon at the top right of each main page so that users can immediately see any relevant notifications without having to find a specific page.
- The settings icon on the top right of each main page was to link to a settings page where
  users could set course preferences (on courses they would prefer to take), notification
  preferences, auto-registration settings, and customize the type of information displayed
  on the home screen.

## **Home Page**



The home page was meant to provide a quick summary of a student's registration progress which also serves as quick links to important information.

The Main Schedule panel shows the student's current course schedule (if created), providing a list of selected classes, schedule visualization, and options to edit the schedule, manually register, or set auto-register. This was meant to help students remember where they were at on the registration process (since this process is often interrupted). The "Edit Schedule" button would take users to the Schedule Builder page, where they could make changes to their main and/or backup schedules. The "register" button directly registers these classes for the student (if there are no schedule conflicts) and would provide a pop-up confirmation message to indicate the classes were registered. If there were schedule conflicts (such as a closed class, classes that occur

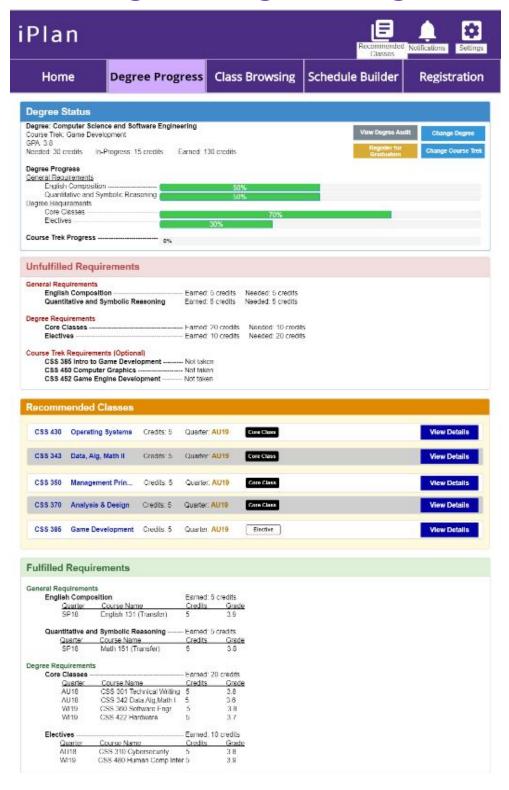
at the same time or overlapping times, missing prerequisites, etc.), a pop-up will appear indicating that registration failed and would provide a list of reasons why it failed. The "auto-register" button takes students to the auto-registration page. If no schedule was created, this panel would indicate that the student did not have a schedule and provide a button with the option to create a schedule (taking students to the schedule builder page).

The "Recommended Classes" panel provides the top five classes for that particular student to take based on unfulfilled degree requirements, completed classes, and course preferences (if set). This was to provide a quick list of suggestions for students coming to the home page to begin the process of registration where they would most likely want to know what classes they should take. If the user has already registered or taken a class, it will not be shown on the recommended classes list. Clicking on the "View Details" button on any of the recommended classes would display a pop-up of the class's details, which would look like the pop-up shown when a user selects a course in the course list (see Course Browsing for more details). From this pop-up, users would be able to bookmark a course section, directly register for that class (assuming no conflicts), and add/remove that class from their main schedule or backup schedule. The "register" button will be grayed out if the student could not register for that class (due to things like missing prerequisites, closed class, requires an add code, conflicts with another registered class, etc.).

The "Bookmarked Courses" panel lists all the courses the student has bookmarked (if any). This was meant to show the list of classes the student has already considered taking or already added to their main or backup schedules (to remind them of where they were at on registration, since this process can be interrupted). Clicking the "plus" sign on the top right corner of the panel takes students to the Course Browsing page where they can add/remove bookmarked courses.

The "contact an advisor" button takes students to a page where they can email an academic advisor. This was provided since many students considered consulting with an advisor to understand what classes they need to take. The "request an add code" button provides a pop-up that allows users to request an add code for a selected class. This was provided for convenience since the current method to request an add code requires students to navigate to a separate page. The "petition for a course" button allows users to request that a particular course be taught by filling out a short form. This feature was created because our generative research found that many students wanted a way to petition for courses.

## **Degree Progress Page**



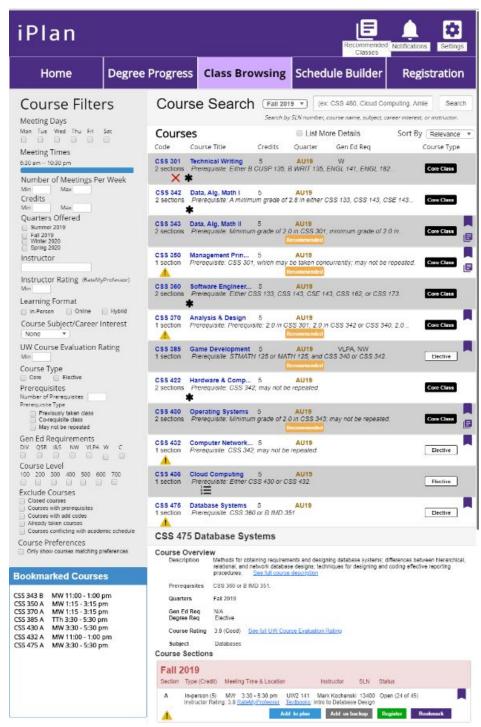
The Degree Progress page shows a quick summary of the student's progress on their selected degree. This was meant to eliminate the need for a separate Degree Audit page if users wanted to know what requirements they needed to fulfill.

The "degree status" panel summarizes degree and course trek details and provides progress bars to visualize each requirement. This helps students better visualize their degree progress, providing a sense of achievement and progress. If no degree was selected, the panel would indicate that no degree was selected and provide students with the option to choose a degree. If no course trek (general subject/career path with recommended classes) was selected, the panel would indicate that no course trek was selected and provide students with the option to choose a course trek. The "degree audit" button lets students view the original degree audit page if students wanted more detailed information. The "change degree" button lets students change their selected degree. The "change course trek" button lets students change their selected course trek. The "register for graduation" button opens a new page where students can register for graduation if all degree requirements have been met (otherwise, this button is grayed out).

The "Recommended Classes" panel provides the top five classes (and brief summary for each) for that particular student to take based on unfulfilled degree requirements, completed classes, and course preferences (if set). This was to provide a convenient list of suggestions that fulfill unfulfilled degree requirements. If the user has already registered or taken a class, it will not be shown on the recommended classes list. Clicking on the "View Details" button on any of the recommended classes would display a pop-up of the class's details, which would look like the pop-up shown when a user selects a course in the course list (see Course Browsing for more details). From this pop-up, users would be able to bookmark a course section, directly register for that class (assuming no conflicts), and add/remove that class from their main schedule or backup schedule. The "register" button will be grayed out if the student could not register for that class (due to things like missing prerequisites, closed class, requires an add code, conflicts with another registered class, etc.).

The "fulfilled requirements" panel lists the degree requirements that have been met and the classes that the user has taken. This is to provide more detail to the progress bars in the "degree status" panel so that users remember what completed classes fulfill specific requirements.

## **Class Browsing Page**



The Class Browsing page lets users browse and filter available classes. This was a "must-have" functionality that was present in each registration system we examined.

The list of courses shows a brief summary of each course. Clicking on a course expands that panel to show more course details. This feature allows users to get more information on a course without crowding the course list screen with too much information or forcing the user to go to a different page (like in MyPlan).

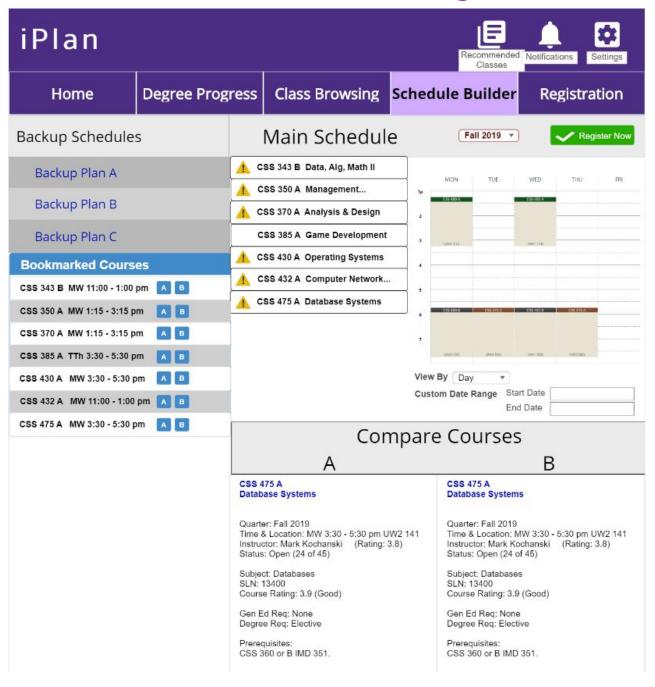
Symbols on each course panel indicate a course's status and hovering over them will show a tooltip explaining the meaning of the icon. This uses icons to allow students to quickly understand a course's status without having to dig for information. The triangle warning sign means that a course/section conflicts with a current bookmarked, added to schedule, or registered course. The red "X" means that a course/section is closed. The black asterisk "\*" indicates that the user has already taken that course. The list symbol indicates unfulfilled prerequisites. The "recommended" label indicates this course is recommended by the system. The "add code" label (not shown in screenshot) indicates that an add code is required. The "core"/"elective" labels indicate whether a course is a core class or an elective. The purple bookmark symbol means the user has bookmarked a course/section. The purple book-like symbol means the user has added that course/section to their academic schedule.

The course details for a selected course provides a more detailed description and links where students can find more information on that course. All sections for the selected course are listed, and students can bookmark/unbookmark the section, add/remove it from their main or backup schedules, or directly register for that section (assuming no conflicts). This provides multiple paths for students to register for a course, since different students have different methods and preferred ways for registering. The "register" button will be grayed out if the student could not register for a section (due to things like missing prerequisites, closed class, requires an add code, conflicts with another registered class, etc.).

The course search bar allows users to search for courses by name, course code, subject/career interest, or instructor. This was one of the features from MyPlan that students really liked, and thus had to be included. Course filters allow students to narrow down search results based on a variety of conditions. This was also a feature from MyPlan that students found helpful, and so was included in our website.

The "Bookmarked Courses" panel shows courses the student has bookmarked. This will show in the Schedule Builder page so students do not have to go back to the Course Browsing page to view courses they bookmarked. By hovering over a course, a red "x" is shown, indicating that a student can delete a course from their bookmarked list by clicking on the "x".

## Schedule Builder Page



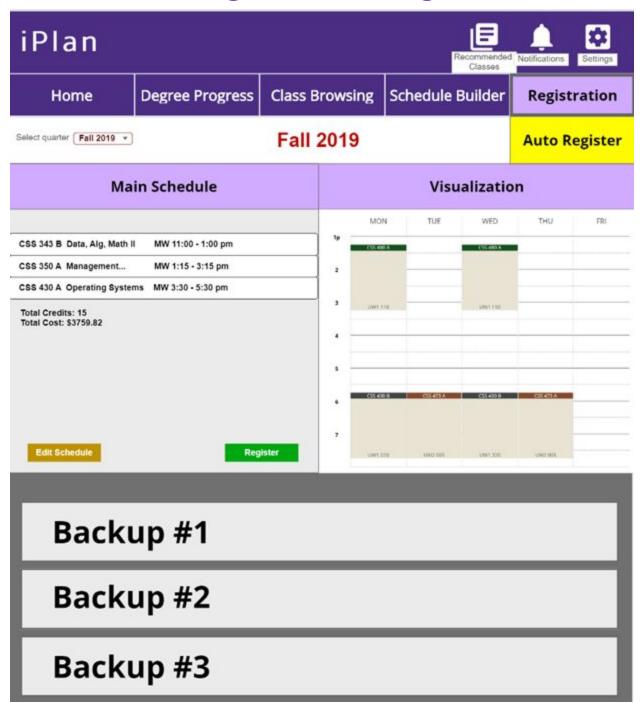
The Schedule Builder page lets users build and check potential class schedules. This was a feature in MyPlan that students also liked, and so was included in the design.

The "Main Schedule" panel shows the list of classes added to the schedule and schedule visualization. Ideally, students would be able to drag and drop classes into and out of the schedule, since students complained that adding and removing classes from the MyPlan schedule builder was hard. If a class in the schedule has a time that conflicts with another class in the schedule or the student cannot register for that class (e.g. class closed, missing prerequisites, add code required, etc.), a yellow warning sign will appear and hovering over it will display a tooltip explaining the reasons for the warning. The "register now" button takes students to the Registration page where they can either register for the schedule manually or set auto-register. The schedule visualization can be changed to display the schedule for a single day, weekdays, entire week, month, quarter, or year, or users could enter a custom date range. Students can view or create schedules for different quarters by changing the quarter from the small dropdown next to the "register now" button. Students can also show/edit backup schedules with the backup schedule panel. Clicking on a backup schedule will display it in the schedule display panel.

The "Bookmarked Courses" panel provides a shortcut for students to drag and drop bookmarked classes into and out of their academic schedules without having to return to the Course Browsing page.

The "Compare Courses" page allows students to directly compare two course sections based on a summary of their details. This was provided so students did not need separate pages to compare two class sections, plus our generative research indicated that students wanted this feature. Ideally, students would be able to drag and drop course sections from the Bookmarked Courses list into the "Compare Courses" panel, instead of clicking on the "A" button to show course details in column A and the "B" button to show course details in column B.

## **Registration Page**



The Registration Page allows users to register for their created academic schedule. Each schedule has a brief summary of selected classes, class times, schedule visualization, total credits, and total cost. This was meant to provide a brief summary of the student's finalized academic schedule all in one location so students do not have to jump between different pages to find out schedule visualization, list of classes, cost, etc. This also lets students who finished creating a schedule but were interrupted before registering to come back and recall their current registration progress and/or instantly register for their selected classes. Clicking the "Edit Schedule" button takes users to the Schedule Builder page where they can edit their selected schedule. Selecting the "register" button registers the classes in the selected schedule (assuming no conflicts). If there are schedule conflicts, reasons for schedule conflicts will show in the schedule panel below the list of courses. If there are no schedule conflicts, once the classes are registered, a confirmation pop-up will appear indicating that the classes were successfully registered. Selecting a backup schedule will expand the panel for that schedule, which will look similar to the expanded main schedule panel.

Students can change the quarter for which they are registering by clicking the "select quarter" dropdown. Students can also set auto-register by clicking the "auto-register" button which takes users to the Auto-Register page.

## **Auto-Register Page**



#### **Auto Register**

Fall 2019	Auto Register Settings
CSS 343 B Data, Alg, Math II MW 11:00 - 1:00 pm  CSS 350 A Management MW 1:15 - 3:15 pm	Automatically register this schedule once registration period opens.
CSS 430 A Operating Systems MW 3:30 - 5:30 pm	If one or more classes in this schedule are closed  Register on waitlist  Register backup plan
Total Credits: 15 Total Cost: \$3759.82	Wait for user action  If one or more classes in this schedule have conflicting times  Register backup plan  Wait for user action
Edit Schedule	<ul> <li>✓ Notify me once classes are registered</li> <li>✓ Notify me if auto-register failed</li> </ul> Auto Register

The Auto-Register page lets students set auto-register for their classes so the system will automatically register their selected courses once the student's registration period opens. This was a requested feature from our generative research.

A brief schedule summary is provided so students remember what they are registering for, and an "Edit Schedule" button is provided so students can go directly to the Schedule Builder page to conveniently change their schedule. The "Auto-Register Settings" panel lets users set their preferences on what auto-register should do in certain situations. If auto-register detects that one or more selected classes are closed at or before the time of registration, users can choose to be added to the waitlist, register for a selected backup course, or have the system wait for the user to make a decision. If course times are changed or cancelled (thus auto-register cannot register for the selected classes), users can choose to either register a backup plan or have the system wait for the user to make a decision. Users can also choose to be notified once auto-register succeeds and/or fails. This lets users customize what auto-register does based on their preferences. Clicking the "auto-register" button sets auto-register for the selected schedule and quarter, and a confirmation pop-up is displayed to inform users. Users can return back to the main site with the menu tabs by clicking the back button on the top left corner of the screen.

## **Usability Evaluation Metrics**

Our design will require further usability testing to figure out what needs to be added/removed/changed and finalize the look and feel of the website.

#### **Proposed Usability Evaluation Methods**

- More Think Alouds will need to be conducted to gauge users' levels of satisfaction with our design. This will be used to gain both quantitative, and more importantly, qualitative data on how users feel when using our website and their likes, dislikes, and suggestions for improvements.
- A/B Testing will need to be conducted once our design is more finalized to determine the best placement and styling of certain aspects (e.g. color, placement of buttons, information displayed on course lists, etc.).

#### **Proposed Usability Evaluation Metrics**

- Effectiveness
  - Number of tasks successfully completed (broken into first attempt and not first attempt).
  - Number of incomplete tasks (broken into attempted and not attempted).
  - Number of users who successfully completed a task.

#### Efficiency

- The amount of time taken per task (divided into time spent on non-productive actions and productive actions).
- The number of errors made per task and the types of errors made.

#### Satisfaction

- The number and types of aspects that were confusing/need improvement (qualitative).
- The number and types of features/delighters that users would like to have (qualitative).
- The number and types of aspects that worked well/were delightful (qualitative).
- o Rating scale for satisfaction using the SUS usability assessment.