Lab 2 - Product Specification Outline

CS 411W Lab II

Product Specification

Kelsey Marantan

Monarch Course Explorer, Team Silver

November 10th, 2023

Table of Contents (M1: Brown)

List of Figures

List of Tables

1 Introduction

Monarch Course Explorer addresses the challenges faced in course selection at Old Dominion University. The purpose and scope is further explained here.

1.1 Purpose

The purpose of this SRS document is to serve as a guide for Monarch Course Explorer. It outlines Monarch Course Explorer's scope, key words, and references. The document delves into product perspective, functional and non-functional requirements, and user characteristics.

1.2 Scope

It is challenging for students to pick courses due to limited information about course structures and expectations. This is particularly disadvantageous for students with inflexible schedules or those balancing a part-time job, considering that a substantial majority of college students (81%) hold part-time jobs (Wan, 2022).

To address these concerns, a proposed solution involves creating a website with comprehensive course information. This lets students provide anonymous feedback and helps advisors, the curriculum review committee, and faculty in improving communication and personalizing the learning experience. Monarch Course Explorer facilitates this by providing students with access to syllabi, allowing anonymous feedback, and offering grade distributions from past semesters. This fosters better communication and personalized learning experiences at Old Dominion University.

1.3 Definitions, Acronyms, and Abbreviations (O: Pieroni, M1: Brown, M2: Jennings)

- **Beautiful Soup:** A Python library for parsing structured data.
- **Django:** A free and open-source, Python-based web framework that follows the model–template–views architectural pattern.
- **HTML:** Hypertext Markup Language, standard markup language for documents designed to be displayed in a web browser.
- **MIDAS:** Monarch Identification and Authorization System, Old Dominion University's log-in and password management system.
- **NLP:** A subfield of computer science and artificial intelligence (AI) that focuses on the interaction between computers and humans in natural language.
- **PostgreSQL:** A free and open-source relational database management system emphasizing extensibility and SQL compliance.
- **RWP:** Real World Product that will be developed and used.
- **spaCy:** An open-source software library for advanced natural language processing, written in the programming languages Python and Cython.
- **SSO:** Single Sign On. A method for providing a single login across multiple related services.

1.4 References (O: Brown)

- Team Silver. (2023, November 10). Lab 1 - Monarch Course Explorer Product Description.
  Retrieved November 01, 2023 from
  https://monarchcourseexplorer.github.io/Monarch-Course-Explorer/header.html

- Anderson, K., & Chinowsky, G. (2020, January 30). Students should have access to course syllabi before classes begin. The GW Hatchet. Retrieved January 23, 2023, from https://www.gwhatchet.com/2020/01/30/students-should-have-access-to-course-syllabi-before-classes-begin/

- Boccaccio, Eric. "Debunking Myths about RateMyProfessors.com and Course Evaluations." *Medium*, 18 April 2018, https://medium.com/@green4172/debunking-myths-about-ratemyprofessors-com-and-course-evaluations-dd91453535aa. Accessed 14 February 2023.

- Cartwright, S. (2016, September 28). *Syllabi to be available online for students to preview before enrolling in classes*. The Lantern. Retrieved January 22, 2023, from https://www.thelantern.com/2016/09/syllabi-to-be-available-online-for-students-to-preview-before-enrolling-in-classes/

- Park, Y., & Sprung, J. M. (2013). Work-School Conflict and Health Outcomes: Beneficial Resources for Working College Students. Journal of occupational health psychology, 18(4), 384-394. https://doi.org/10.1037/a0033614

- Wan, M., Feng, L., Meng, X., Zhai, M., & Konopaske, R. (2022). Working College Students' Time Pressure and Work-School Conflict: Do Boundary Permeability and Dispositional Mindfulness Matter? Psychological reports, 125(6), 3100-3125. https://doi.org/10.1177/00332941211029621

1.5 Overview

This product specification provides the productive perspective, functional description, and prototype functional description of Monarch Course Explorer. The information found in the later section of this document will further explain the various features and requirements for the utilization of Monarch Course Explorer.

2 General Description

The Monarch Course Explorer prototype will be deployed in the form of a website. Although there are a few differences between the real-world product and the prototype, the prototype will still contain many of the main features for individuals to use.

2.1 Product Perspective

Monarch Course Explorer is a website designed for use by faculty and students. It provides access to course syllabi, provides access to grade statistics, makes exchanging course feedback easier, and ensures automatic comparisons and filtering. This website's objective is to become the go-to source for thorough course information, helping both students and faculty.

2.2 Prototype Functional Description

The core functionalities of Monarch Course Explorer revolve around syllabi, feedback, and various tools for course recommendations. For syllabi, specific features are automated to streamline different operations. Syllabi are scraped, allowing for extraction of syllabi and eliminating the need for a manual upload. A feature that analyzes syllabi in different formats is partially implemented in the prototype. Other features related to syllabi are user-initiated. Faculty are able to upload syllabi that were not able to be scrapped. Students can directly access syllabi, and can filter the syllabi by sections and compare it to other syllabi. For feedback, students can provide feedback, view feedback, rate feedback, and filter feedback. Faculty can view and rate the feedback provided. Students can also access grade statistics for individual courses from past semesters. If students are still uncertain about what course to take after viewing all of this information, they are able to take a quiz to get a course recommendation.

2.3 User Characteristics

There are various user roles involved in Monarch Course Explorer. Students can view syllabi, provide and view feedback on courses, view grade distributions from past semesters, and take a quiz to get a course recommendation based on their preferences. Faculty members share similar functionalities, with the additional functionalities to upload syllabi and respond to feedback. The syllabi committee can also use the tool to identify sections that are missing in course syllabi. Monarch Course Explorer is also helpful for advisors, offering them more information about courses and enhancing their ability to support students in making more informed decisions.

2.4 Constraints

N/A

2.5 Assumptions and Dependencies

N/A

3 Specific Requirements

3.1 Functional Requirements (O: Brown)

The Functional Requirements for Monarch Course Explorer are listed in subsections 3.1.1 to 3.1.10

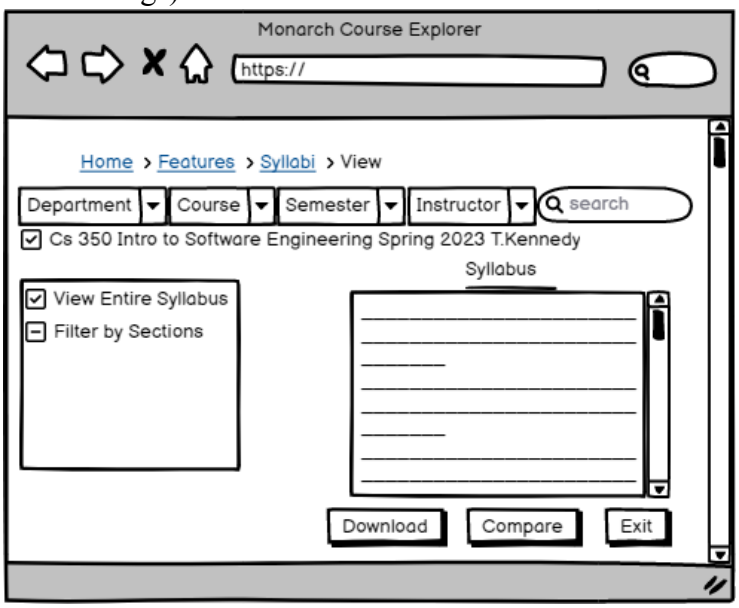
3.1.1 Syllabi (O: Brown, M1: Varnier)

3.1.1.1 View Syllabi. This function shall allow the user to view syllabi after the user has logged in through the MIDAS authentication software.
This will allow the user to view important information from the syllabi. The following functional requirements shall be provided:

1. An User Syllabus View which provides viewing of syllabi which includes the following information illustrated in Figure 4:
    a. Course Name
    b. Course Catalog Description
    c. Course CRN
    d. Course Semester for which the syllabus is for:
        i. Spring
        ii. or Summer
        iii. or Fall
        iv. or Winter
    e. Course Location (in person location or online)
    f. Course Meeting Type (online synchronous or online asynchronous or in person)
    g. Course Meeting Times (if online synchronous or if in person) or N/A for online asynchronous
    h. Course Meeting Type for Quizzes (online synchronous or online asynchronous or in person)
    i. Course Meeting Type for Tests (online synchronous or online asynchronous or in person)
    j. Name of Professor(s)
    k. Professor(s) Contact Information (email and/or office phone)
    l. Professor(s) Office Location (location on campus and/or location off campus) or N/A if no office location
    m. Professor(s) Office Hours (in person hours and/or online hours) or N/A if no office hours
    n. Professor(s) Review Sessions (in person hours and/or online hours) or N/A if no review sessions
    o. Prerequisites
    p. Corequisites

q. Required Materials
    i. physical textbooks and/or other physical materials
    ii. online textbooks and/or other online materials
    iii. online educational accounts
    iv. or N/A if no extra materials are required

(O:Brown, M1: Jennings)



li

Figure 1. User Syllabus View

3.1.1.2 Monarch Course Explorer will provide a side-by-side view of syllabi for the same course, such that the matching sections are displayed next to each other regardless of the order in the actual syllabi. (O: Jennings)

3.1.1.3 Monarch Course Explorer will store each syllabus in a database. (O: Wilson)

3.1.2 User Login (O: Carr, M1: Jennings)

3.1.2.1 User Login and Authentication. Monarch Course Explorer will use ODU's SSO, MIDAS, to authenticate users before they are allowed to make any edits.

3.1.3 Professor Role Functional Requirement (O: Carr, M1: Newton)

3.1.3.1 "Professor" User Role Function. Monarch Course Explorer shall allow the professor user account to upload their syllabi into the system. (O: Carr)

3.1.3.2 Monarch Course Explorer will allow professors to be notified if there are sections missing from a syllabus that the professor upload. (O: Wilson)

3.1.4 Feedback (O: Varnier, M1: Newton)

3.1.4.1 Monarch Course Explorer will provide the capability for the user to post feedback about a course. (O: Varnier)

3.1.4.2 User Feedback Functionality. When the user provides their feedback for the course or professor, integrity checks will be performed to ensure high quality feedback and that it adheres to the code of conduct. The integrity check will not allow inappropriate or disrespectful feedback. (O: Carr)

3.1.4.3 Monarch Course Explorer will allow users to rate feedback that other users have posted. (O: Jennings)

3.1.4.4 Monarch Course Explorer will provide an interface for moderators to review reported feedback and remove anything that goes against the site ToS. (O: Jennings)

3.1.5 Advisor Role Functional Requirement (O: Carr, M1: Varnier)

3.1.5.1 "Advisor" User Role Function. The advisor user account shall only have read and filter authority within Monarch Course Explorer. (O: Carr)

3.1.6 Curriculum Committee Member Functional Requirement

3.1.6.1 Monarch Course Explorer will provide the curriculum committee members the capability to check the uploaded syllabi for missing sections. (O: Wilson, M1: Newton)

3.1.7 Monarch Course Explorer Quiz/Course Recommendation

3.1.7.1 Monarch Course Explorer will allow the user to take a quiz. The quiz will give the user results from the questions they are asked in order to find an option suitable to create a more preferred schedule. (O: Newton, M1: Brown)

3.1.7.2 Monarch Course Explorer will provide the capability for student users to receive a course recommendation for courses that the student choose to compare that covers:

- Which professor to take the course with
- Which course to take that semester based on data from Spring, Fall and Summer Semesters
- Which course is the most flexible with the student's schedule based on delivery type (online or in person) and attendance policies
- Which course is more difficult or demanding based on grade distributions and feedback from students

(O: Wilson, M1: Brown)

3.1.8 Database Management Functional Requirement (O: Carr, M1: Varnier)

3.1.8.1 Monarch Course Explorer will provide a function to site administrators to update the site's database of courses with the current ODU course catalog. (O: Jennings)

3.1.8.2 Monarch Course Explorer will provide a function to site administrators to update the site's database of course sections that have been offered and will be offered from https://courses.odu.edu. (O: Jennings)

3.1.9 Courses View

3.1.9.1 Monarch Course Explorer will provide a page that lists all the schools and colleges at ODU, as well as the departments housed within each. (O: Marantan, M1: Newton)

3.1.10 Grade Distributions

3.1.10.1 Monarch Course Explorer will provide the capability for the user to view detailed grade distributions from past semesters for individual courses. The following functional requirements must be met:

- Provide the capability to allow the user to select a course for which they wish to view grade distributions.
- Provide the capability to allow the user to select a semester for the grade distribution data.
- Provide the capability to allow the user to select a specific professor associated with the selected course.
- Display numerical statistics for the selected course's grade distribution, including mean GPA and the percentage of students corresponding to each grade letter.
- Display graphical representations for the selected course's grade distribution.

(O: Marantan, M: Newton)

3.2 Performance Requirements (O: Brown)

The Performance Requirements for Monarch Course Explorer are listed in subsections 3.2.1 and 3.2.2.

3.2.1 Performance Requirement 1 (O: Marantan, M1: Brown, M2: Jennings)

Prototype uptime

1. 100% uptime availability during demonstrations.
2. 99.9% uptime availability for the real world product. Exceptions include planned maintenance, unplanned maintenance, and unexpected downtime.
3. MCE is hosted on the CS department servers, this assumes that the department servers also maintain greater than 99.9% uptime.

3.2.2 Performance Requirement 2 (O: Marantan, M1: Brown, M1: Pieroni)

Search performance

1. Be able to perform a search via keyword constraints.

2. The search should take no more than 10 seconds to complete. This accounts for conditions beyond the control of Monarch Course Explorer, including, but not limited to low internet connectivity and computing devices made before 2007.

3.2.3 Performance Requirement 3 (O: Newton, M1: Pieroni)

Loading times

1. Be able to load in 10 Second
2. The loading time should take no more than a maximum of 10 seconds to complete. This time is used to account for conditions that are not the responsibility of Monarch Course Explorer. The conditions can include low internet connectivity and computing devices.

3.3 Assumptions and Constraints

Condition	Type	Effect on Requirements
(O:Wilson, M1: Brown) Monarch Course Explorer requires the use of a modern web browser.	Dependency	The Monarch Course Explorer should not be accessed on any computing device older than 2007 in order to maintain optimal operability and compatibility.
(O: Jennings M1: Newton) MIDAS will be available for the development of the prototype.	Dependency	An authentication function must be simulated if access is not granted. The real world prototype will have MIDAS authentication.
(O: Jennings) During the prototype, feedback will be simulated.	Assumption	Moderation functions do not have to be developed for demonstrations.
(O: Jennings) Prototype site will only be available on the ODU network.	Constraint	Separate website redirection services will not have to be provided for demonstrations.
(O: Marantan, M1: Brown) Site will only be accessible through an internet connection.	Assumption	Internet access of the devices is required for the exchange of information between the application and server.

Table 1. Effects of Assumptions, Dependencies, and Constraints on Requirements.

3.4 Non-Functional Requirements (O: Brown)

The Non-Functional Requirements for Monarch Course Explorer are listed in subsections 3.4.1, 3.4.2, and 3.4.3.

3.4.1 Security (O: Marantan, M1: Varnier, M2: Brown)

- Ensure authentication through MIDAS implementation.
    - MIDAS authentication will only be simulated in the prototype.
    - The real world product will use MIDAS authentication, similar to the ODU portal website.

3.4.2 Maintainability (O: Pieroni, M1: Brown)

- Monarch Course Explorer will be maintained through docker containerization of Django web servers, Nginx reverse-proxy, and Postgres databases.
- Monarch Course Explorer web pages will need to be stored locally within the docker container and also hosted remotely through a Github repository as a secondary backup.

3.4.3 Reliability (O: Brown, M: Newton)

The Reliability Sub-Requirements for Non-Functional Requirements for Monarch Course Explorer are listed in subsections 3.4.3.1.

3.4.3.1 Database (O: Marantan, M1: Pieroni, M2: Brown)

- For the prototype and real world product, the database that stores profiles will be accessible 24/7 (except when down for maintenance or emergency situations).
- For the prototype and real world product, the database that stores syllabi will be accessible 24/7 (except when down for maintenance or emergency situations).
- For the prototype and real world product, the database that stores student feedback needs to be accessible 24/7 (except when down for maintenance or emergency situations).

Appendix (O: Brown, M1: Pieroni)

- Hardware:
    - To run Monarch Course Explorer:
        - 1x server node.
        - 1x Uninterruptible Power Supply (UPS).
    - To access Monarch Course Explorer:
        - Stable Internet connection.
        - This can be either Wired Ethernet, Wi-fi Wireless, Cellular Network, WISP, Radio Frequency internet or Satellite Internet similar to Starlink.
        - 1x computing device manufactured in the year 2007 or later.
            - This can be either a desktop pc, laptop, smartphone, tablet, or smartwatch. Smartwatch is not recommended due to compatibility issues.
- Software:
    - To run Monarch Course Explorer:
        - Docker Containers.
        - Github.
        - A Linux Distro capable of running Docker Containers.
    - To access Monarch Course Explorer:
        - An operating system on the computing device capable of running a modern web browser.
        - A modern web browser, either Google Chrome, Mozilla Firefox, Microsoft Edge, Opera, or equivalent web browser.