# 1.0 Introduction

## 1.1. Purpose

The purpose of the Software Testing Documentation (STD) is to describe the methodology that is going to be used to test each function (the execution of procedures and code). The STD can facilitate communication by providing a common frame of reference (e.g., a customer and a supplier have the same definition for a test plan). This document can serve as a complete checklist for the associated testing process. It can also provide a baseline for the evaluation of current test documentation practices. In many organizations, the use of these documents significantly increases the manageability of testing. Increased manageability results from the greatly increased visibility of each phase of the testing process.

## 1.2. Scope

As was explained on section 1.1, this document will explained the methods used to test each of the procedures and functions necessary to fulfil the requirements described for Astra-Enroller (AE) in the Software Requirements Specifications (SRS) document. All the procedures and functions are explain in detail in the Software Design Description (SDD) document.

The procedures and/or functions that will be tested are:

* Homepage
* Login
* Enrolled In
* Logout
* Enroll
* View transcript
* View curriculum

The methods that are going to be used to test each of the procedures and/or functions mentioned above are:

* Unit Test
  + Black Box
  + White Box
* Integration Test
  + Bottom-up
  + Top-down
  + Sandwich

**1.3 Definitions and acronyms**

**1.3.1 Definitions**

|  |  |
| --- | --- |
| Term | Definition |
| Database | Collection of all the information monitored by this system. |
| Student | A student of the Polytechnic University of Puerto Rico. |
| User | A student of the Polytechnic University of Puerto Rico. |
| Query | A form of questioning, in this case language a DBMS can understand of which we can ask for certain data and it will |
| Software Design Description | Is a representation or model of the software system to be created. Provide the precise design information needed for planning, analysis and implementation, |
| Term | Trimester or Semester (depends on institution) |
|  |  |

**1.3.2 Acronyms**

|  |  |
| --- | --- |
| Term | Acronym |
| Polytechnic University of Puerto Rico. | PUPR |
| Software Design Description | SDD |
| Software Requirement Specification | SRS |
| Database Management System. | DBMS |
| Astra-Enroller. | AE |
| Entity-Relationship Diagram | ERD |
| Operating System. | OS |
| PHP | Hypertext Preprocessor |
| relational database management system | RDBMS |
| “And so on” or “et cetera” | etc. |
| COE | Computer Engineering Course |
| EE | Electrical Engineering Course |
| MGMT | Management |
| ENGI | Engineering Course |
| Section | sec. |
| Hybrid Section of a course | RH |
| M-T-W-R-F-S | Monday-Tuesday-Wednesday- Thursday-Friday-Saturday |

1**.4 References**

IEE Std 610.12-1990, IEEE Standard Glossary of Software Engineering Terminology.

**2.0 Equipment**

Since the main features of our system are on interfaces on the web page, the testing of each function mention on the scope (section 1.2) of this document are simple selection of options and buttons. The Equipment or materials necessary for implementing the testing of each function listed below:

* Astra-Enroller web page (Internet)
* PUPR Database
* Astra-Enroller server

**3.0 Test Plan**

The test plan is necessary in order to archive a better “life” for the product. This plan will detail which test would be done. All of these tests can be implemented when an update is make or just for regular maintenance.

**System function Test #**

a. Homepage Test 1

b. Login Test 2

c. Enrolled In Test 3

d. Enroll Test

* + - Show available course Test 4
    - Select Course Test 5
    - Select Section Test 6

e. Logout Test 7

f. View Transcript Test 8

g. View Curriculum Test 9

**4.0 Test Design Specification**

This section of the STD specifies what is the requirement and function to be tested, the method to be use (mentioned in section 1.2) and under what conditions the test will be implemented. The conditions can be different ways for implementing a test and/or performance requirements. The requirements and function are in full detail in the SRS and SDD, respectively.

**4.1 Test 1**

**4.1.a Test design specification identifier**

Test if the function gets the Astra-Enroller webpage when the user write the url.

**4.1.b Function to be tested**

Homepage

**4.1.c Method to be use**

Integration: Sandwich

**4.1.d Conditions for the test**

* + Using different web browsers (Mozilla Firefox, Opera).
  + Using different OS (Windows XP, Mac OS X).
  + Using different devices. (PC, Laptop, tables, smartphones)

**4.2 Test 2**

**4.2.a Test design specification identifier**

Test if the function login the user to his account. (Validation of credential)

**4.2.b Function to be tested**

Login

**4.2.c Method to be use**

Integration: Bottom Up

**4.2.d Conditions for the test**

* + User writes his valid credentials (username and password).
  + User writes his valid username but not the valid password.
  + User writes his valid password but not the valid username.
  + User writes not valid credentials (username and password).
  + User writes his valid credentials with Uppercase or lowercase (username and

password)

**4.3 Test 3**

**4.3.a Test design specification identifier**

Test if the function displays the courses the user enroll or selects for the next term.

**4.3.b Function to be tested**

Enroll In

**4.3.c Method to be use**

Unit Testing: Black Box

**4.3.d Conditions for the test**

* + Spike Test: 400 users will select 7 courses and press the Enroll In button and then 8000 user will do the same as the first 400 users 1 minute later.

**4.4 Test 4**

**4.4.a Test design specification identifier**

Test if the function displays the courses the user can take on the next term when the user clicks on the course button.

**4.4.b Function to be tested**

Enroll - Show available courses

**4.4.c Method to be use**

Unit Testing: White Box

**4.4.d Conditions for the test**

* + The user presses the button to register/enroll when it is not the time for registration.
  + The user presses the button to register/enroll when it is time for registration.

**4.5 Test 5**

**4.5.a Test design specification identifier**

Test if the function selects the desire course.

**4.5.b Function to be tested**

Enroll-Select Course

**4.5.c Method to be use**

Unit Testing: Black Box

**4.5.d Conditions for the test**

* + Scalability Test: 50 users will select 7 courses and enroll. The same amount of users will do the same in an interval of time of 3 minutes for 2 hours.

**4.6 Test 6**

**4.6.a Test design specification identifier**

Test if the function selects the desire section.

**4.6.b Function to be tested**

Select Section

**4.6.c Method to be use**

Unit Testing: White box

**4.6.d Conditions for the test**

* + User selects a course using the one radio button and enroll the course using the enroll button.
  + User selects a course using one radio button and then selects another course using another radio button and then enroll click the enroll button.

**4.7 Test 7**

**4.7.a Test design specification identifier**

Test if the function logout the user (student) from his account.

**4.7.b Function to be tested**

Logout

**4.7.c Method to be use**

Unit Testing: Black Box

**4.7.d Conditions for the test**

* + User close the page without logout.
  + Isolation Test:
    - Use a server with a processor speed less than 3.6 GHz.
    - Use a server with a Memory (RAM) less than 3 GB.

**4.8 Test 8**

**4.8.a Test design specification identifier**

Test if the function displays the user’s transcript when the user clicks the view transcript button.

**4.8.b Function to be tested**

View Transcript

**4.8.c Method to be use**

Integration-Top-Down

**4.8.d Conditions for the test**

* + Implement Test 2 before this one.
  + Implement Test 1 before this one

**4.9 Test 9**

**4.9.a Test design specification identifier**

Test if the function displays the user’s curriculum when the user clicks view curriculum button and loads the user’s transcript.

**4.9.b Function to be tested**

View Curriculum

**4.9.c Method to be use**

Unit Testing: Black Box

**4.9.d Conditions for the test**

* + 5000 users will click on the View Curriculum button.

**5.0 Test Description**

This section describes in full detail what is the data to be used for each testing, the expected results and a step-by-step procedure for implementing the test. For the expected results its is taken in consideration the conditions (sections 4.d.#) defined on each test specification in section 4 and the data use for each testing.

**5.1 Test 1**

**5.1.a Test Data**

The data for this test is the URL of the Web page, web browser (Mozilla Firefox, Opera), OS (Windows XP and Mac OS X) and devices (desktop, laptop, tables, smartphones).

**5.1.b Expected Results**

The expected results, taking in consideration all the conditions mention on 4.1.d and 5.1.a, are that the web page for the enrollment process will load using any combination of web browser, OS and device.

**5.1.c Test Procedure**

1. Test 2 is made here for making a test 1 an Integration Test.

2. Test 8 is made here for making a test 1 an Integration Test.

3. With a Desktop using Windows XP and mozilla firefox we’ll connect to the internet

4. Enter the URL for web page.

5. Repeat steps 1 and 2 but using Opera.

6. Repeat steps 1 and 2 but using Mac OS X and mozilla firefox.

7. Repeat steps 1 and 2 but using Mac OS X and Opera.

8. Repeat steps 1 and 2 but using a laptop with Windows XP and mozilla firefox.

9. Repeat steps 1 and 2 but using a laptop with Windows XP and Opera.

10. Repeat steps 1 and 2 but using a laptop with Mac OS X and mozilla firefox.

11. Repeat steps 1 and 2 but using a laptop with Mac OS X and Opera.

12. Repeat steps 6 - 9 but using a tablet.

13. Repeat steps 6 - 9 but using a smartphone.

**Test 2**

**5.2.a. Test Data**

The data for this test is the username and password.

**5.2.b. Expected Results**

The expected results, taking in consideration all the conditions mention on 4.2.d and 5.2.a, are that the user will access his account.

**5.2.c Test Procedure**

1. Test 8 is made here for making a test 2 an Integration Test.

2. Test 1 is made here for making a test 2 an Integration Test

3. On the login page enter valid credentials (username and password)

4. Enter a valid username but not a valid password.

5. Enter a valid password but not a valid username.

6. Enter a not valid credentials (username and password).

7. Enter valid credentials with Uppercase or lowercase (username and password).

**Test 3**

**5.3.a. Test Data**

The data for this test are the courses already selected by the user (student). The course are:

* + COE 3300 sec. 20 4:30-6:30 PM T-R
  + COE 3301 sec. 35 1:00-5:00 PM S
  + EE 3520 sec. 07 2:00-4:00 PM M-W
  + EE 4000 sec. 07 2:00-4:00 PM M-W
  + MGMT 4670 sec. RH 6:30-8:30 PM R

**5.3.b. Expected Results**

The expected results, taking in consideration all the conditions mention on 3.3.d and 4.3.a, are that the list of courses that the user enroll/select for the next term will be displayed.

**5.3.c Test Procedure**

1. Click the Enroll In button.

**Test 4**

**5.4.a. Test Data**

The data for this test is the undergraduate course offering for spring 2011.

**5.4.b. Expected Results**

The expected results, taking in consideration all the conditions mention on 3.4.d and 4.4.a, are that the list of courses that the user can for the next term will be displayed if it is time for registration.

**5.4.c Test Procedure**

1. Click the Enroll button when it is not time for registration.

2. Click the Enroll button when it is time for registration.

**Test 5**

**5.5.a. Test Data**

The data for this test are 7 courses from the schedule:

* + COE 3300
    - sec. 09 4:30-6:30 PM M-W
    - sec. 20 4:30-6:30 PM T-R
  + COE 3301
    - sec. 22 6:30-8:30 PM T-R
    - sec. 31 8:00-12:00 PM S
    - sec. 35 1:00-5:00 PM S
  + EE 3520
    - sec. 07 2:00-4:00 PM M-W
    - sec. 20 4:30-6:30 PM T-R
  + EE 4000
    - sec. 07 2:00-4:00 PM M-W
    - sec. 80 Online
  + COE 4300
    - sec. 20 4:30-6:30 PM T-R
  + ENGI 4210
    - sec. 07 2:00-4:00 PM M-W
    - sec. 20 4:30-6:30 PM T-R
  + MGMT 4670
    - sec. 21 6:30-8:30 PM M-W
    - sec. RH 6:30-8:30 PM R

**5.5.b. Expected Results**

The expected results, taking in consideration all the conditions and data mention on 4.5.d and 5.5.a respectively, are that the user will select the courses and a drop-down window will appear with a list of section for that course.

**5.5.c Test Procedure**

1. Click on course EE 4000.

2. Click on course EE 3520.

3. Click on course COE 3300.

4. Click on course COE 3301.

5. Click on course COE 4300.

6. Click on course ENGI 4210.

7. Click on course MGMT 4670.

**Test 6**

**5.6.a. Test Data**

The data for this test are 7 courses from the schedule:

* + COE 3300
    - sec. 09 4:30-6:30 PM M-W
    - sec. 20 4:30-6:30 PM T-R
  + COE 3301
    - sec. 22 6:30-8:30 PM T-R
    - sec. 31 8:00-12:00 PM S
    - sec. 35 1:00-5:00 PM S
  + EE 3520
    - sec. 07 2:00-4:00 PM M-W
    - sec. 20 4:30-6:30 PM T-R
  + EE 4000
    - sec. 07 2:00-4:00 PM M-W
    - sec. 80 Online
  + COE 4300
    - sec. 20 4:30-6:30 PM T-R
  + ENGI 4210
    - sec. 07 2:00-4:00 PM M-W
    - sec. 20 4:30-6:30 PM T-R
  + MGMT 4670
    - sec. 21 6:30-8:30 PM M-W
    - sec. RH 6:30-8:30 PM R

**5.6.b. Expected Results**

The expected results, taking in consideration all the conditions and data mention on 3.6.d and 4.6.a respectively, are that the user will select the sections without any conflict of date and hour.

**5.6.c Test Procedure**

1. Click on section 07 of course EE 4000.

2. Click on section 07 of course EE 3520.

3. Click on section 20 of course EE 3520.

4. Click on section 09 of course COE 3300.

5. Click on section 35 of course COE 3301.

6. Click on section 20 of course COE 4300.

7. Click on section 21 of course MGMT 4670.

8. Click on section RH of course MGMT 4670.

**Test 7**

**5.7.a. Test Data**

The data for this test are the username and password

**5.7.b. Expected Results**

The expected results, taking in consideration all the conditions and data mention on 4.7.d and 5.7.a respectively, are that the user will be logout of his account.

**5.7.c Test Procedure**

1. Click on logout option on the web page.

**Test 8**

**5.8.a. Test Data**

The data for this test is the transcript.

**5.8.b. Expected Results**

The expected results, taking in consideration all the conditions and data mention on 4.8.d and 5.8.a respectively, are that the user will be see his transcript.

**5.8.c Test Procedure**

1. Test 2 is made here for making a test 8 an Integration Test.

2. Test 1 is made here for making a test 8 an Integration Test

3. Click on the transcript option on the web page.

**Test 9**

**5.9.a. Test Data**

The data for this test is the curriculum.

**5.9.b. Expected Results**

The expected results, taking in consideration all the conditions and data mention on 4.9.d and 5.9.a respectively, are that the user will be see his curriculum.

**5.9.c. Test Procedure**

1. Click on the curriculum option on the web page.

**6.0 Performance Test**

This section will describe the tests that are going to be made for the complete system. This test will be done after each of the tests describe on sections 4 and 5. Some conditions describe on section 4 are the same as some of the following tests, this is because some tests are too simple that there was only one way to implemented the test and it was necessary to have at least one condition.

**6.1 Stress**

* 1. For testing the availability the web page will be visit at 5 am, 12pm, 8pm and 12am.
  2. For testing the maximum capacity of the web page10000 users will log into it then 5 more users will login.

**6.2 Load**

* 1. 500 users will click on the View Transcript button.

**6.3 Endurance**

* + 9000 users will login and stay login for 24 hours.

**6.4 Spike**

* 1. 400 users will select 7 courses and press the Enroll In button and then 8000 user will do the same as the first 400 users 1 minute later.

**6.5 Scalability**

* 1. 50 users will select 7 courses and enroll. The same amount of users will do the same in an interval of time of 3 minutes for 2 hours.

**6.6 Isolation**

* 1. Use a processor speed less than 233 MHz.
  2. Use a Memory (RAM) less than 68 MB.
  3. Use a server with a processor speed less than 3.6 GHz.
  4. Use a server with a Memory (RAM) less than 3 GB.
  5. Have 10005 users login to the web page.