

CSMC Website Architecture Design

Group project

SE 6387

Submitted to

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1. Introduction

The CSMC (Computer Science Mentor Center) currently handles various activities, such as mentor scheduling, student registration for sessions, communication with instructors about pertinent information, and so on. A supportive software system was developed to help users perform most of these activities – the CSMC Website. However, the development of the website had multiple iterations, each with a different developer team, which lead to different implementation decisions regarding languages, frameworks, etc.

1.1 Purpose

The purpose of this document is to describe a new project proposal, the CSMC Website Renewal, which aims to solve (or at least alleviate) some of the issues. In addition, the project will give CS and SE students (graduate level) the opportunity to benefit from the experience of working in a real project, from planning to deployment, with “real” clients, needs, and requirements.

1.2 Scope

Computer Science Mentor Center helps students with review of classes, the website used for this is developed on PHP for backend and Twig for frontend. In this project the backend would be transformed to Spring Boot Java, to make it a maintainable code and document these for future purpose. This would help the future developers joining CSMC to understand the code easily and make new updates.

1.3 Overview

In this document, we describe the architecture design of CSMC system, that includes 8 sections. Section 1 introduces general idea and goals of the project. The two following sections present the high-level design of CSMC.

1.4 Reference Material

1. Requirement Engineering Course Website: <http://utdallas.edu/~chung/RE/syllabus.htm>
2. For Software Project Plan – <http://www.utdallas.edu/~chung/SP/SoftwareProjectManagementPlanTemplate.htm>
3. Scrum Model image - [https://en.wikipedia.org/wiki/Scrum_\(software_development\)#/media/File:Scrum_process.svg](https://en.wikipedia.org/wiki/Scrum_(software_development)#/media/File:Scrum_process.svg)
4. Software Architecture Document - <https://www.ecs.csun.edu/~rlingard/COMP684/Example2SoftArch.htm>
5. Software Architecture Document IEEE - https://sovannarith.files.wordpress.com/2012/07/sdd_template.pdf

1.5 Definitions and Acronyms

- CSMC: Computer Science Mentor Center
- Role:
 - Admin: the user accounts who have access to all information of the system.
 - Instructor: have access to student information under his/her supervision
 - Mentor: anything related to session, timesheet, and schedule (except absences)
 - Student: information directly related to them (e.g., classes, grades, etc.)

2. Use-case View

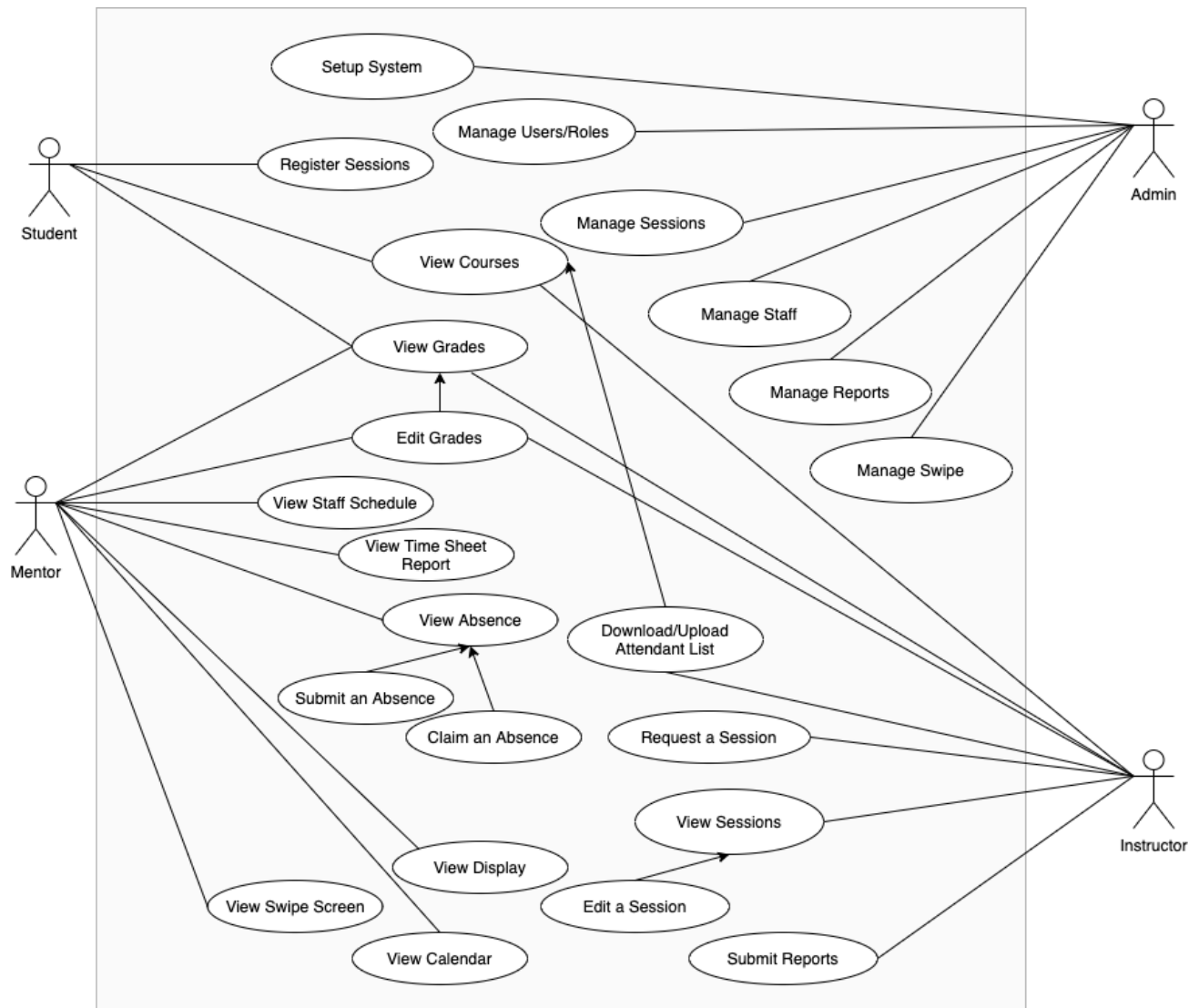


Figure 1. Use cases diagram

3. System Overview

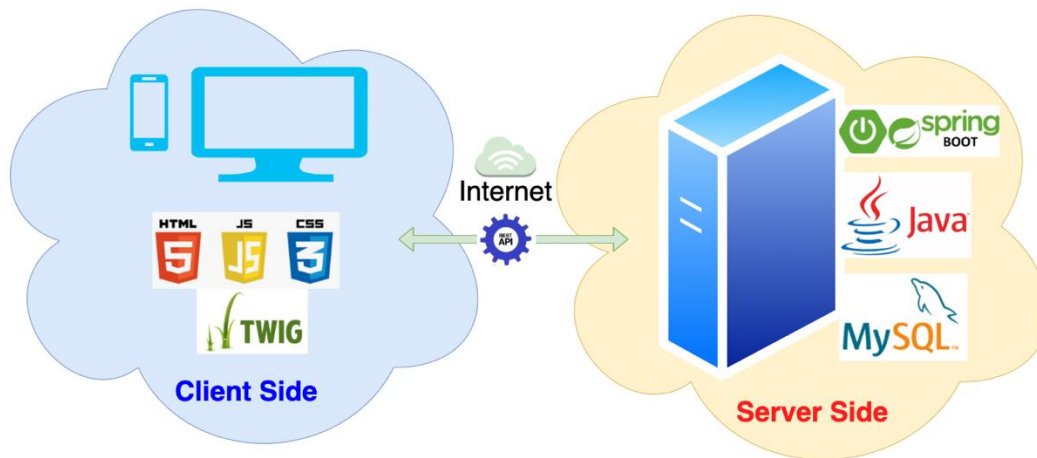


Figure 2. Tech stack diagram

4. System Architecture

4.1 Architectural Design

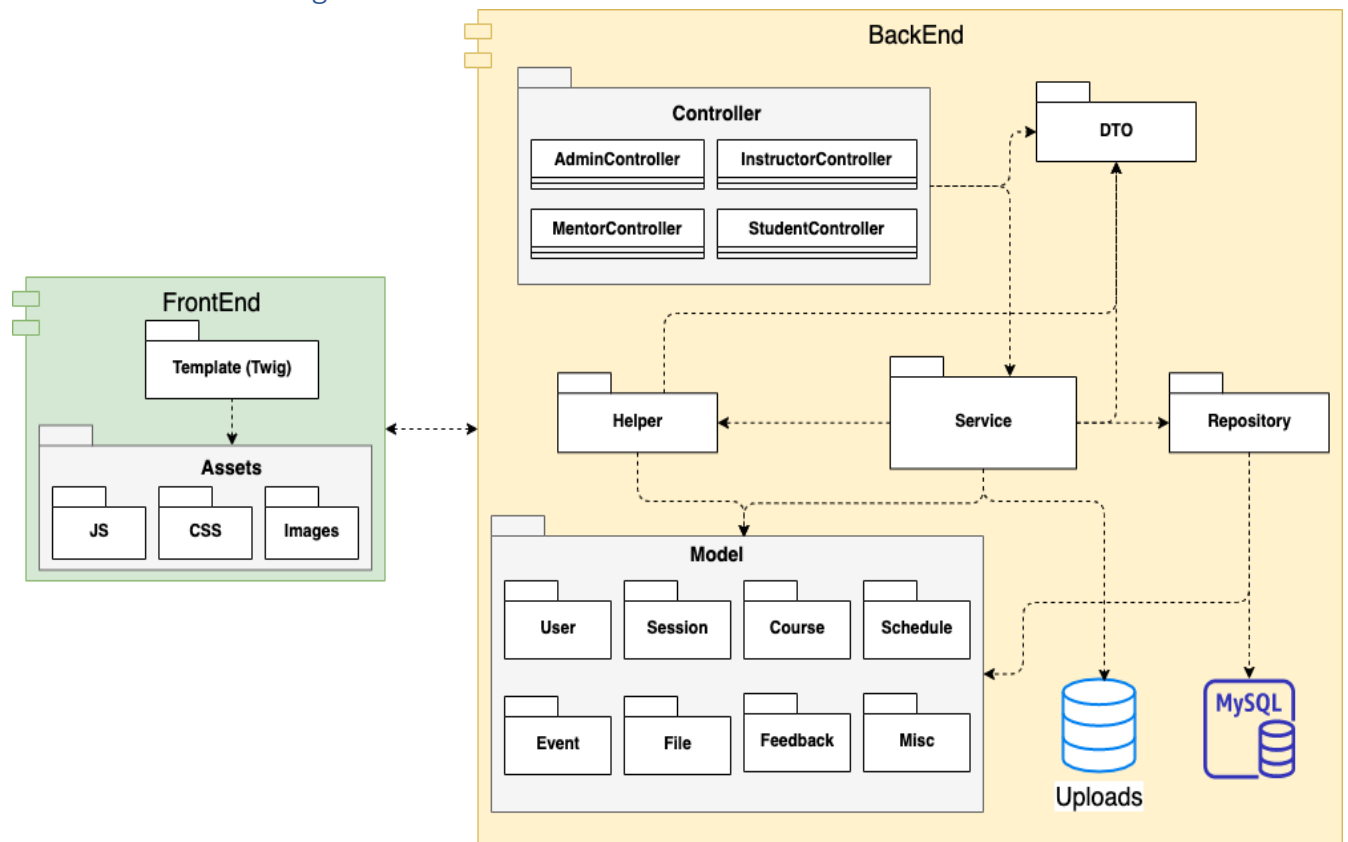


Figure 3. Package Diagram

4.2 Decomposition Description

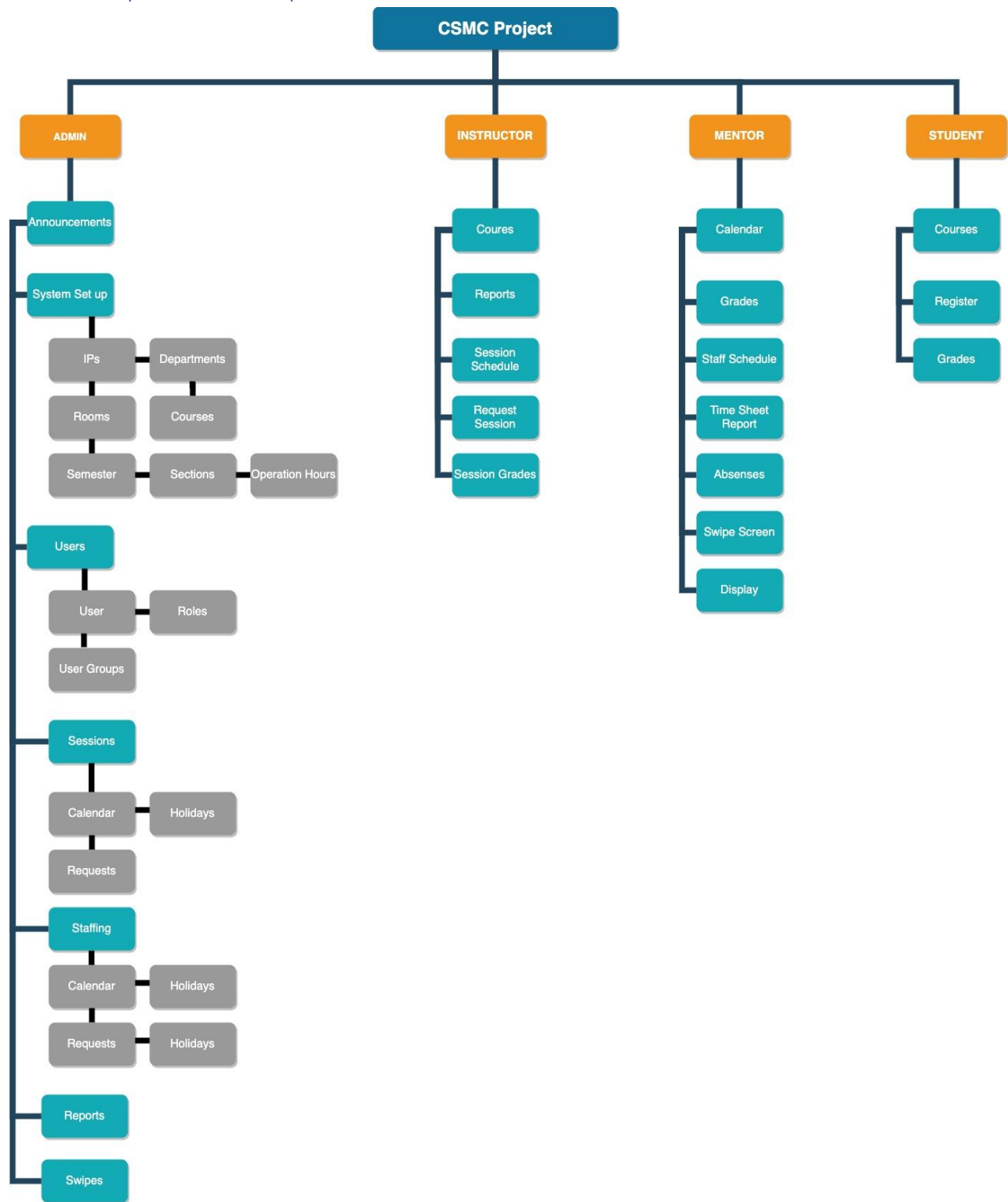


Figure 4. Structural Diagram

4.3. Design Rationale

The architecture design is inherited from the current CSMC system which is deployed in PHP. The new system uses Spring Boot for backend and Twig for Frontend. We use Model-View-Controller (MVC) - an architectural pattern that separates an application into three main logical components: the model, the view, and the controller. Each of these components are built to handle specific development aspects of an application. Spring Boot is used since it provides a flexible way to configure Java Beans, XML configurations, and Database Transactions. It provides a powerful batch processing and manages REST endpoints. It also offers annotation-based spring application and includes Embedded Servlet Container.

5. Data Design

5.1 Data Entities

The system uses the existing SQL database from current CSMC system, which includes 76 tables as listed below:

| | |
|---------------------------------|---------------------------------|
| 1 absence | 37 room |
| 2 absence_status | 38 schedule |
| 3 aggregate_section | 39 scheduled_session |
| 4 announcement | 40 scheduled_session_attendance |
| 5 announcement_groups | 41 scheduled_session_swipes |
| 6 announcement_roles | 42 scheduled_shift |
| 7 announcement_users | 43 section |
| 8 attendance | 44 section_instructors |
| 9 attendance_mentors | 45 section_students |
| 10 course | 46 section_tas |
| 11 department | 47 semester |
| 12 dietary_restriction | 48 semester_season |
| 13 dietary_restriction_category | 49 session |
| 14 event | 50 session_attendance |
| 15 feedback | 51 session_files |
| 16 feedback_type | 52 session_sections |
| 17 file_hash | 53 session_timeslot |
| 18 file_metadata | 54 session_type |
| 19 file_permissions | 55 shift |
| 20 holiday | 56 shift_assignment |
| 21 ip_address | 57 shift_subject |
| 22 issue | 58 shift_subject_mentors |
| 23 major | 59 subject |
| 24 operation_hours | 60 swipe |
| 25 page_visit | 61 timesheet |
| 26 policy | 62 timeslot |
| 27 policy_files | 63 user |
| 28 policy_roles | 64 user_dietary_restrictions |
| 29 quiz | 65 user_group |
| 30 quiz_attendance | 66 user_info |
| 31 quiz_timeslot | 67 user_majors |
| 32 registration | 68 user_profile |
| 33 request | 69 user_roles |
| 34 request_files | 70 user_specialty |
| 35 request_sections | 71 user_user_group |
| 36 role | 72 virtual_file |
| | 73 visit |

| | | | | | |
|--|------------------------------------|--|--|-----------|---------------------------|
| | | | The system shall allow the admin to delete a room. | Completed | |
| | | | The system shall allow the admin to view rooms. | Completed | |
| | Admin_SystemSetup_Semesters | | The system shall allow the admin to add a semester. | Completed | |
| | | | The system shall allow the admin to edit a semester | Completed | |
| | | | The system shall allow the admin to delete a semester | Completed | |
| | | | The system shall allow the admin to view semesters. | Completed | |
| | | | | | |
| | Admin_SystemSetup_Departments | | The system shall allow the admin to add a department. | Completed | |
| | | | The system shall allow the admin to edit a department. | Completed | |
| | | | The system shall allow the admin to delete a department. | Completed | |
| | | | The system shall allow the admin to view departments. | Completed | |
| | Admin_SystemSetup_Courses | | The system shall allow the admin to add a course for a department. | Completed | |
| | | | The system shall allow the admin to edit a course for a department | Completed | |
| | | | The system shall allow the admin to delete a course for a department | Completed | |
| | | | The system shall allow the admin to view a course for a department | Completed | |
| | | | The system shall allow the admin to upload a roster for courses | Completed | |
| | Admin_SystemSetup_Sections | | The system shall allow the admin to add a section for a course | Completed | |
| | | | The system shall allow the admin to edit a section for a course | Completed | |
| | | | The system shall allow the admin to view the roster of a section | Completed | |
| | | | The system shall allow the admin to delete a section for a course | Completed | |
| | Admin_SystemSetup_Operations_Hours | | The system shall allow the admin to edit the operation hours for a day | Completed | |
| | | | The system shall allow the admin to add the holiday | Pending | Low Priority / Less Usage |
| | Admin_SystemSetup_IPs | | The system shall allow the admin to add and edit IP addresses. | Completed | |
| | Admin_Users | | The system shall allow the admin to add the role | Completed | |
| | | | The system shall allow the admin to edit the role | Completed | |
| | | | The system shall allow the admin to add new users | Completed | |
| | | | The system shall allow the admin to edit an existing user | Completed | |
| | | | The system shall allow the admin to view all the users and filtered as per the roles | Completed | |

| | | | | | |
|--|--------------------------|--|--|-----------|--|
| | Admin_Sessions | | The system shall allow the admin to view the sessions in calendar with options like daily, monthly, weekly and also in a list format | Pending | |
| | | | The system shall allow the admin to schedule an unscheduled session | Completed | |
| | | | The system shall allow the admin to create a new session | Completed | |
| | | | The system shall allow the admin to view requests for new sessions | Completed | |
| | | | The system shall allow the admin to approve the new requests for sessions | Completed | |
| | | | The system shall allow the admin to edit the new requests for sessions | Completed | |
| | | | The system shall allow the admin to delete the new requests for sessions | Completed | |
| | | | The system shall allow the admin to view the approved and unscheduled requests for sessions | Completed | |
| | | | The system shall allow the admin to deny the new requests for sessions | Completed | |
| | Admin_Staffs | | The system shall allow the admin to view the schedule for a mentor | Completed | |
| | | | The system shall allow the admin to assign the schedule for a mentor | Completed | |
| | | | The system shall allow the admin to assign the shift leader for a shift | Completed | |
| | | | The system shall allow the admin to view time attended by one mentor for that time frame | Completed | |
| | | | The system shall allow the admin to view the list of absent mentors | Completed | |
| | | | The system shall allow the admin to view the level of confidence for a mentor for each course | Completed | |
| | Admin_Swipe | | The system shall allow the admin to view the card swipes of all users | Completed | |
| | Admin_Home | | The system shall allow the admin to view the swipes for that particular day in a graphical view. | Completed | |
| | Admin Announcement | | The system shall allow the admin to view all announcement | Completed | |
| | | | The system shall allow the admin to add announcement | Completed | |
| | | | The system shall allow the admin to edit announcement | Completed | |
| | | | The system shall allow the admin to delete announcement | Completed | |
| | Admin_Staffing_Timesheet | | The system shall allow admin to view mentor timesheet from a start date to end date | Completed | |
| | Admin_Staffing_Mentor | | The system shall allow the admin to view the mentor's speciality in each subject | Completed | |

| | | | | | |
|--|-----------------------------|-------------|--|-----------|------------------------|
| | Admin_Impersonate | | The system shall allow the admin to impersonate other roles. | Completed | |
| | Student_Register | Student | The system shall allow the student to view the registered courses for the current semester. | Completed | |
| | | | The system shall allow the student to view their registered sessions for all the courses | Completed | |
| | | | The system shall allow the student to register for a session | Completed | |
| | | | The system shall allow the student to unregister for a session. | Completed | |
| | | | The system shall allow the student to register for a quiz. | Completed | |
| | | | The system shall allow the student to unregister for a quiz | Completed | |
| | Student_Grades | | The system shall allow the student to view their grades for the registered sessions | Completed | |
| | Instructor_Course | Instructors | The system shall allow the instructor to view the courses for the current semester. | Completed | |
| | | | The system shall allow the instructor to view the number of students in each section. | Completed | |
| | | | The system shall allow the instructor to view/upload roster for each course | Completed | |
| | | | The system shall allow the instructor to search for the student in that session | Completed | |
| | | | The system shall allow the instructor to download the student list from a particular session. | Completed | |
| | Instructor_Report | | The system shall allow the instructor to view the report for each course and respective session. | Completed | |
| | Instructor_Session_Schedule | | The system shall allow the instructor to view his scheduled sessions | Completed | |
| | Instructor_Request_Session | | The system shall allow the instructor to request for a session by filling details like topic, type, student instruction, start date, end date, session and file. | Completed | |
| | Instructor_Grades | | The system shall allow the instructor to view their upcoming quiz. | Completed | |
| | Mentor_Calendar | Mentor | The system shall allow the mentor to view the scheduled quizzes. | Completed | |
| | | | The system shall allow the mentor to view the scheduled sessions. | Completed | |
| | | | The system shall allow the mentor to start/end/continue session. | Pending | SSO part remaining for |

| | | | | | |
|--|------------------------|--|--|-----------|---|
| | | | | | register flow. Materials download flow is remaining |
| | Mentor_Grades | | The system shall allow the mentor to view the student grades of quizzes held. | Completed | |
| | | | The system shall allow the mentor to edit the student grades for the quizzes held | Completed | |
| | | | The system shall allow the mentor to view the student grades of Sessions held | Completed | |
| | | | The system shall allow the mentor to edit the student grades for the Sessions held | Completed | |
| | | | The system shall allow the mentor to mark a student as attended for a session. | Completed | |
| | Mentor_Staff_Schedule | | The system shall allow the mentor to view the shift leaders and mentors assigned for a session(s) for each day | Completed | |
| | | | The system shall the mentor to view Sessions with the course and the mentors assigned for each day | Completed | |
| | | | The system shall allow the mentor to view the Quizzes and their schedule for each day | Completed | |
| | Mentor_TimesheetReport | | The system shall allow the mentor to view the timesheet report for a week | Completed | |
| | Mentor_Absences | | The system shall allow the mentor to record their absence for a session | Completed | |
| | | | The system shall allow the mentor to update their absence record for a session | Completed | |
| | | | The system shall allow the mentor to cancel their absence record for a session | Completed | |
| | | | The system shall allow the mentor to claim for shifts of other mentors in case of an absence recorded | Completed | |
| | Mentor_Swipe | | The system shall allow the mentor to capture attendance through card swipe | Pending | SSO part remining for register flow |
| | Mentor_Display | | The system shall play a dashboard for the sessions/mentor's activity for the day | Pending | Images are not getting displayed |