

**The University of the West Indies**

**Department of Computing and Information Technology**

**Undergraduate Project Course**

**Project Scope Statement**

**Project**

University Shuttle Routing and Tracking System

**Group Members**

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**Project Scope Statement**

The University of the West Indies’ (UWI) shuttle service can be improved by providing students with accurate and timely information on the whereabouts of shuttles. This information can be provided by a robust application to be used by the University’s students. This system will maintain a store of shuttle routes and estimated arrival and departure times. This is done so that a student who uses the system can receive estimated times of arrival, locate which shuttle they require based on the routes available and then determine whether the shuttle will be unable to satisfy their transportation needs. This project will produce an Android application which utilizes location-based services to allow students of the University of the West Indies to track the real-time location and routes of the shuttles provided by the University’s shuttle service. The product requires that every shuttle driver’s phone has a constant internet connection. This is required for the real time tracking to work effectively. If a constant internet connection cannot be had, then the system will rely on the scheduled time of departure and arrivals. The product requires that students’ phones be connected to the internet to receive updated information of the shuttle’s location. This will also benefit the drivers of the shuttles, as well as the university. Drivers will be able to avoid common complaints which can facilitate a better working environment, while also saving on time and resources. The university will also stand to benefit as they will benefit from receiving less complaints from the students with regards to late and missing shuttles.

**General Project Information**

In light of the of the recent advocating concern for campus security, along with personal experiences of the shuttle service and student complaints, the group felt inclined to mitigate these social issues with a software solution that addresses security and an improved UWI experience. This project is a demonstration of university’s concern, which places its students’ security at paramount importance.

This project should be implemented because it has the potential to increase the efficiency of the service for the students, as well as the shuttle drivers. It also increases a sense of trust in the reliability of the service which will promote an improved and more secure campus.

It is expected that after the project is implemented that students will view the shuttle service as more reliable and thus feel inclined to use the service more. Similarly, since there will be well established times of arrival knowledge in the student body domain, it is expected that drivers will be held more accountable for late arrivals or “no shows.” Additionally, it is expected that the management of the shuttle service will be more responsive to student complaints since more knowledge will be in the hands of the students. If management does not respond satisfactorily, it may lead to a sense of distrust in the system similar to before the system was implemented.

Alternatively, GPS systems can be installed into the shuttles. Similarly, online fleet tracking services can also be utilized; however, these will be expensive for the University as they usually incur a monthly fixed cost per device (and thus per shuttle). The implemented project will cost less than half of those online fleet tracking services according to estimations. Additionally, no University in the Caribbean provides the utility of shuttle tracking. This provides the group with an opportunity to implement a unique system in the Caribbean region.

**Problem/Opportunity Statement**

Shuttle services facility that is provided by the university. It has been utilized at least once by the majority of the university's population. However, on the 18th October 2018, there was a student protest regarding the safety of the students. Dialogue with colleagues and social media complaints, indicated high levels of dissatisfaction with the shuttle services. The protest was regionally recognized and the ease of access for university facilities can encourage students to adequately utilize it without interruption. This created an opportunity for the system this project seeks to implement.

Upon conducting requirements gathering, it was overwhelmingly evident that students complain most about late shuttle arrivals, “no shows” and attitude of drivers. The group did not understand the magnitude of the problem until the analysis of the requirement gathering’s questionnaire was completed. Approximately 85% of respondents complained about the lateness of shuttles. Additionally, only 15.1% of respondents reported having a positive experience with the service, with only one student claiming to have a “very good” experience. Lastly, 54.7% of respondents reported a negative experience when using the service.

If left unaddressed, the situation has the potential to lead other protest by students for a better shuttle service experience.

**Project Objectives**

The goals and objectives of the University Shuttle Routing and Tracking System project are as follows:

1. **Goal:** Specify user requirements
   1. **Objective:** Disperse questionnaires and conduct interviews to obtain information necessary to tailor the project design. This process should begin on January 28th and end Friday 8th February 2018.
   2. **Objective:** Manually analyze the information procured from the questionnaires and interviews conducted. This process should begin a few days after the dispersion of the questionnaire in order to give users ample time to respond. Analysis should begin 10th of February and end 11th of February.
   3. **Objective:** Define functional, non-functional, user and system requirements from the analyzed information.
2. **Goal:** Design a user interface
   1. **Objective:** Develop a series of low fidelity sketches of the system interface. In alignment with the functional features of the application; prototypes with focus on Human Computer Interaction principles, which should be constructed by each member of the team. This will give a wider range of design options to choose from in order to select the most efficient design. This is process should begin Tuesday 12th of February and end Friday 15th of February.
   2. **Objective:** Perform observation on clients’ interaction with the sketches to determine their usability.
3. **Goal:** Understand the existing system
   1. **Objective:** Develop a working relationship with the administrators of the shuttle service. This can be done by emailing the administrative head of the drivers, informing that person of our project and request a meeting. That email should be sent 11th February.
   2. **Objective:** Become familiar with the current routes that the shuttles take. This can be done by communication with the administrative head and interviewing drivers. Interviewing of drivers to gather further requirements for the system will be conducted Wednesday between the hours of 10am -12pm.The group members will rate at the end of the interviews, their level of understanding for the system.
4. **Goal:** Develop the application
   1. **Objective:** Develop the Android based application in accordance with the functional requirements and architecture specified. This process should begin 25th of February and end the 5th of April.
   2. **Objective:** Following the user requirements refactor the code in the development of the application and ensure that all functional and nonfunctional requirements are adhered to. This process should begin 25th of February and end the 5th of April.
   3. **Objective:** Ensure that security and availability requirements are met by the database of the application.
5. **Goal:** Application Testing
   1. **Objective:** Functional Testing and Non-Functional testing.
   2. **Objective:** Deploy the application to the Google Play Store.
   3. **Objective:** Beta user testing to get clients feedback
   4. **Objective:** Make any minor changes to improve user satisfaction.

**Project Description**

The project shall produce an Android application that has several multiuser capabilities. These different users shall have different capabilities, the roles are: student, driver and administrator.

The application, when viewed by students shall afford them two options. First is the option to view a list of all current routes that can be taken by shuttles. This list can be filtered alphabetically or by estimated time of arrivals. Students can then click on any route from the list to get more information about the route such as: the predefined stops, estimated time of arrivals at those stops, scheduling information and a graphical map representation of the route information. From this screen, the application will also indicate whether a bus on that route is running behind schedule and in some cases why. The second option that will be available to students is a list of alerts about bus schedules. This list will be updated whenever there is any broadcast-worthy information about a shuttle trip. This information can include: the cancellation of a trip, a delay of a trip etc.

Shuttle drivers will also be able to use the application. They shall be required to authenticate themselves with the application before proceeding to using any of the features. After authentication, they will be greeted with a screen listing of the routes assigned to them and their start and end times for their shifts. Drivers also have the option to raise a flag whenever they are running behind schedule due to traffic or any unforeseen event. This flag will be translated to an alert for students. Additionally, whenever the application notices that the shuttle is running behind schedule, it will notify the driver then proceed to ask them whether they like to raise a flag or not.

Lastly, administrators will be able to use the application to add and manage routing information. They will also be able to manage all student and driver accounts. The assignment of drivers to shuttles and routes also lies in their role, all of which can be done through the application.

**Business Benefits**

Financial benefits:

These are easy to measure in terms such as cost savings. Cost can be saved through the efficient use of the shuttle services. Should the students become more aware of shuttle timings, it can reduce the amount of return trips for destinations because the students would embark their intended shuttle. With this change, and after analysis, the shuttles can even reduce the number of trips and save gas. Additionally, the implemented system can lead to:

1. Revenue growth
2. Cash inflows
3. Increased profits

Non-financial benefits:

Reduced driver workload can occur as a result of students embarking their intended shuttle, this can reduce the number of trips a driver makes. Additionally, it can reduce the drivers’ time on the road and drivers’ stress which is a probable cause for the negative attitudes from the drivers as stated in an interview with a student.

With the features provided by the application, students would be able to be at the terminal, in time for their shuttle. Moreover, in the case of any late shuttles, the student/customer would be able to make more informed decisions. Responses from a survey in which over 104 persons participated in, this reason ranked the highest for persons who do not take the shuttle and those who do. Thus, there is potential for increased customer satisfaction.

Our application reduces safety risks for our colleagues. The improved features from our application, solves the reasons for persons not using the shuttle including persons who are discouraged from using the services regularly. The shuttle would not only be a convenience but also secures transit form the campus to their intended destination. Thus, there is potential for risk reduction.

The university of the West Indies St. Augustine campus will be the only campus in the Caribbean region which incorporates this high-quality service and it reflects positively on the university. Therefore, perceived branding and quality of service can be improved.

**Project Deliverables**1. Project Scope

2. Project Timeline, Work Breakdown and Use Cases Guidelines

3. Project Implementation Document

3. Software product

4. Final Report

**Estimated Project Duration**The project’s estimated duration spans across 3 months and can be seen [here](https://myuwi-my.sharepoint.com/:f:/g/personal/amanda_seenath_my_uwi_edu/ElOo4wZaKFRNvtmkgFpRw50BfZGJYIqILECAkJY4go5EOQ?e=3gNlHh).